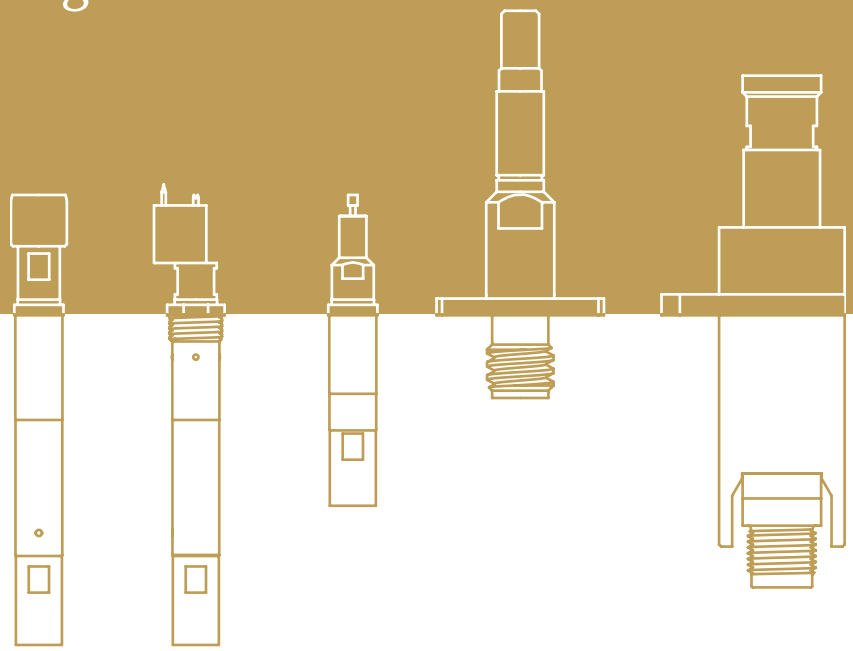
ingun®

Test Probes · Test Fixtures

IN TESTING SOLUTIONS No.1 IN DER PRÜFTECHNIK

RF-Probes

Plug Connector, Miniature Switch and PCB Contacting



Catalogue 5.3

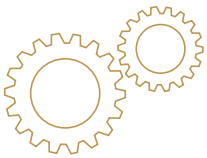
Competent in your field

Telecommunications

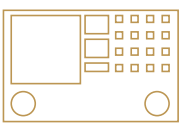
Information Electronics

Consumer Electronics

Automotive



Engineering



Tests and Measurements

Aviation and Space Technology

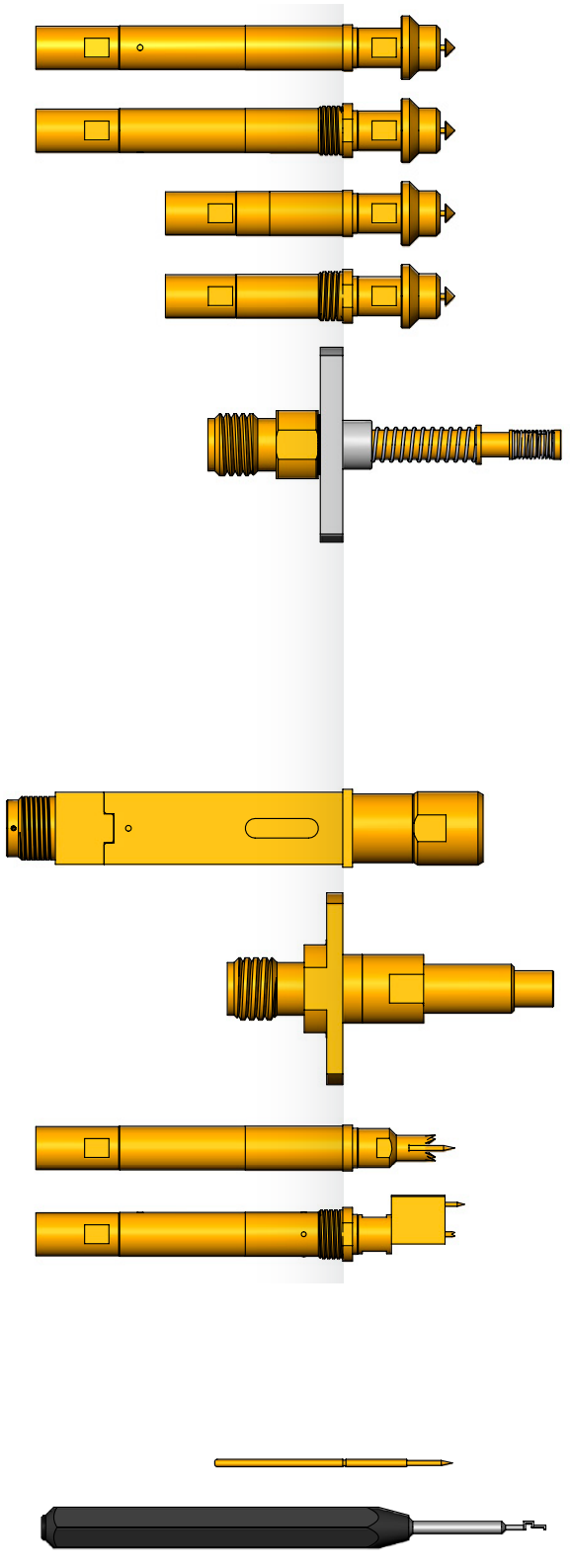
INGUN spring-loaded test probes are used by our customers in various industries, and enable a precise, accurately repeatable test of electronic assemblies to guarantee product quality and customer satisfaction.

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.

You will find more information about INGUN, spring-loaded test probes, and their applications on pages 4 to 19.

INGUN RF Test Probes

Quality – Made in Germany



Plug connector contacting	Analogue	MMBX / MMCX / MMPX / MBX / MCX
		SMB / SMC
		SMP / SMP-L / SSMP / SMP-MAX / P-SMP / SMPX
		SMA / PC3.5 / QMA
		BMA / BNC / 1.0/2.3
		N / FME / 7/16
		U.FL / W.FL / W.FL2 / X.FL/ MM5829
		Reverse SMA / TNC
		IEC / F (75 Ω)
		FAKRA / GT13 / GT16
	Digital	HSD / USB Mini / MX-series / USB-series / RJ-series / 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

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 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
- Now represented worldwide in 28 countries
- 145 employees

2007

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

2018

- Over 45 years of INGUN
- Represented worldwide on every continent
- 11 subsidiaries
- 350 employees

Worldwide in Contact

Your reliable partner worldwide
INGUN co-operates with agencies worldwide and is represented all over the world with 11 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

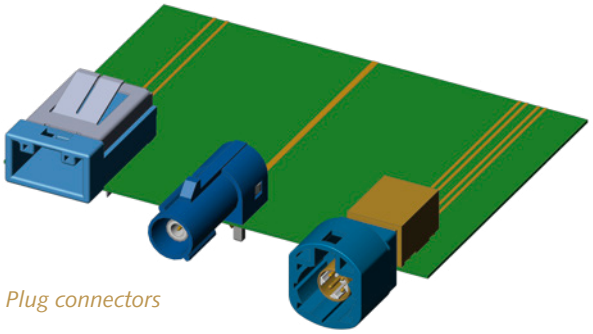
Only those who understand their customers can offer the best products and services. The INGUN group can be reached via one of their many subsidiaries and agencies worldwide – one of which is guaranteed to be near you.

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

Solutions for your application

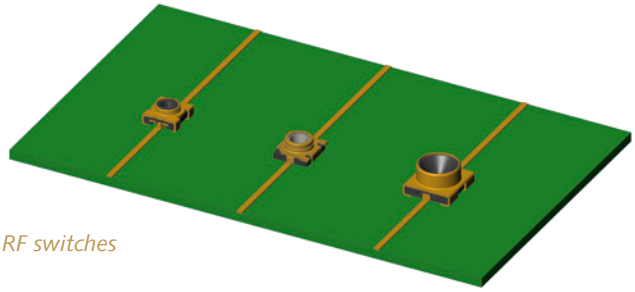
INGUN offers a suitable test solution for each industry and application. This includes plug connectors, RF switches or layouts on the PCB.

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.



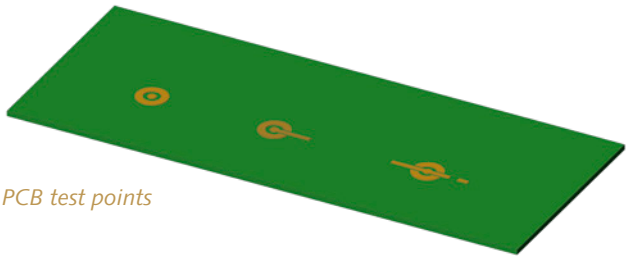
Plug connectors

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



RF switches

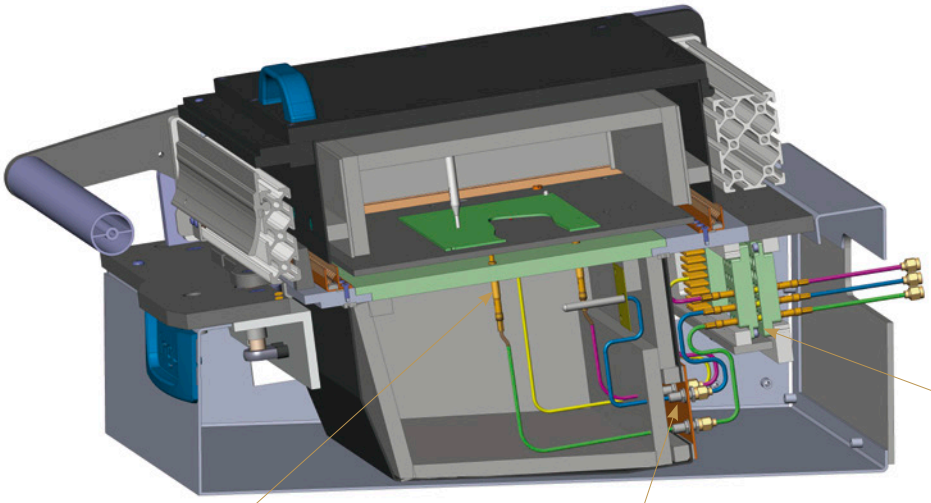
PCB test points are structured so that they can be contacted by RF signals directly on the PCB. Depending on the nature of the PCB and application, these are carried out differently.



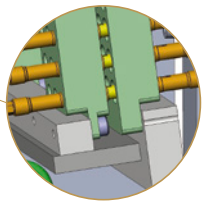
PCB test points

Solutions for your application

From test point to measurement system: INGUN has the compatible, optimally aligned 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.

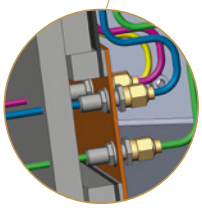


connection to the measurement device



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, PCB layouts, please see the overview on page 8/9

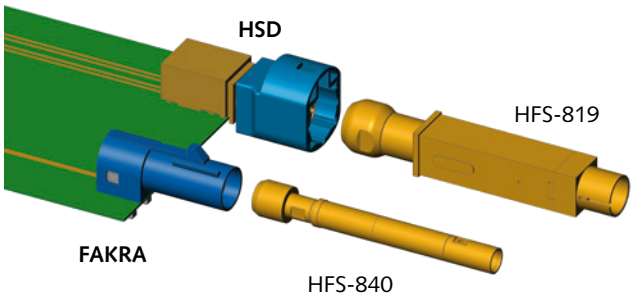


For further information about RF cables and plug connectors, please see page 196

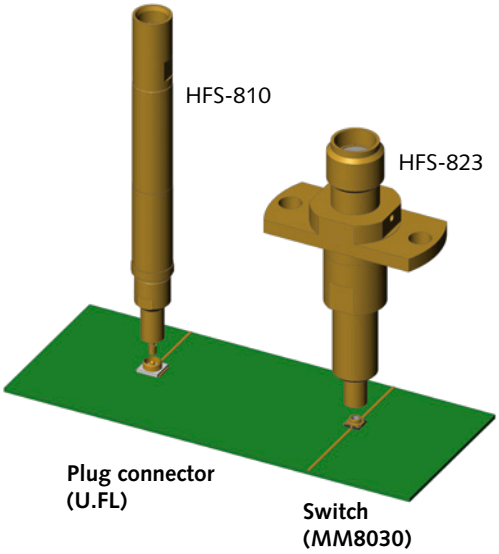
Request our new test fixture catalogue or go to our homepage www.ingun.com

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

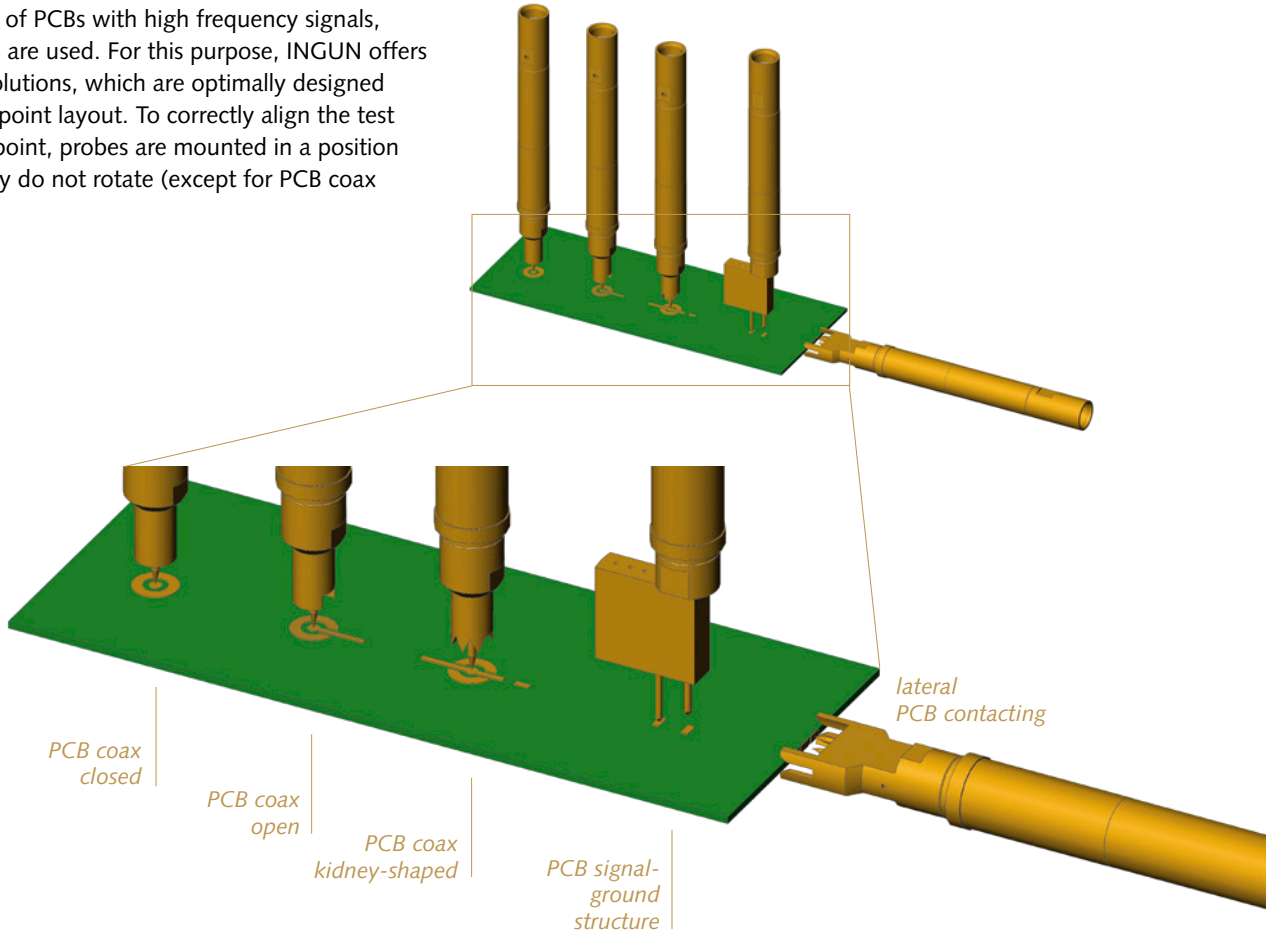


Example of plug connectors from communication and consumer electronics

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

PCB contacting

To test the quality of PCBs with high 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).



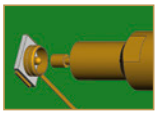
RF test probes from INGUN are available for the following PCB test points:

	PCB: PCB Layout with different levels
	PCB coax closed: PCB Layout with closed Ground/Ring and Signal Guiding to inner side (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 through 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 tailored RF test probe.

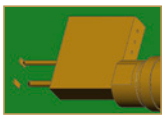
Version and application advice

For optimum fulfilment of the 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.



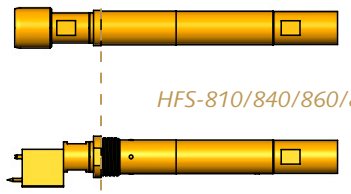
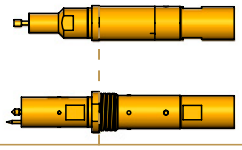
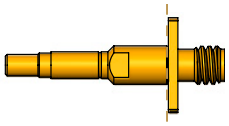
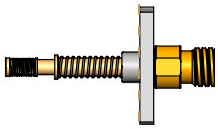
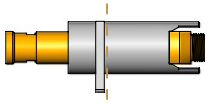
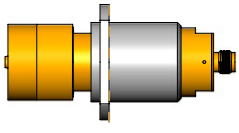
E.g. U.FL

Coaxial test points
Rotation-symmetrical RF test probes are used with 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 domains. The RF probes are either pressed into or screwed into the receptacle. With position-oriented test points, the RF probe is aligned accordingly. To balance out the mounting tolerances on / for coaxial test points, receptacles with fixed or free-moving mount are available. The connection is carried out by means of a MCX plug connector (with series HFS-865 using MMPX™).
Short HFS	 *HFS-410/440*	Short RF probes are designed for applications, which, due to limited available space, do not allow standard RF probes to be used.
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 free moving (floating) contact tips enable optimal alignment to the test point and ensure a very good, repeatable measurement quality. Mounting tolerances are balanced out and consequently, side forces as a result of misalignment in the contacting process are 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

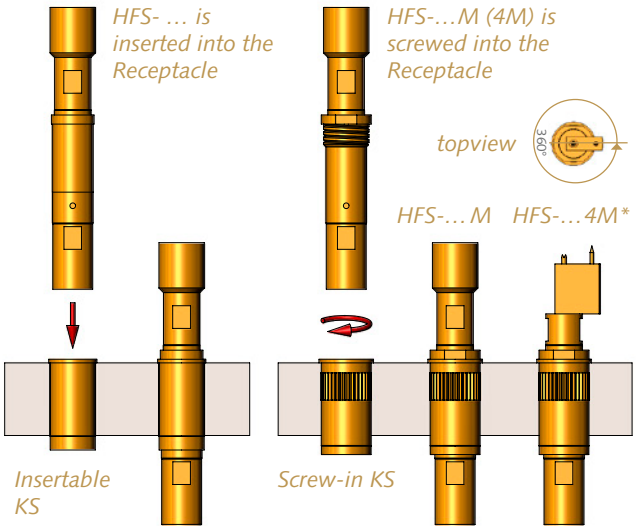
Assembly

Depending on the customer application, the RF probes can be pressed into 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.

Furthermore, 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 couling 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). Flange HFS-822/823/852/856 are connected via a SMA connector.

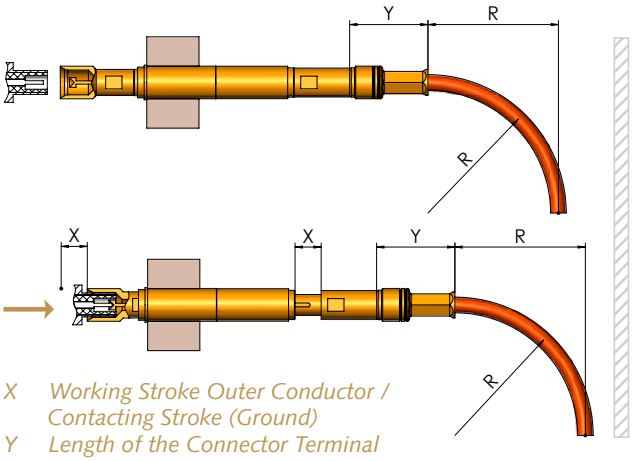
For a complete overview of available RF cable plug assemblies, see page 196 - 199

Installation instructions

To ensure the minimum bending radius of the RF cable in several series does not exceed, care should be taken during assembly to ensure that the cable reaches "X"(see right) comfortably, with sufficient space for the cable plug assembly including specified minimum bending radius.

For applications with limited space available, cable plug assemblies with angular plugs are available, see page 196.

Furthermore, side force during the contacting process should be avoided. This could occur through possible misalignment in the contacting process, or incorrectly laid RF cables. Otherwise, this can lead to the reduction in the performance of, or even damage to, the RF test probes and cables.



X Working Stroke Outer Conductor / Contacting Stroke (Ground)
Y Length of the Connector Terminal
R min. Bending radius (dynamic)

Choosing the right test probe

From test point to RF test probe:

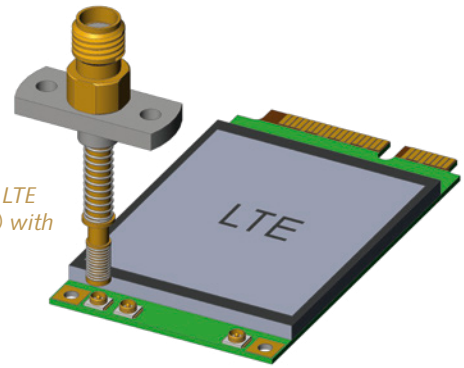
The prerequisite to performing/conducting precise and accurately-repeatable RF measurements is a correctly selected RF test probe as well as its correct assembly and connection. The following steps should help with RF test probe selection:

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 what is the geometry of the test point?	What is the max. 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 mounted and connected (RF cable)?

Selection example

The RF signal should be tested for quality assurance 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: standard probe HFS-810 or flange probe HFS-856 is recommended.
5. Connection option – 2 versions
   1. HFS-810 with MCX cable connection, assembly in receptacle with fixed or free moving mounting (to balance out the misalignment through mounting tolerances)
   2. HFS-856 with SMA cable connection, assembly via flange.

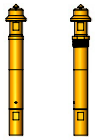


Contacting of LTE module (U.FL) with HFS-856

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

Icons	
	Signal Conductor Plug: Connector with Signal Conductor/Inner Conductor designed as Connector/Pin
	Signal Conductor Jack: Connector with Signal Conductor/Inner conductor designed as Jack
	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 through 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 Diverse	page
	RF test probe series	HFS-810	HFS-840	HFS-860	HFS-865	HFS-410	HFS-440	HFS-819	HFS-821	HFS-822	HFS-823	HFS-852	HFS-856	s. bottom	
	Frequency or Gbit/s	2 GHz	4 GHz	6 GHz	12 GHz	2 GHz	4 GHz	Gbit/s	Gbit/s	6 GHz	8 GHz	6 GHz	6 GHz	s. page	
	Cable movement by contact	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	yes	s. page	
	Image														
Plug connectors	1.0/2.3	x	x			x	x								59
	7/16													HFS-864	85
	BMA	x	x			x	x								55
	BNC	x	x			x	x								57
	F													HFS-409	108
	FAKRA	x	x			x	x								111
	FME	x	x			x	x								83
	GT13	x	x			x	x								115
	GT16	x	x			x	x								117
	HDMI													PS-HDMI	136
	HSD							x							124
	IEC													HFS-409	107
	MBX	x	x			x	x			x					34
	MCX	x	x	x		x	x								38
	MM5829									x					98
	MMBX	x	x		x	x	x								28
	MMCX	x	x			x	x								31
	MMPX				x										33
	MX-series								x						130
	N	x		x		x									81
	PC3.5				x										69
	P-SMP									x					59
	QMA			x											70
	RJ-series													PS-RJ	137
	R-SMA			x											101
	R-TNC	x	x			x	x								102
	SMA	x	x	x	x	x	x								63
	SMB	x	x			x	x								43
	SMC	x	x			x	x								47
	SMP	x	x			x	x						x		52
	SMP-L									x					55
	SMP-MAX									x					57
	SMPX				x										60
	SSMP			x											56
	TAE													PS-TAE	136
	U.FL	x	x	x		x	x			x		x	x		90
	USB-series								x					PS-USB	129
	W.-FL			x									x		96
	W.-FL2			x									x		96
	X.FL			x									x		96
RF switches	MM8030, MM8130, MM8430			x	x						x		x		142
	MS-156, MS-180			x							x		x		147
	Pico II, PN 1551372-1			x	x						x		x		151
PCB	Coaxial dipole probes / Kelvin measurement													HFS-010, HFS-110 DPS-215, DPS-465	187
	PCB coax closed / (75 ohm)	x	x			x	x							HFS-858	156
	PCB coax kidney-shaped	x	x	x		x	x								161
	PCB coax open / (75 ohm)	x	x	x		x	x							HFS-858	158
	PCB-GSG / PCB-GGSGG	x	x			x	x							HFS-836	170
	PCB-SG / PCB-SG-compensation	x	x			x	x							HFS-837	164
	PCB lateral test point	**x**	**x**			**x**	**x**								**183**

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-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	spear point	**08**	conical tip
03	inverse cone	**13**	30° tip with bullet-nose
04	crown	**53**	inverse cone: special length
05	bullet-nosed	**55**	bullet-nosed: special length
06	serrated	**58**	cone: special length
07	90° tri-hedral or pyramid		

5 Inner conductor tip diameter (1/100 mm)
Example:
180 1,8 mm (tip-ø 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

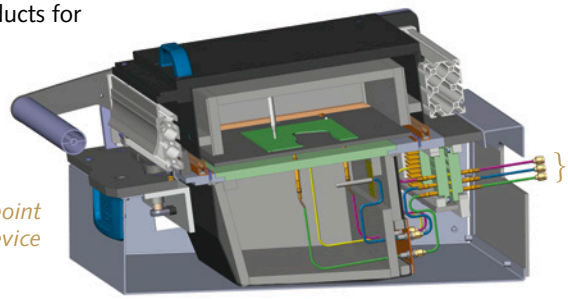
8 Outer conductor
02 flat
06 serrated
14 self-cleaning 4-point crown
29 ground tips
40 lamellas
42 centering: inner side of plug connector
43 centering: outer side of plug connector

9 Special indexes

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

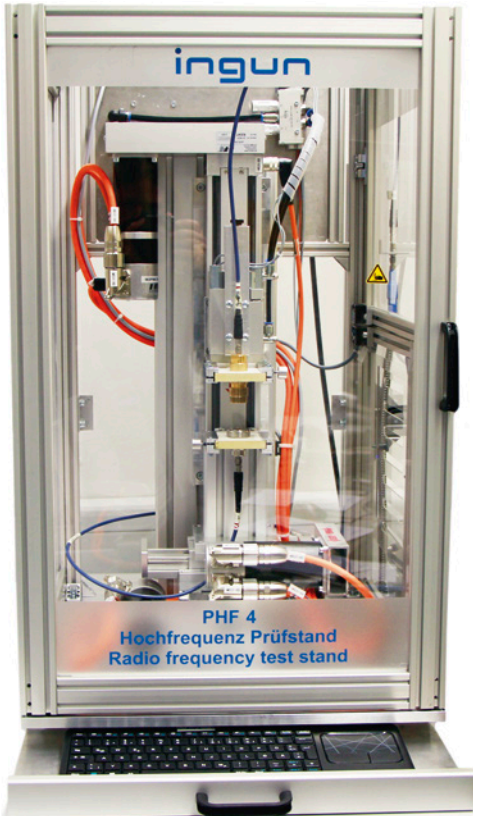
High measuring accuracy and long lifetime

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 overall quality assurance of the products for our global customers.



Connection to the measurement device

RF fixture, from test point to measurement device



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

Quality through Precision – Made in Germany

A high measurement accuracy, repeatability, and long service lives are vital 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 graphs, 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.

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

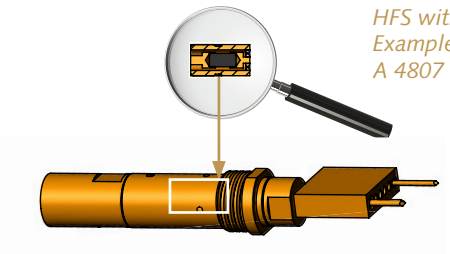
Decades of experience, innovative know-how, and close contact to our customers are our strengths. Try us out for your optimal test solution!

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

Integrated Technologies

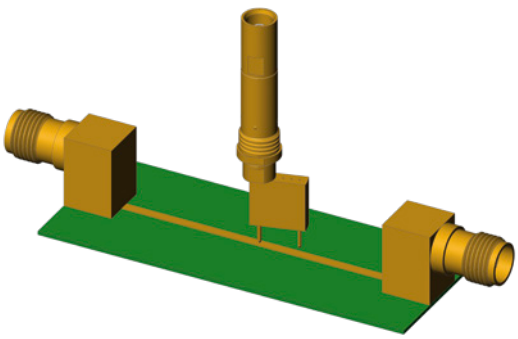
High impedance tip – RF test probes with integrated filter

Measurement by RF test probes normally 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 with 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.

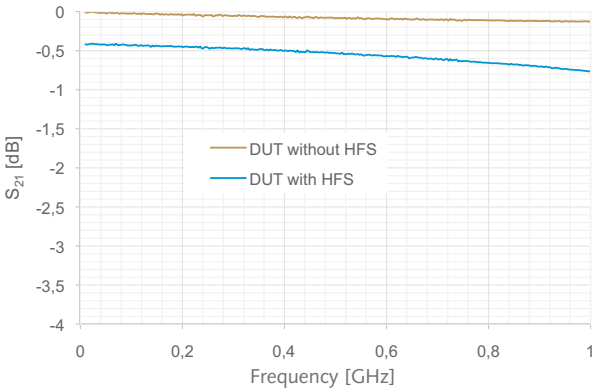


HFS with integrated filter
Example: HFS-440 007 051 A 4807 P5-AS 4M

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

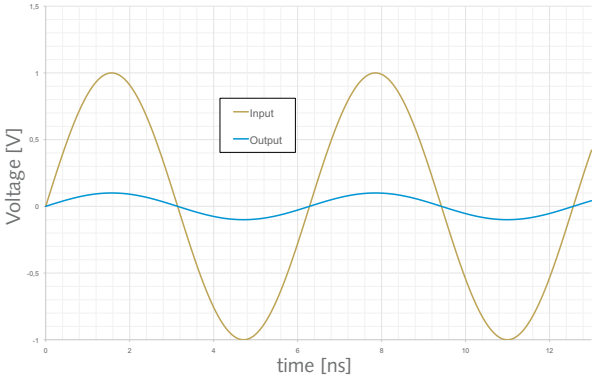


Example of test set-up with three-port measurement



Insertion loss of the DUT with and without contacting of the RF test probe

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 with an oscilloscope.



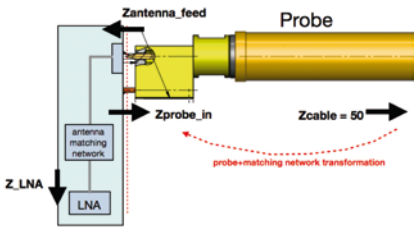
1/10 scaling factor of RF test probe is clear as shown in time domain

More information about RF test probes with integrated filter s. page 169

RF test probes with narrow band matching network

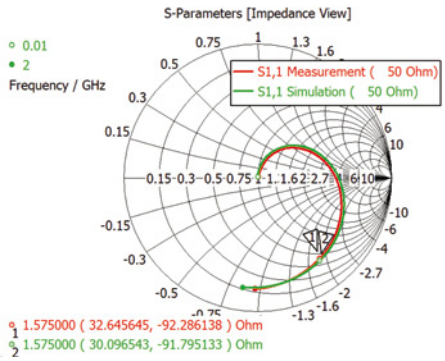
There are applications where the RF test points have complex resistances (Z) made up of a real part (R) and an imaginary part (X) (Z = R + jX). In order to be able to connect the test system, a transformation of the complex resistance should occur to achieve an impedance of 50 Ω without an imaginary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



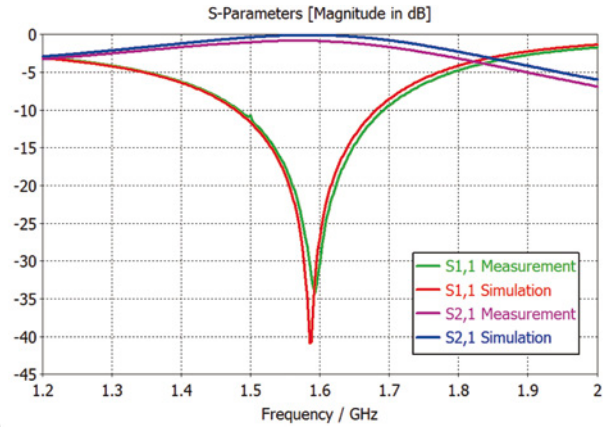
Example for the use of a RF test probe with narrow band matching network

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 tailored 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.

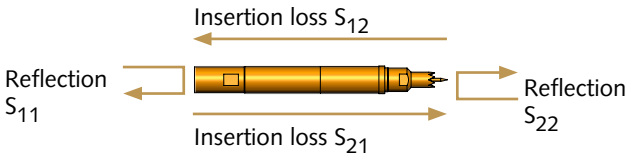
RF test probe with narrow band matching network

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 we at INGUN think that some measurements are a vital part in the development and quality management process, 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 und 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 in 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.

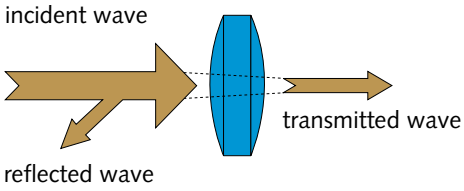
To fully describe the properties of a 2-port RF network, there are a total of four S-parameters, each of which are determined according to magnitude and phase: $S_{xy,value}$ and $S_{xy,phase}$ (with x,y = 1...2). The reciprocity principle, however, applies to linear passive components in good proximity.

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

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, which direction the signal transmitted in 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:

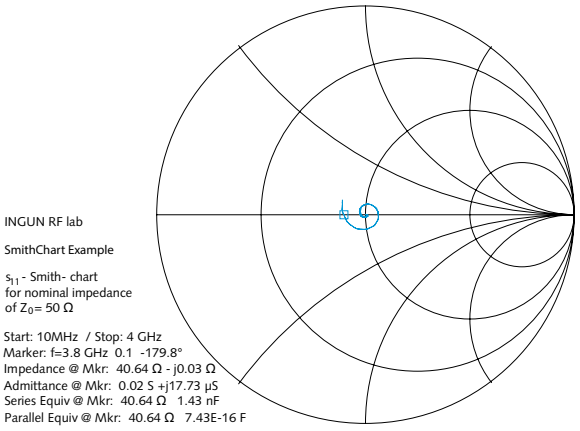
$$VSWR = \frac{1 + 10^{-\frac{RL'}{20}}}{1 - 10^{-\frac{RL'}{20}}} \quad (2)$$

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.)



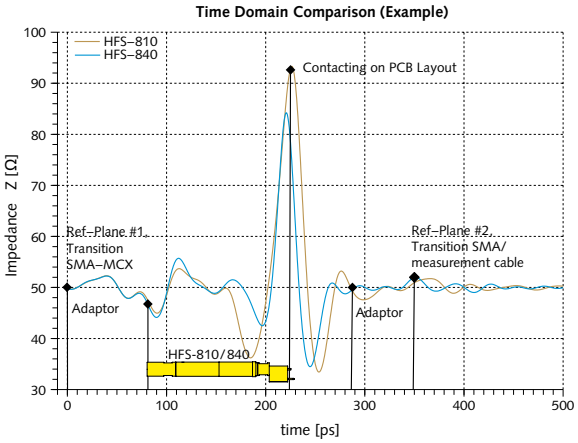
Time domain reflectometry (TDR)

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 mask

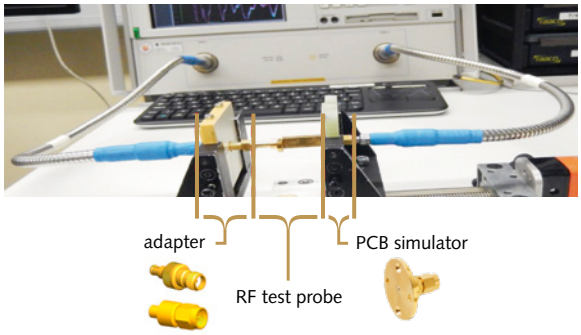
The eye diagram is generated using multiple overlap from individual bits of a transmitted signal. To achieve higher accuracy, the sample used should be as long as possible. Information such as jitter, and loss of the transmission channel can be read from the eye diagram. The so-called eye mask also specifies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

RF products from INGUN

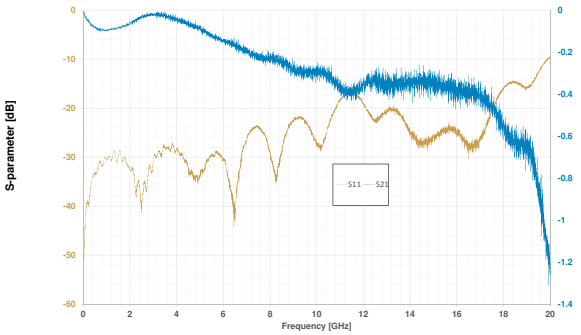
Specification of coaxial (analogue) RF test probes

Test solutions for the measurement of analogue signals are normally specified in the frequency domain using so-called S-parameters, which are measured with 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.

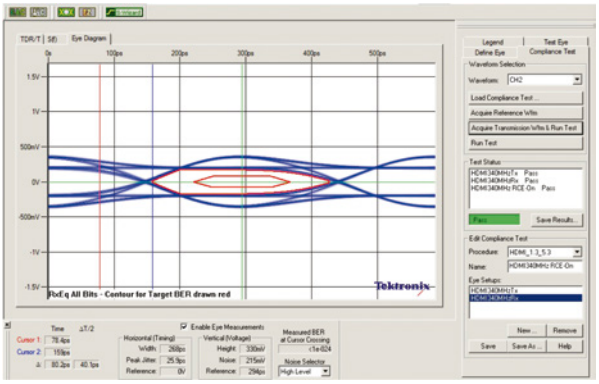


Return and insertion loss of a RF test probe

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.

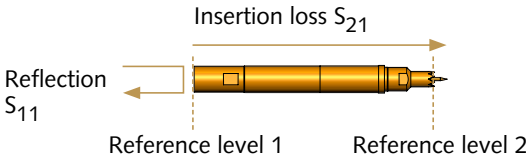
However, one of the most important criterion during specification is signal integrity of the entire signal path, which is shown in a so-called eye diagram. Matching the resulting eye diagram with the eye mask, provided by the transmission standard, reveals whether the transmission path meets the minimum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



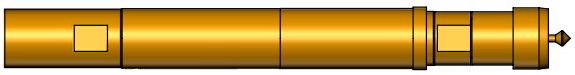
The INGUN laboratory has the capacity (the appropriate measurement equipment and software) to perform specification of digital test probes. Using time domain analyses, measurements to determine the differential impedance can also be performed.

S-parameter of RF Test Probes

If a RF test probe is part of a signal path that needs to be characterised, its characteristics of transmission must be known precisely. 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.

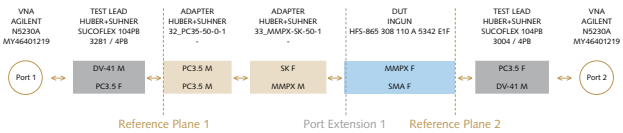


INGUN provides accompanying charts, also as digital s2p files in Touchstone format. These refer to the typical characteristics of transmission of the corresponding RF test probe. Please contact us if you require support with the characterisation of your signal path.



Connection for MMPX™-plug

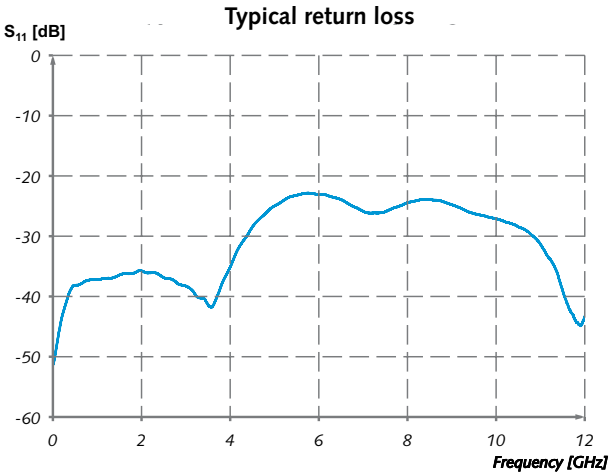
INGUN test set-up

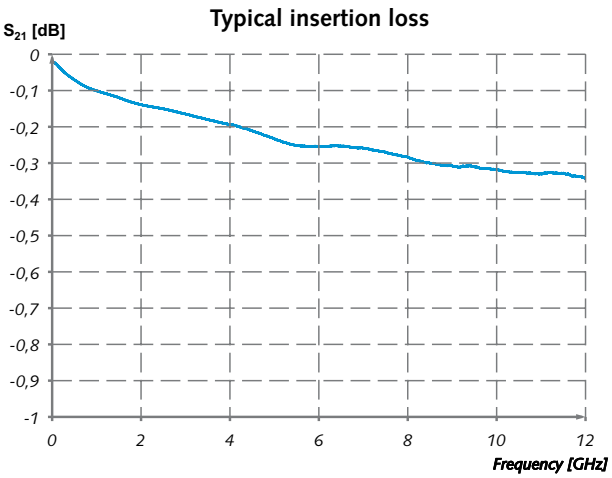


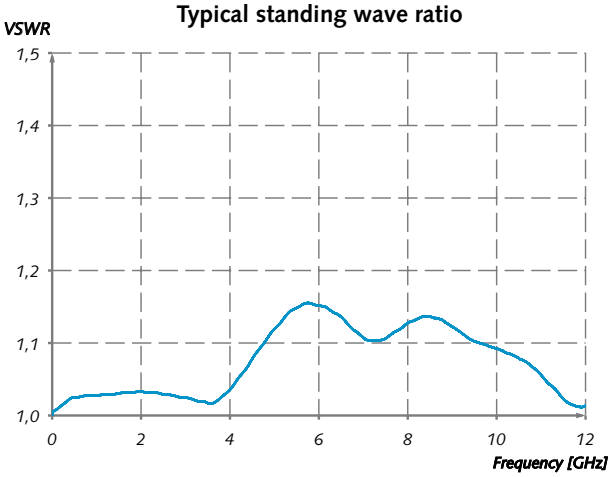
Schematic illustration of measurement set-up

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

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







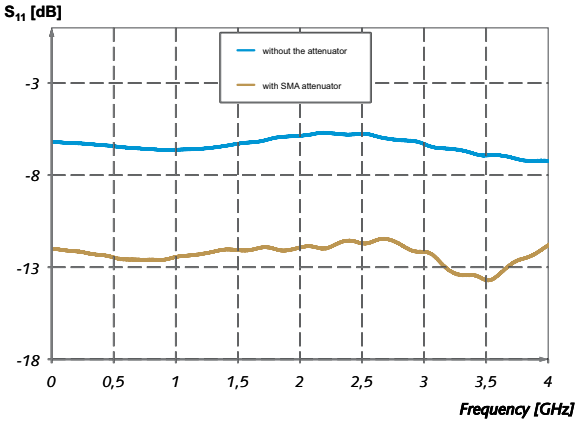
In-line attenuator for RF test probes

In-line for RF contact probes

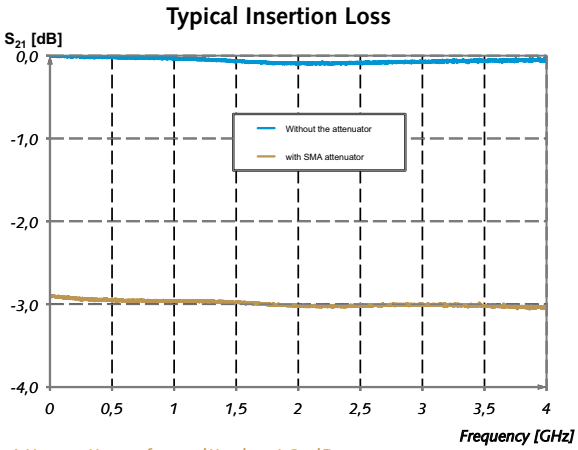
To artificially improve the return loss, so-called in-line attenuators can be used. These reduce the amplitude of the measurement signal. However, this factor is often less important than the fact that a reflected signal runs through an attenuator twice and therefore the return loss is theoretically 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 199.



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 one time "back-to-back" measurement.

The set enables:

– precise measurement by accounting for the calibration of the test probe, and omitting this from the measurement.
– a 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 put on each individual component.

BeCu (Beryllium-Copper) provides a good combination and 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 then ensures good durability and optimizes the 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 points and the flanks. This ensures good 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 the Barrels of the Test Probes. These materials have a high tensile strength, which is ideal for the long-term life of Test Probes. Furthermore, these materials provide a good elasticity of the crimps on the Receptacles.

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

Plating Material

INGUN hard-gold is used.

Hard-gold: Special gold-plating developed specifically for RF Probes with very good chemical durability.
Hardness 150 – 200 HV. Especially good for tarnish and corrosion protection.

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

EG Environmental Legislations

Numerous European Environmental Legislations have the aim to ensure a high level of protection of human health and the environment. For this reason, the business decisions and actions of INGUN Prüfmittelbau GmbH are always regarded in the interest of these legislations.

For the presently most important European Environmental Legislations, INGUN has prepared official statements, which are always up to date and available on our homepage 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		

Applied Radio Frequency Technology

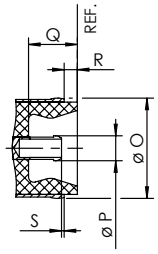
The radio frequency probes from INGUN are used especially when radio frequency signals must be measured.

Contacting of MMBX Connectors

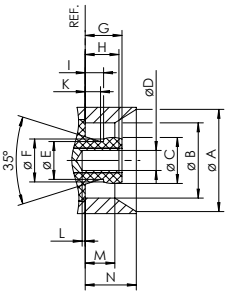
Series MMBX

Connection Dimensions

Signal Conductor Plug

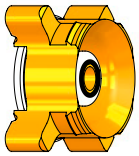


Signal Conductor Jack



	Signal Conductor Plug/Jack	
	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

Example of manufacturer Huber+Suhner:
MMBX Signal Conductor Jack

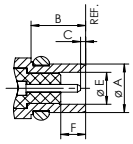


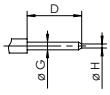
Contacting of MMCX Connectors

Series MMCX

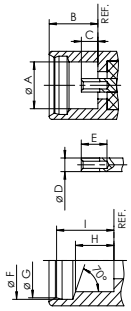
Connection Dimensions

Signal Conductor Plug





Signal Conductor Jack

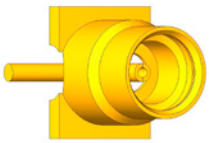


	Signal Conductor Plug		Signal Conductor Jack	
	min.	max.	min.	max.
A	–	2.40 / *.094*	2.41 / *.095*	-
B	2.70 / *.106*	-	-	2.65 / *.104*
C	0.00 / *.000*	0.25 / *.010*	0.90 / *.035*	1.20 / *.047*
D	1.23 / *.048*	-	0.70 / *.028* nom.	
E	1.58 / *.062*	1.62 / *.064*	1.40 / *.055*	-
F	1.23 / *.048*	-	3.00 / *.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*

*	Jack		
G	2.88 / *.113*	2.90 / *.114*	2.92 / *.115*
I	2.34 / *.092*	2.30 / *.091*	2.26 / *.089*

Remarks: I is related to G

Example of manufacturer Huber+Suhner:
MMCX Signal Conductor Jack

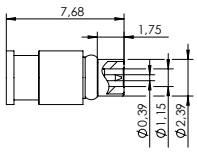


Contacting of MMPX Connectors

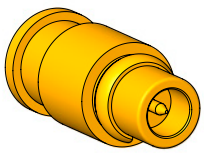
Series MMPX

Connection Dimensions

Signal Conductor Jack



Example of manufacturer Huber+Suhner:
MMPX Conductor Jack



Contents

MBX

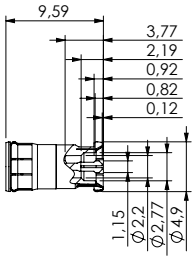
MCX

Contacting of MBX Connectors

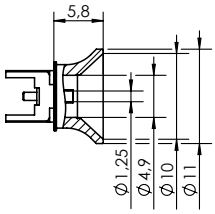
Series MBX

Connection Dimensions

Signal Conductor Plug



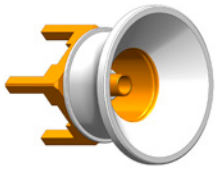
Signal Conductor Jack



Example of manufacturer Huber+Suhner:

MBX Signal Conductor Plug

MBX Signal Conductor Jack

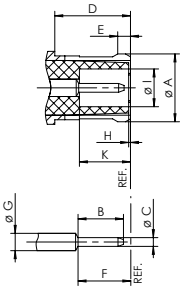


Contacting of MCX Connectors

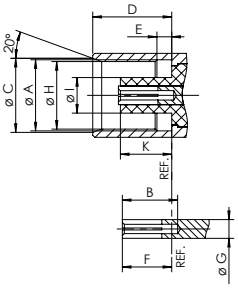
Series MCX

Connection Dimensions

Signal Conductor Plug



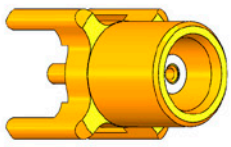
Signal Conductor Jack



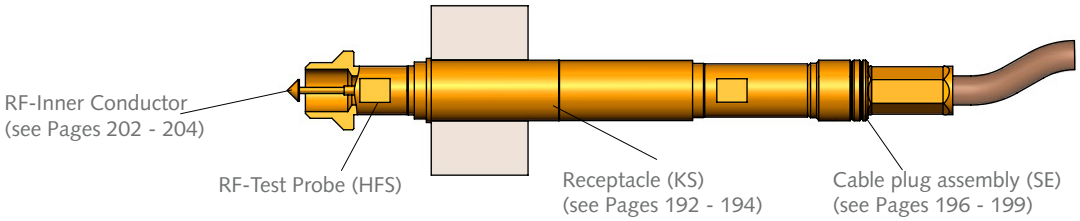
	Signal Conductor Plug		Signal Conductor Jack	
	min.	max.	min.	max.
A	3.72 / *.146**	3.80 / *.150**	3.60 / *.142*	3.70 / *.146*
B	2.49 / *.098*	2.59 / *.102*	2.80 / *.110*	-
C	0.48 / *.019*	0.53 / *.021*	3.75 / *.148*	3.85 / *.152*
D	4.15 / *.163*	-	4.00 / *.157*	4.12 / *.162*
E	0.70 / *.028*	0.75 / *.030*	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

Example of manufacturer Huber+Suhner:

MCX Signal Conductor Jack

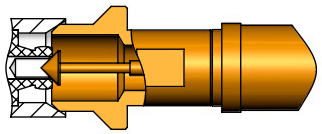


MMBX / MMCX / MMPX / MBX / MCX Connectors

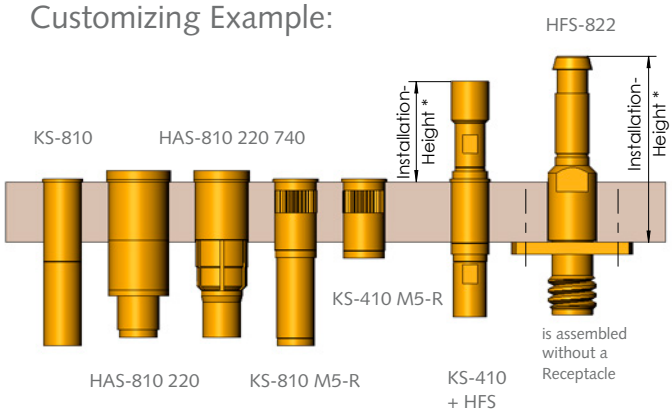


Contacting Example MMBX:

Contacting of MMBX Signal Conductor Jack
HFS-810 308 180 A 5342 BX



Customizing 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)	withoout KS
Variant		* Installation Height HFS in KS		
MMBX Signal Conductor Jack	...BX / ... BX M	11.9 mm	13.0 mm	---
	... BXF / ... BXF M	10.3 mm	11.4 mm	---
MMCX Signal Conductor Jack	... Z / ... Z M	11.1 mm	12.2 mm	---
MMPX Signal Conductor Jack	... PF	10.9 mm	12.0 mm	---
MBX Signal Conductor Plug	... MBXF	---	---	28.5 mm
MBX Signal Conductor Jack	... MBX /... MBX M	12.4 mm	13.l5 mm	---
MCX Signal Conductor Jack	... 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	---

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
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range

– 40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

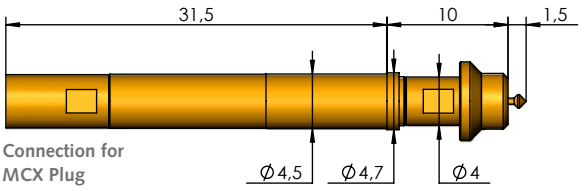
◎ MMBX Signal Conductor Jack

up to 2 GHz (50 Ω)

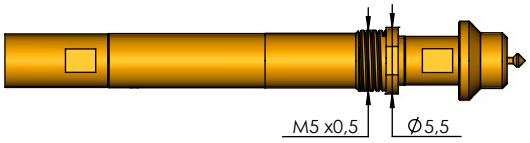
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

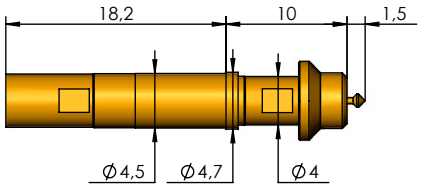
HFS-810 ...



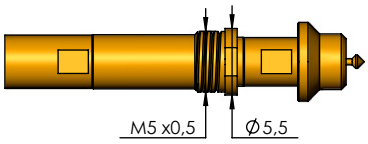
HFS-810 ... M (*)



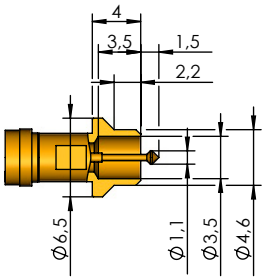
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 308 110 A **xx** 42 BX
HFS-810 308 110 A **xx** 42 BX M
HFS-410 308 110 A **xx** 42 BX
HFS-410 308 110 A **xx** 42 BX M

Note:
Centering range: ± 0.5 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

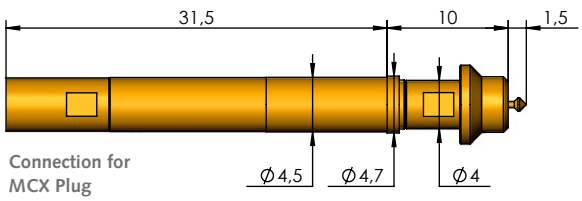
Mechanical Data
HFS-410 and HFS-410 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

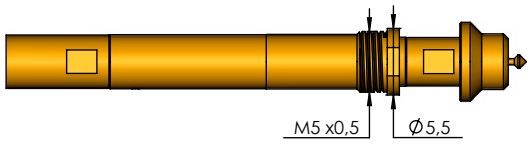
MMBX Signal Conductor ◎ Jack

Series:

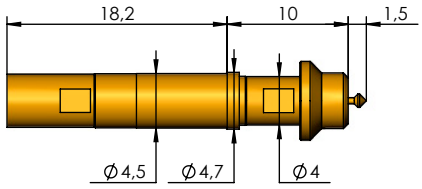
HFS-840 ...



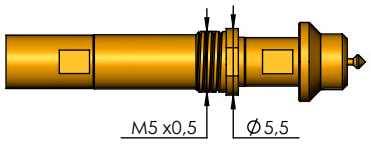
HFS-840 ... M (*)



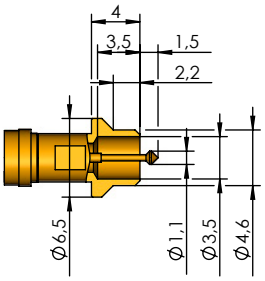
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 308 110 A **xx** 42 BX
HFS-840 308 110 A **xx** 42 BX M
HFS-440 308 110 A **xx** 42 BX
HFS-440 308 110 A **xx** 42 BX M

Note:
Centering range: ± 0.5 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

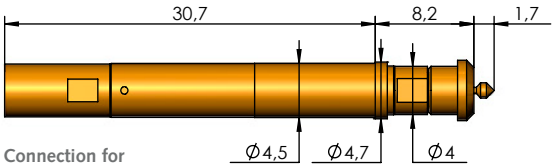
◎ MMBX Signal Conductor Jack

up to 12 GHz (50 Ω)

HFS-865

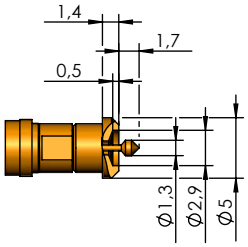
Series:

HFS-865 ...



Connection for MMPX Plug

Available Tip Styles:



Ordering Description:

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

Note:
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-865		
Spring Force of Inner Conductor (N)	1.3	1.3	1.3
Spring Force of Outer Conductor (N)	4.0	6.0	8.0
Character 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

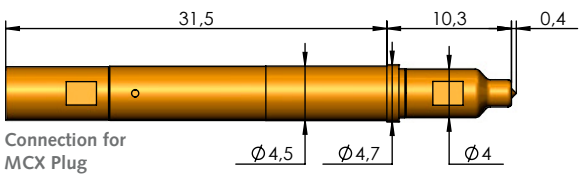
MMCX Signal Conductor ◎ Jack

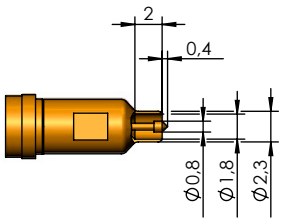
Series:

Available Tip Styles:

Ordering Description:

HFS-810 ...

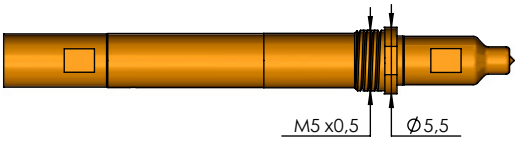




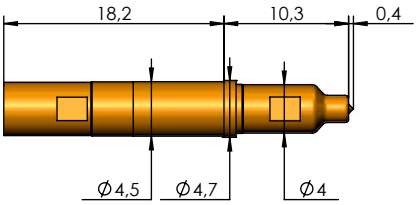
HFS-810 358 080 A **xx** 42 Z
HFS-810 358 080 A **xx** 42 Z M
HFS-410 358 080 A **xx** 42 Z
HFS-410 358 080 A **xx** 42 Z M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

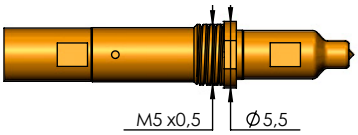
HFS-810 ... M (*)



HFS-410 ...



HFS-410 ... M (*)



Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

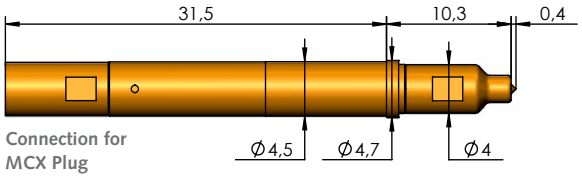
◎ MMCX Signal Conductor Jack

up to 4 GHz (50 Ω)

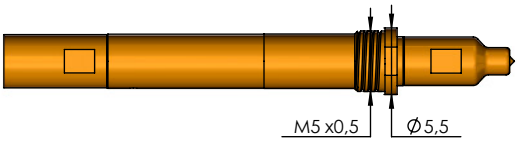
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

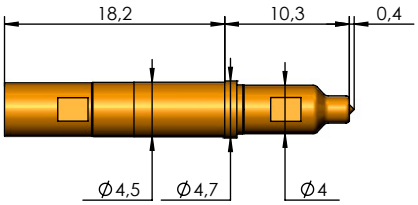
HFS-840 ...



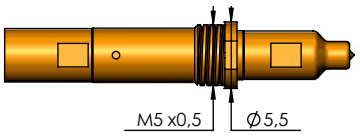
HFS-840 ... M (*)



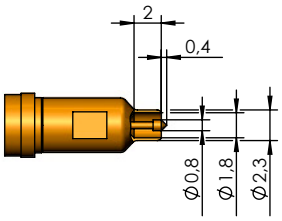
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 358 080 A **xx** 42 Z
HFS-840 358 080 A **xx** 42 Z M
HFS-440 358 080 A **xx** 42 Z
HFS-440 358 080 A **xx** 42 Z M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

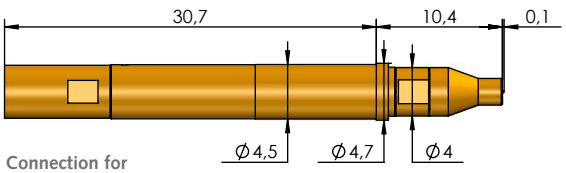
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	1.2 mm
Maximum Stroke:	3.0 mm	2.2 mm

MMPX Signal Conductor Jack

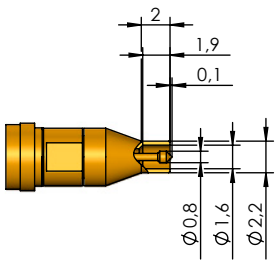
Series:

HFS-865 ...



Connection for
MMPX Plug

Available Tip Styles:



Ordering Description:

HFS-865 308 080 A **xx** 42 MMPF

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-865		
Spring Force of Inner Conductor (N)	1.3	1.3	1.3
Spring Force of Outer Conductor (N)	4.0	6.0	8.0
Character 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

MBX Signal Conductor Plug

up to 6 GHz (50 Ω)

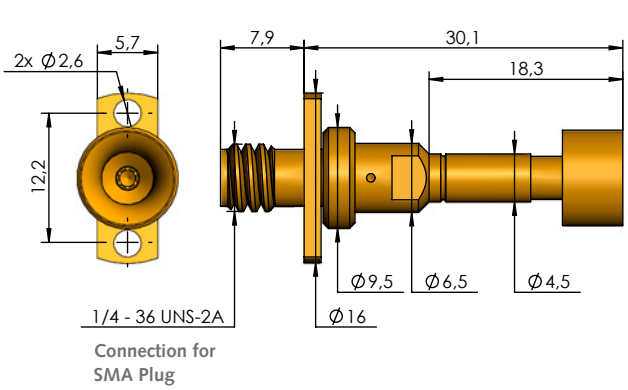
HFS-822

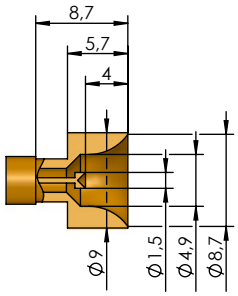
Series:

Available Tip Styles:

Ordering Description:

HFS-822 ...





HFS-810 308 180 A **xx** 42 MBX

Note: Version with flange connection. No movement of the connection during stroke movement. Centering range: ± 1.8 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

Mechanical Data

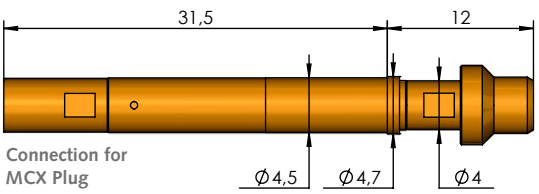
HFS-822

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

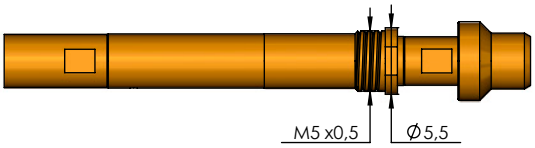
MBX Signal Conductor ◎ Jack

Series:

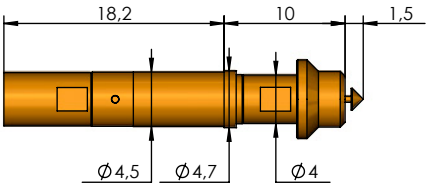
HFS-810 ...



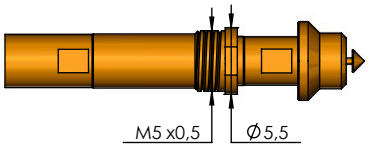
HFS-810 ... M (*)



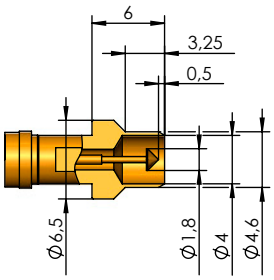
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 308 180 A **xx** 42 MBX
HFS-810 308 180 A **xx** 42 MBX M
HFS-410 308 180 A **xx** 42 MBX
HFS-410 308 180 A **xx** 42 MBX M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

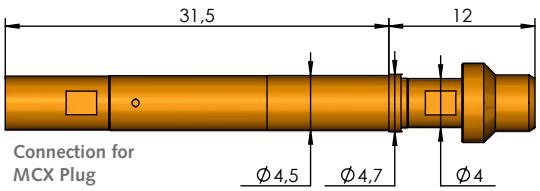
◎ MBX Signal Conductor Jack

up to 4 GHz (50 Ω)

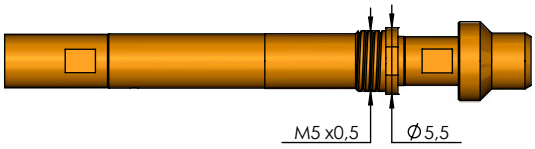
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

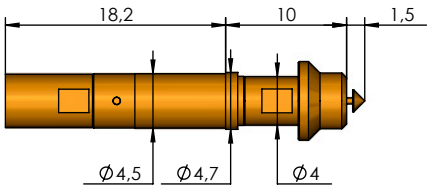
HFS-840 ...



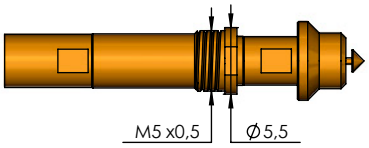
HFS-840 ... M (*)



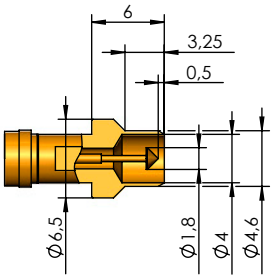
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

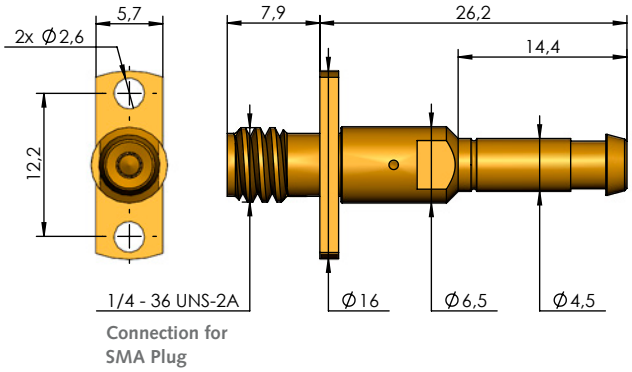
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

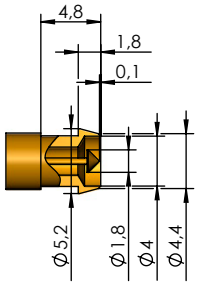
Series:

Available Tip Styles:

Ordering Description:

HFS-822 ...





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

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character 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

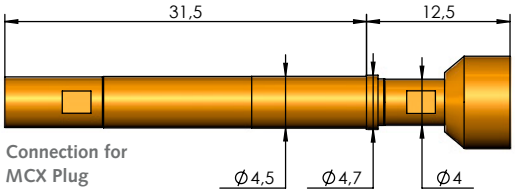
◎ MCX Signal Conductor Jack

up to 2 GHz (50 Ω)

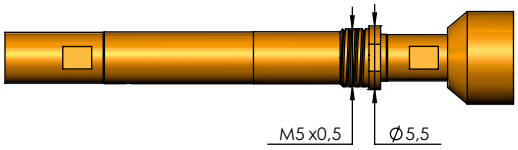
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

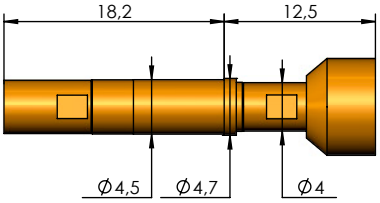
HFS-810 ...



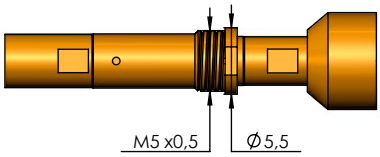
HFS-810 ... M (*)



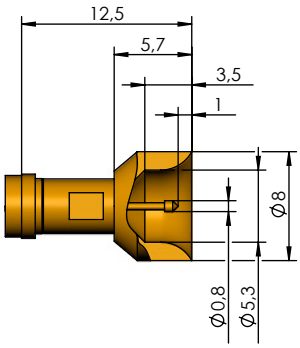
HFS-410 ...

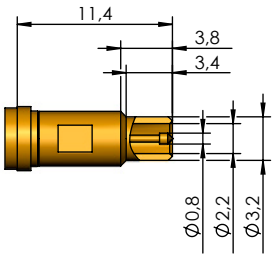


HFS-410 ... M (*)



Available Tip Styles:





Ordering Description:

HFS-810 308 080 A **xx** 43 X
HFS-810 308 080 A **xx** 43 X M
HFS-410 308 080 A **xx** 43 X
HFS-410 308 080 A **xx** 43 X M

Note: Version with enlarged centering range. Outer conductor centers itself from the outer side on the Connector. Centering range: ± 1.4 mm

HFS-810 308 080 A **xx** 42 X4
HFS-810 308 080 A **xx** 42 X4 M
HFS-410 308 080 A **xx** 42 X4
HFS-410 308 080 A **xx** 42 X4 M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

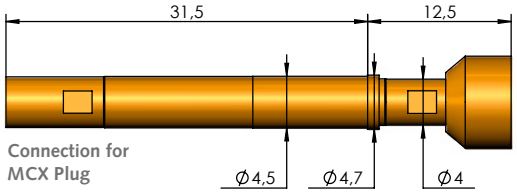
Mechanical Data
HFS-410 and HFS-410 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

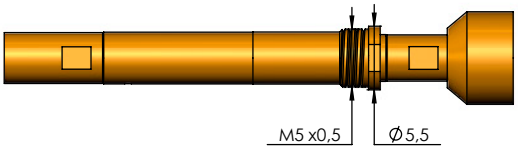
MCX Signal Conductor ◎ Jack

Series:

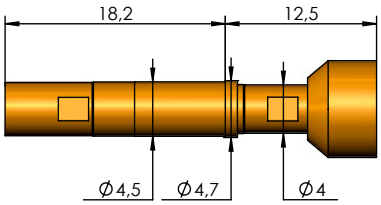
HFS-840 ...



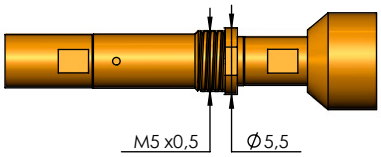
HFS-840 ... M (*)



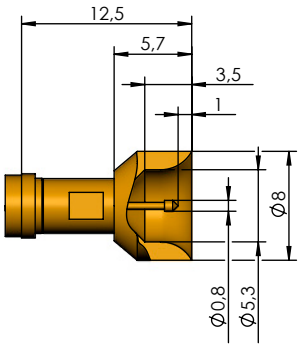
HFS-440 ...

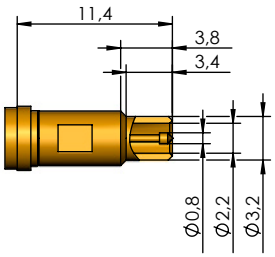


HFS-440 ... M (*)



Available Tip Styles:





Ordering Description:

HFS-840 308 080 A **xx** 43 X
HFS-840 308 080 A **xx** 43 X M
HFS-440 308 080 A **xx** 43 X
HFS-440 308 080 A **xx** 43 X M

Note: Version with enlarged centering range. Outer conductor centers itself from the outer side on the Connector.
Centering range: ± 1.4 mm

HFS-840 308 080 A **xx** 42 X4
HFS-840 308 080 A **xx** 42 X4 M
HFS-440 308 080 A **xx** 42 X4
HFS-440 308 080 A **xx** 42 X4 M

Note: Version with pre-centering on the inner side of the Connector Outer Contact.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

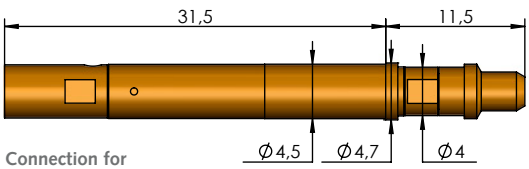
◎ MCX Signal Conductor Jack

up to 6 GHz (50 Ω)

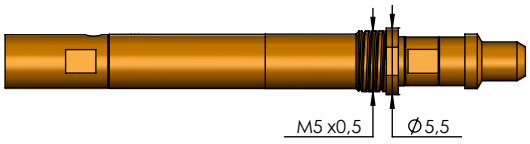
HFS-860 / HFS-860 M

Series:

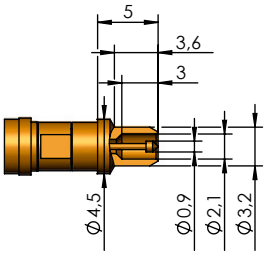
HFS-860 ...



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-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductors are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-860 and HFS-860 M

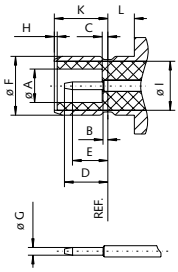
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

Contacting of SMB Connectors

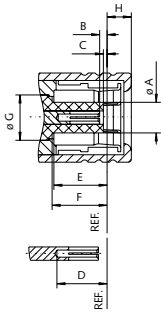
Series SMB

Connection Dimensions

Signal Conductor Plug



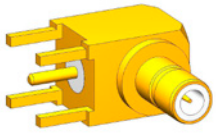
Signal Conductor Jack



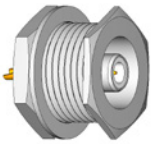
	Signal Conductor Plug		Signal Conductor Jack	
	min.	max.	min.	max.
A	2.08 / .082	-		2.06 / .081
B	-	0.18 / .007	0.18 / .007	0.94 / .037
C	-	0.18 / .007	0.18 / .007	-
D	-	2.97 / .117	2.97 / .117	-
E	1.32 / .052	-	3.58 / .141	-
F	3.66 / .144	3.71 / .146	3.58 / .141	-
G	0.48 / .019	0.53 / .021	3.05 / .120 nom.	
H	0.00 / .000	-	-	1.63 / .064
I	3.05 / .120 nom		-	-
K	3.33 / .131	3.58 / .141	-	-
L	1.65 / .065	-	-	-

Example of manufacturer Huber+Suhner:

SMB Signal Conductor Plug



SMB Signal Conductor Plug



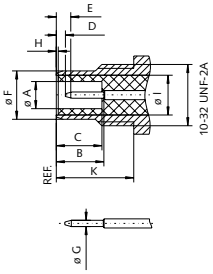
SMB Signal Conductor Jack

Contacting of SMC Connectors

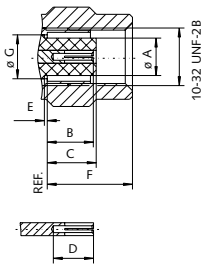
Series SMC

Connection Dimensions

Signal Conductor Plug



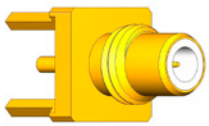
Signal Conductor Jack



	Signal Conductor Plug		Signal Conductor Jack	
	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	-	-	-

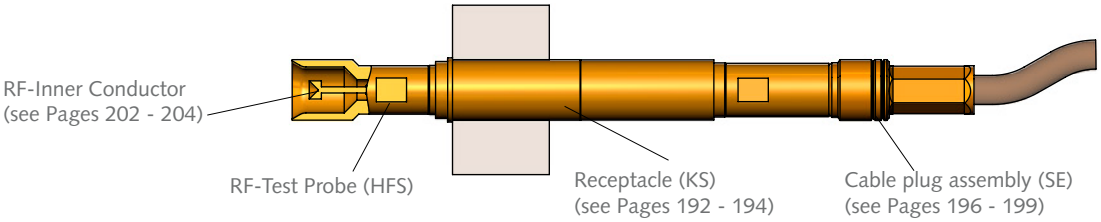
Example of manufacturer Huber+Suhner:

SMC Signal Conductor Plug



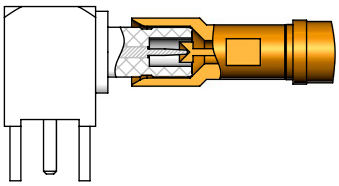
Contents

SMB Connectors
SMC Connectors

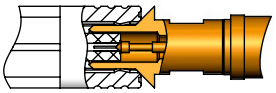


Contacting Example SMB:

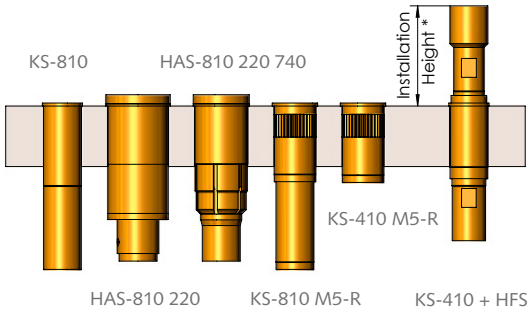
Contacting of SMB Signal Conductor Plug
HFS-810 303 150 A 5343 Y



Conacting of SMB Signal Conductor Jack
HFS-810 308 080 A 5342 ZE



Customizing 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)
Variant		*Installation Height HFS in KS	
SMB Signal Conductor Plug	...Y / ... YM	13.3 mm	14.4 mm
	... Y2 / ... Y2 M		
	... F-Y14 / ... F-Y14 M		
	... Y3 / ... Y3 M		
SMB Signal Conductor Jack	... ZE / ... ZE M	11.8 mm	12.9 mm
SMC Signal Conductor Plug	... 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:	upt to 2 GHz
Frequency Range with HFS-840/440:	up to 4 GHz
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	$\leq$ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range

–40° up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

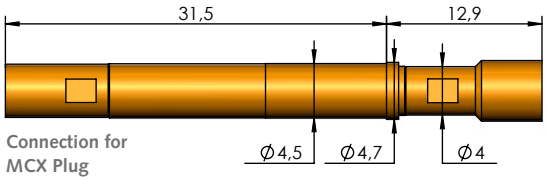
SMB Signal Conductor ⊙ Plug

Series:

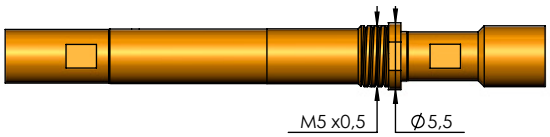
Available Tip Styles:

Ordering Description:

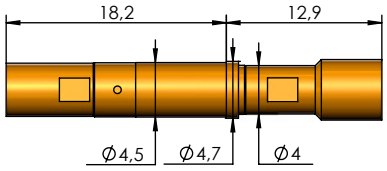
HFS-810 ...



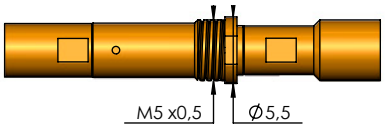
HFS-810 ... M (*)

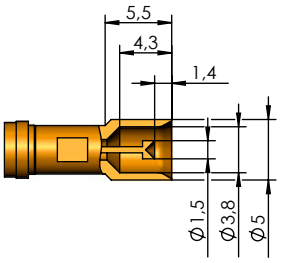


HFS-410 ...



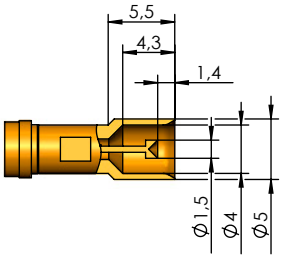
HFS-410 ... M (*)





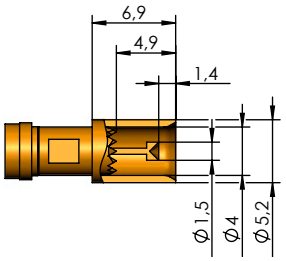
HFS-810 303 150 A **xx** 43 Y
HFS-810 303 150 A **xx** 43 Y M
HFS-410 303 150 A **xx** 43 Y
HFS-410 303 150 A **xx** 43 Y M

Note: Version with enlarged centering range.
Centering range: ± 0.6 mm



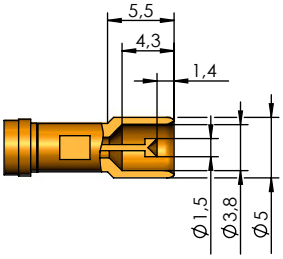
HFS-810 303 150 A **xx** 43 Y2
HFS-810 303 150 A **xx** 43 Y2 M
HFS-410 303 150 A **xx** 43 Y2
HFS-410 303 150 A **xx** 43 Y2 M

Note: Version with larger centering range and inside diameter of Outer conductor - for applications with large position errors.
Centering 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 application when connector is contaminated.
Centering range: ± 0.7 mm



HFS-810 303 150 A **xx** 43 Y3
HFS-810 303 150 A **xx** 43 Y3 M
HFS-410 303 150 A **xx** 43 Y3
HFS-410 303 150 A **xx** 43 Y3 M

Note: Outer conductor with outer chamfer for pre-centering of SMB Connectors with casing.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Connector (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

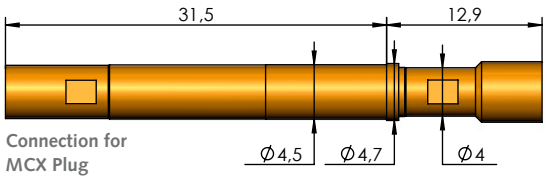
⊙ SMB Signal Conductor Plug

up to 4 GHz (50 Ω)

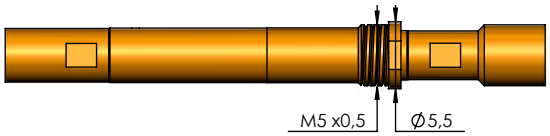
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

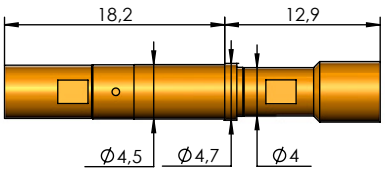
HFS-840 ...



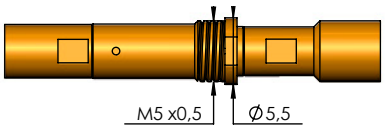
HFS-840 ... M (*)



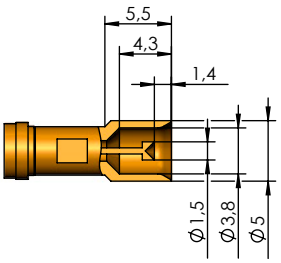
HFS-440 ...

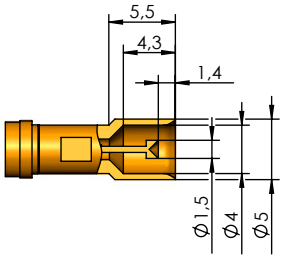


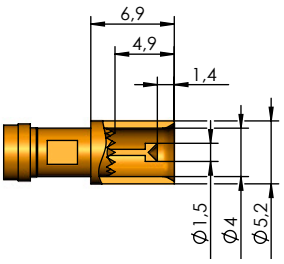
HFS-440 ... M (*)

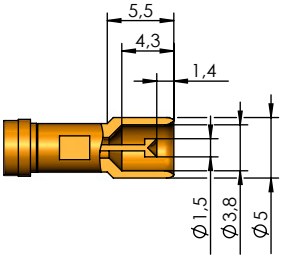


Available Tip Styles:









Ordering Description:

HFS-840 303 150 A **xx** 43 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 enlarged centering range.
Centering 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 centering range and inside diameter of Outer conductor - for applications with large position errors.
Centering 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.
Centering range: ± 0.7 mm

HFS-840 303 150 A **xx** 43 Y3
HFS-840 303 150 A **xx** 43 Y3 M
HFS-440 303 150 A **xx** 43 Y3
HFS-440 303 150 A **xx** 43 Y3 M

Note: Outer conductor with outer chamfer for pre-centering of SMB Connectors with casing.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

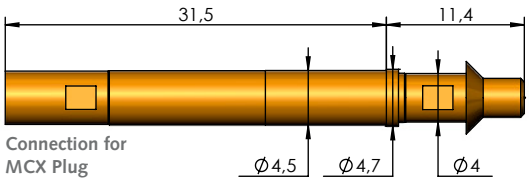
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

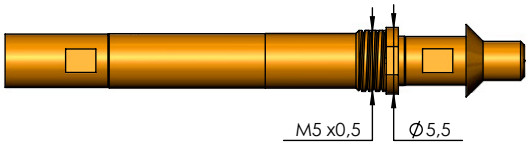
SMB Signal Conductor ◎ Jack

Series:

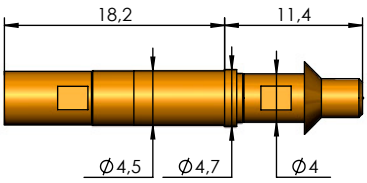
HFS-810 ...



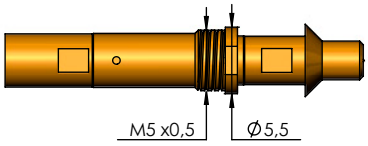
HFS-810 ... M (*)



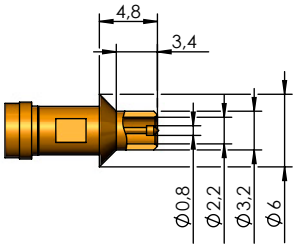
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 308 080 A **xx** 42 ZE
HFS-810 308 080 A **xx** 42 ZE M
HFS-410 308 080 A **xx** 42 ZE
HFS-410 308 080 A **xx** 42 ZE M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

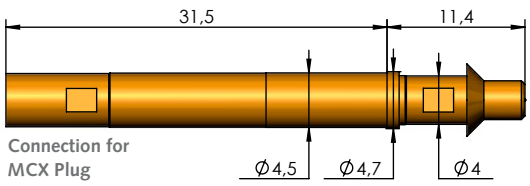
◎ SMB Signal Conductor Jack

up to 4 GHz (50 Ω)

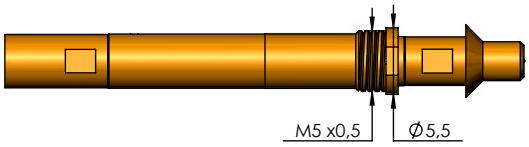
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

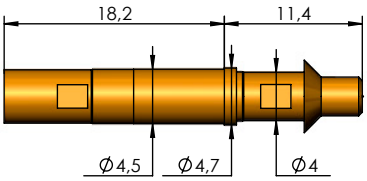
HFS-840 ...



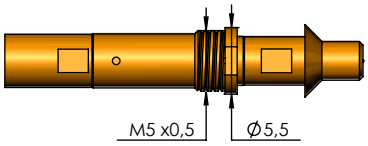
HFS-840 ... M (*)



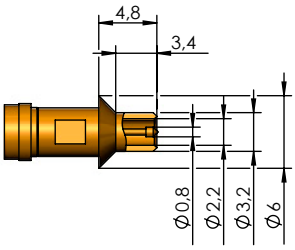
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

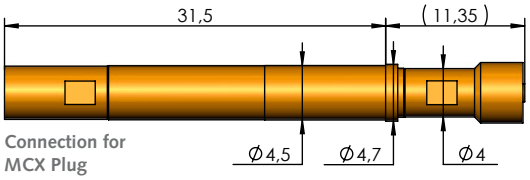
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

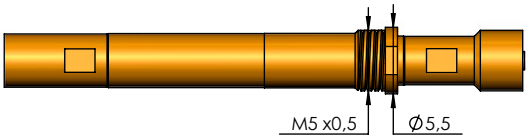
SMC Signal Conductor ⊙ Plug

Series:

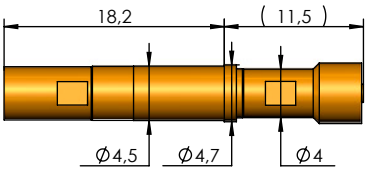
HFS-810 ...



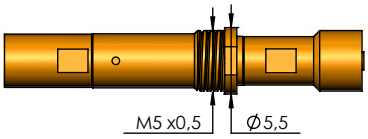
HFS-810 ... M (*)



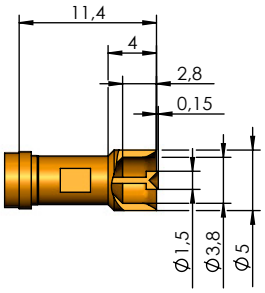
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 303 150 A **xx** 43 Y5
HFS-810 303 150 A **xx** 43 Y5 M
HFS-410 303 150 A **xx** 43 Y5
HFS-410 303 150 A **xx** 43 Y5 M

Note: Not suitable for SMB contacting, because the stroke of the Inner Conductor would be too short.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

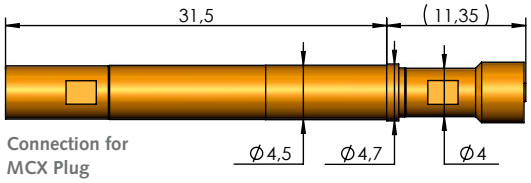
⊙ SMC Signal Conductor Plug

up to 4 GHz (50 Ω)

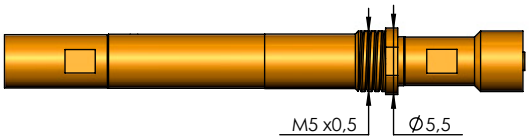
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

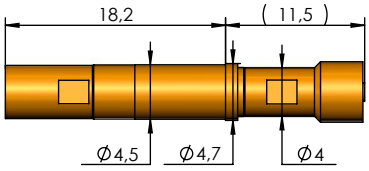
HFS-840 ...



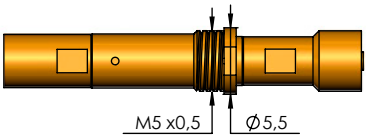
HFS-840 ... M (*)



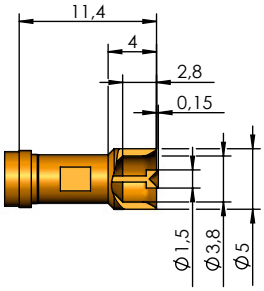
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 303 150 A **xx** 43 Y5
HFS-840 303 150 A **xx** 43 Y5 M
HFS-440 303 150 A **xx** 43 Y5
HFS-440 303 150 A **xx** 43 Y5 M

Note: Not suitable for SMB contacting, because the stroke of the Inner Conductor would be too short. Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

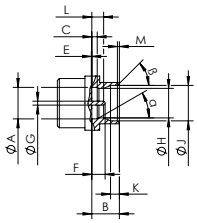
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

Contacting of SMP Conductors

Series SMP

Connection Dimensions

Signal Conductor Plug



	Signal Conductor Plug	
	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

Example of manufacturer Huber+Suhner:

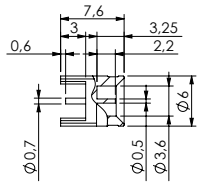
SMP Conductor Plug

Contacting of SMP-L Conductors

Series SMP-L

Connection Dimensions

Signal Conductor Plug



Example of manufacturer Huber+Suhner:

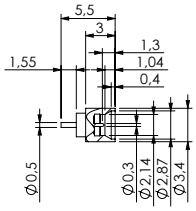
SMP-L Conductor Plug

Contacting of SSMP Conductors

Series SSMP

Connection Dimensions

Signal Conductor Plug



Example of manufacturer Huber+Suhner:

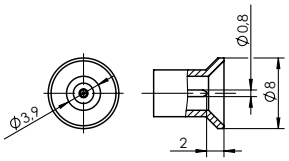
SSMP Conductor Plug

Contacting of SMP-MAX Connectors

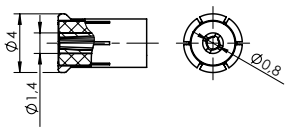
Series SMP-MAX

Connection Dimensions

Signal Conductor Plug



Signal Conductor Jack



Example of manufacturer Huber+Suhner:

SMP-MAX-Signal Conductor Plug

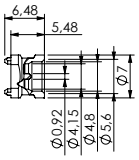
SMP-MAX Signal Conductor Jack

Contacting of P-SMP Connectors

Series P-SMP

Connection Dimensions

Signal Conductor Plug



Example of manufacturer Huber+Suhner:

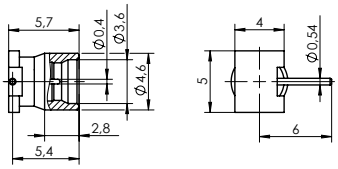
P-SMP Signal Conductor Plug

Contacting of SMPX Connectors

Series SMPX

Connection Dimensions

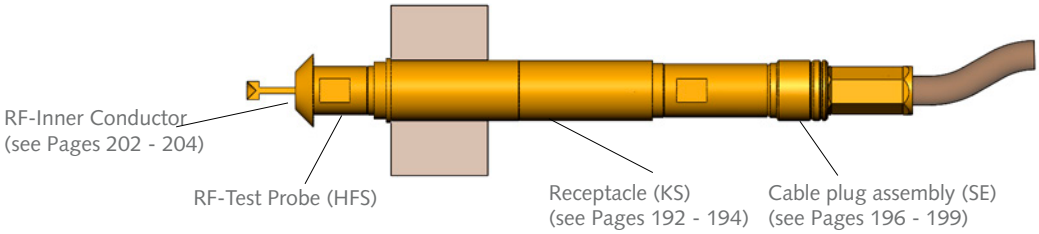
Signal Conductor Plug



Example of manufacturer Huber+Suhner:

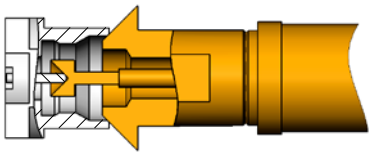
SMPX Signal Conductor Plug

SMP / SMP-L / SSMP / SMP-MAX / P-SMP / SMPX Connector

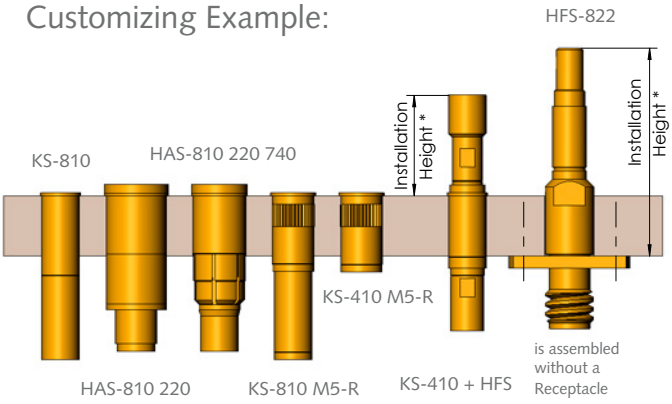


Contacting Example SMP:

Contacting of SMP Signal Conductor Jack
HFS-810 303 150 A 5342 E



Customizing 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
Variant		*Installation Height HFS in KS		
SMP Signal Conductor Plug	... E / ...E M	11.9 mm	13.0 mm	---
	... SMP	---	---	24.1 mm
SMP-L Signal Conductor Plug	...SMPL	---	---	24.0 mm
SSMP Signal Conductor Plug	... SSMP / ...SSMP M	10.9 mm	12.0 mm	---
SMP-MAX Signal Conductor Plug	... SMPM M	---	---	27.5 mm
SMP-MAX Signal Conductor Jack	... SMPM F	---	---	27.5 mm
P-SMP Signal Conductor Plug	... PSMP2	---	---	25.0 mm
SMPX Signal Conductor Plug	... PX F	10.4 mm	11.5 mm	---

Electrical Data

HFS-810 / 810 M **HFS-840 / 840 M**
HFS-410 / 410 M **HFS-440 / 440 M**
HFS-822 **HFS-856**
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-822/856:	up to 6 GHz
Frequency Range with HFS-860:	up to 6 GHz
Frequency Range with HFS-865:	up to 12 GHz
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range

–40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

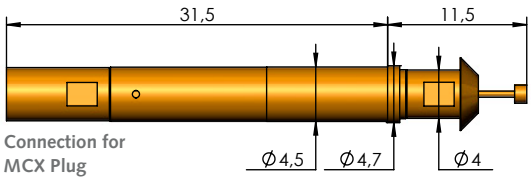
SMP-Signal Conductor Plug

up to 2 GHz (50 Ω)

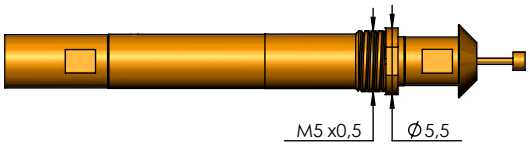
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

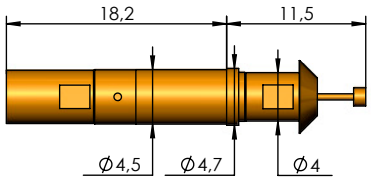
HFS-810 ...



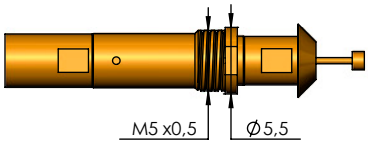
HFS-810 ... M (*)



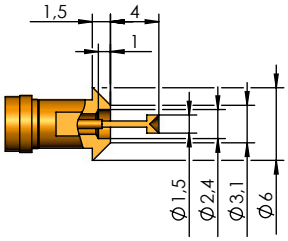
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with centering via Inner Conductor Probe. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

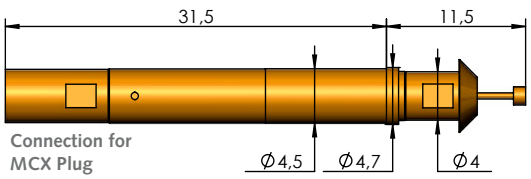
Mechanical Data
HFS-410 and HFS-410 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

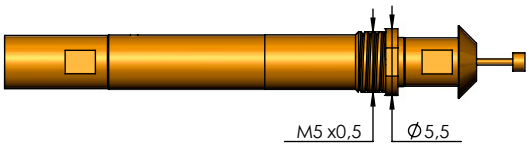
SMP-Signal Conductor ⊙ Plug

Series:

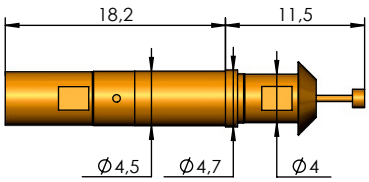
HFS-840 ...



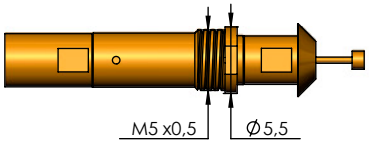
HFS-840 ... M (*)



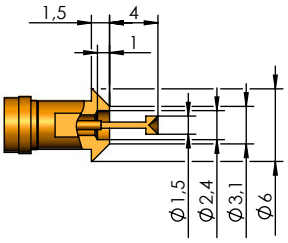
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with centering via Inner Conductor Probe.
Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

SMP Signal Conductor Plug

up to 6 GHz (50 Ω)

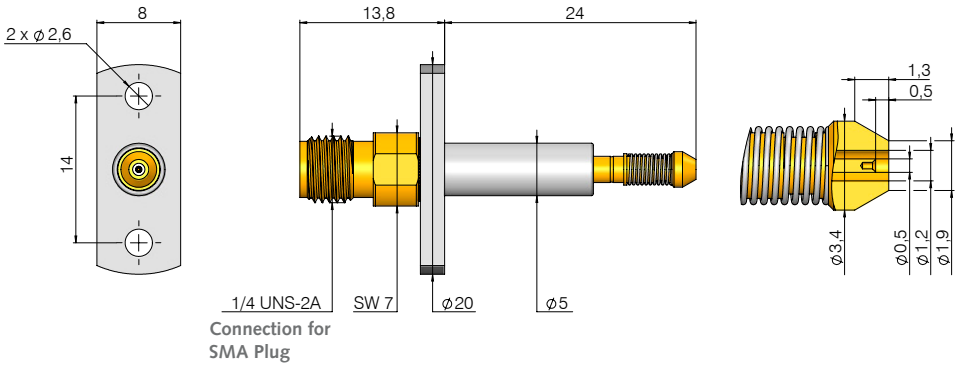
HFS-856

Series:

Available Tip Styles:

Ordering Description:

HFS-856 ...



Connection for SMA Plug

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

Note: The HFS-856 is float-mounted and the connection moves out during the working stroke movement. Compensation of radial positioning inaccuracies of the connector by up to ± 3,0°. Centering range: ± 0.7 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

	HFS-856
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

Mechanical Data

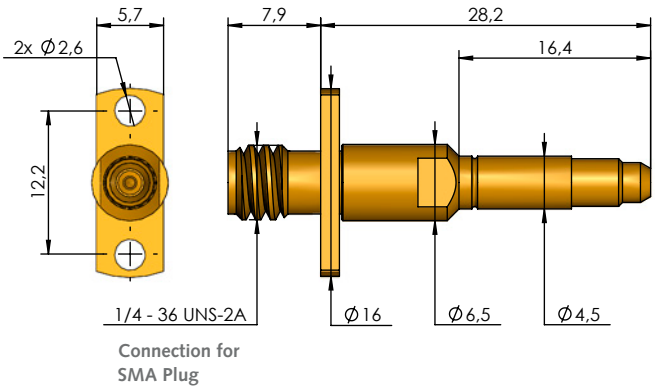
HFS-856

	Outer Cond.	Inner Cond.
Working Stroke:	4.2 mm	1.0 mm
Maximum Stroke:	5.2 mm	1.0 mm

SMP-L Signal Conductor Plug

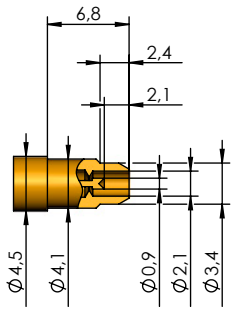
Series:

HFS-822 ...



Connection for
SMA Plug

Available
Tip Styles:



Ordering Description:

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

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character 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

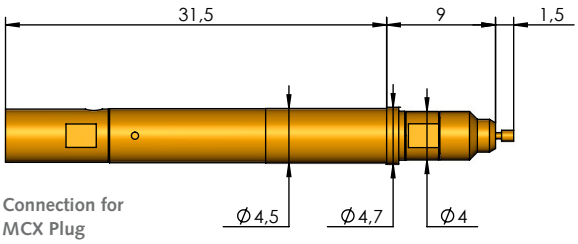
⊙ SSMP Signal Conductor Plug

up to 6 GHz (50 Ω)

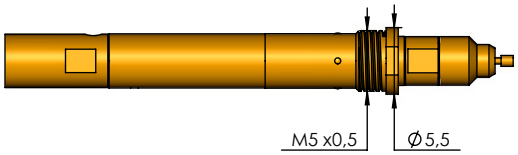
HFS-860 / HFS-860 M

Series:

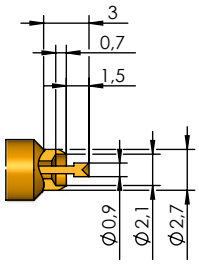
HFS-860 ...



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 precentering on the inner side of the Connector Outer Contact. Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

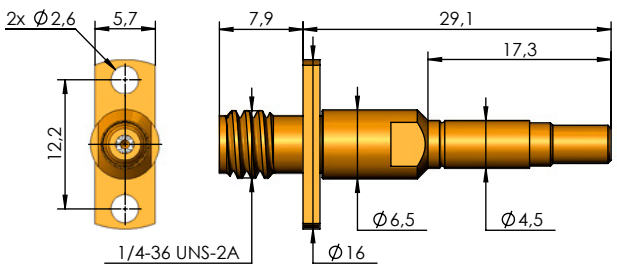
HFS-860 and HFS-860 M

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	1.0 mm
Maximum Stroke:	5.0 mm	2.7 mm

SMP-MAX Signal ⊙ Conductor Plug

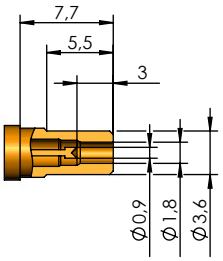
Series:

HFS-822 ...



Connection for
SMA Plug

Available Tip Styles:



Ordering Description:

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

Note: Version with flange connection. No movement of the connection during stroke movement. Pre-centering on the inner side of the Connector Contact. Centering range: ± 1,0 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-822

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

◎ SMP-MAX Signal Conductor Jack

up to 6 GHz (50 Ω)

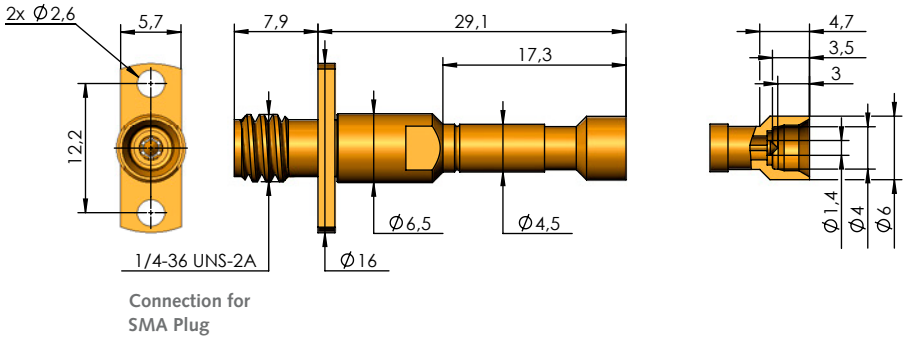
HFS-822

Series:

Available Tip Styles:

Ordering Description:

HFS-822 ...



Connection for SMA Plug

HFS-822 308 140 A **xx** 43 SMPMF

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

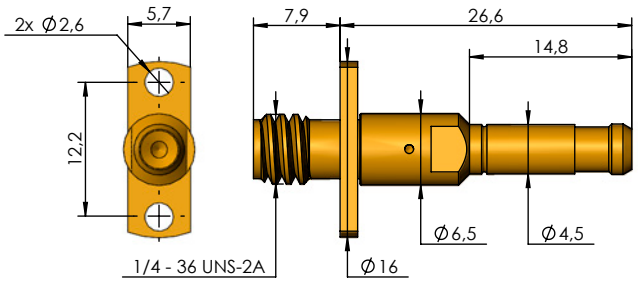
HFS-822

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

P-SMP Signal Conductor ⊙ Plug

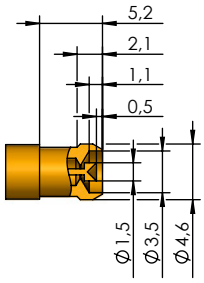
Series:

HFS-822 ...



Connection for
SMA Plug

Available Tip Styles:



Ordering Description:

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

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-822

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

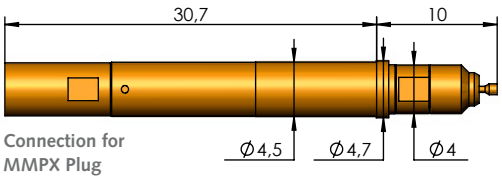
⊙ SMPX Signal Conductor Plug

up to 12 GHz
(50 Ω)

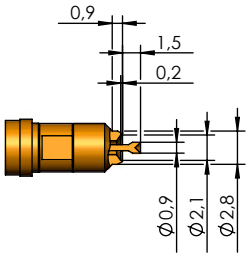
HFS-865

Series:

HFS-865 ...



Available
Tip Styles:



Ordering Description:

HFS-865 303 090 A **xx** 42 PX

Note: Version with centering via Inner Conductor Probe. Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-865		
Spring Force of Inner Conductor (N)	1.3	1.3	1.3
Spring Force of Outer Conductor (N)	4.0	6.0	8.0
Character for ordering	**53**	**73**	**93**

Mechanical Data

HFS-865

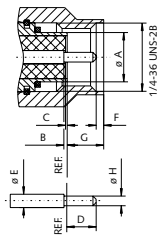
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	1.0 mm
Maximum Stroke:	5.0 mm	1.5 mm

Contacting of SMA Connectors

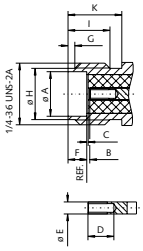
Series SMA

Connection Dimensions

Signal Conductor Plug



Signal Conductor Jack

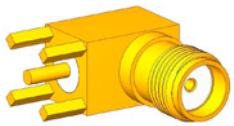


	Signal Conductor Plug		Signal Conductor Jack	
	min.	max.	min.	max.
A	-	4.59 / *.181*	4.59 / *.181*	-
B	0.00 / *.000*	0.25 / *.010*	0.00 / *.000*	0.25 / *.010*
C	0.00 / *.000*	0.25 / *.010*	0.00 / *.000*	0.25 / *.010*
D	-	2.54 / *.100*	2.67 / *.105*	-
E	1.24 / *.049*	1.29 / *.051*	1.24 / *.049*	1.29 / *.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*	-

Example of manufacturer Huber+Suhner:

SMA Signal Conductor Plug

SMA Signal Conductor Jack

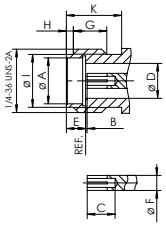


Contacting of PC 3.5 Connectors

Series PC 3.5

Connection Dimensions

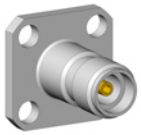
Signal Conductor Jack



	Signal Conductor Jack	
	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*	-

Example of manufacturer Huber+Suhner:

PC 3.5 Signal Conductor Jack

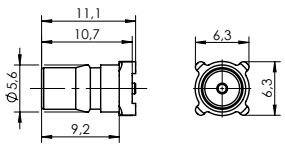


Contacting of QMA Connectors

Series QMA

Connection Dimensions

Signal Conductor Jack

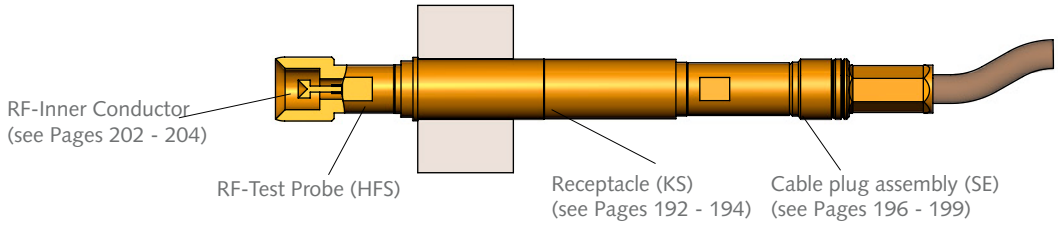


Example of manufacturer Huber+Suhner:

QMA Signal Conductor Jack

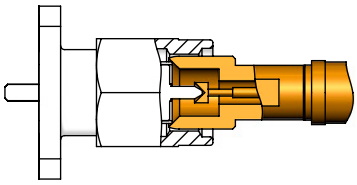
Contents

SMA / PC 3.5 / QMA Connectors

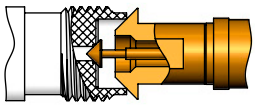


Contacting Example SMA:

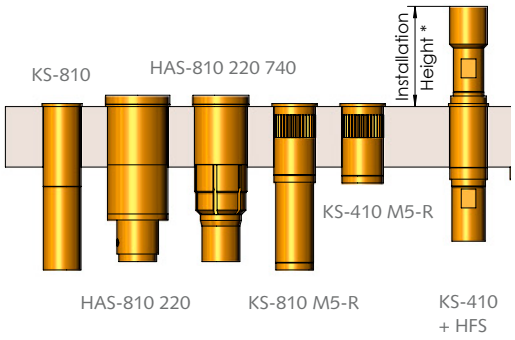
Contacting of SMA Signal Conductor Plug
HFS-840 303 150 A 5343 E3



Contacting of SMA Signal Conductor Jack
HFS-840 308 180 A 8042 E



Customizing 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
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range

–40 up to +80° C

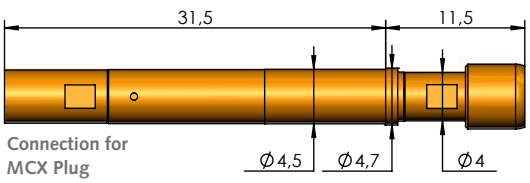
Installation Height in Receptacle		KS-810 (F) KS-410 (F) KS-810 M5-(R/F) KS-410 M5-(R/F)	HAS-810 220 (F) HAS-810 220 740 (F)
Variant		*Installation Height HFS in KS	
SMA Signal Conductor Plug	... E3 / ...E3 M	11.9 mm	13.0 mm
SMA Signal Conductor Jack	...42E / ... 42E M	11.9 mm	13.0 mm
	...43E / ... 43E 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
PC 3.5 Signal Conductor Jack	... E2F	12.2 mm	13.3 mm
QMA Signal Conductor Jack	... QMA / ... QMA M	18.3 mm	19.4 mm

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

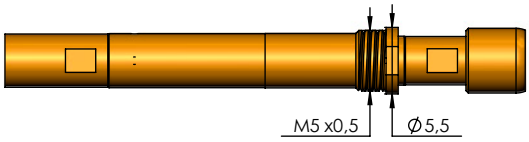
SMA Signal Conductor ⊙ Plug

Series:

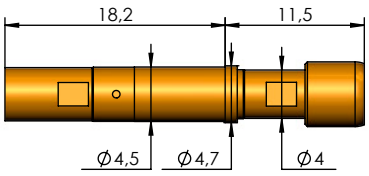
HFS-810 ...



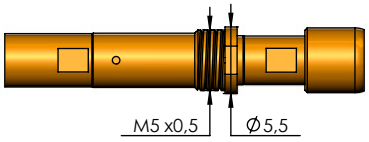
HFS-810 ... M (*)



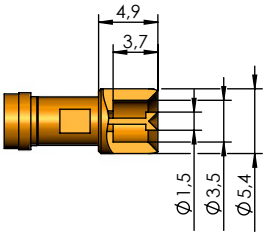
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 303 150 A **xx** 43 E3
HFS-810 303 150 A **xx** 43 E3 M
HFS-410 303 150 A **xx** 43 E3
HFS-410 303 150 A **xx** 43 E3 M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

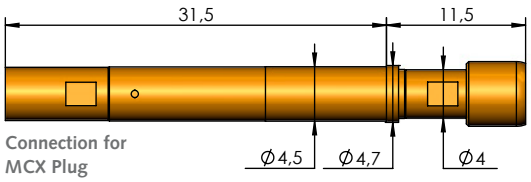
⊙ SMA Signal Conductor Plug

up to 4 GHz (50 Ω)

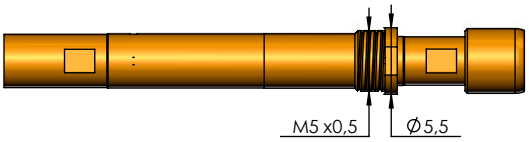
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

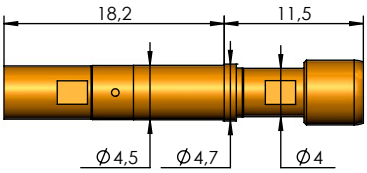
HFS-840 ...



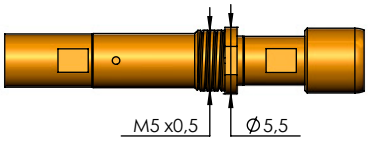
HFS-840 ... M (*)



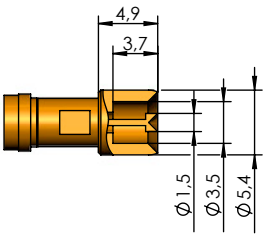
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 303 150 A **xx** 43 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-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

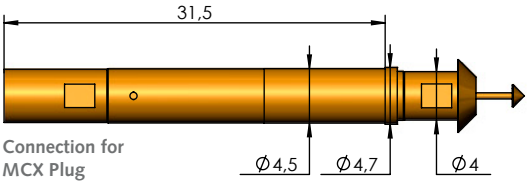
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

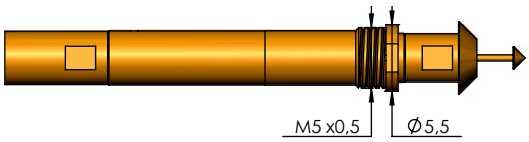
SMA Signal Conductor ◎ Jack

Series:

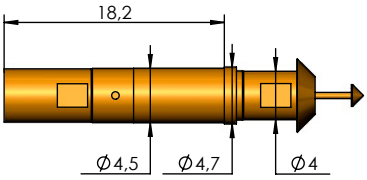
HFS-810 ...



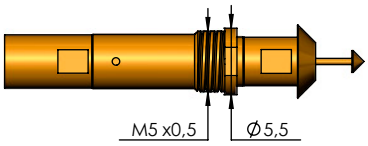
HFS-810 ... M (*)



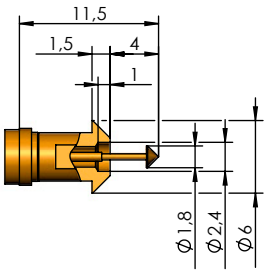
HFS-410 ...

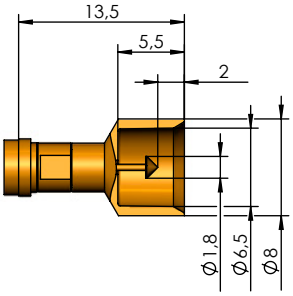


HFS-410 ... M (*)



Available Tip Styles:





Ordering Description:

HFS-810 308 180 A **xx** 42 E
HFS-810 308 180 A **xx** 42 E M
HFS-410 308 180 A **xx** 42 E
HFS-410 308 180 A **xx** 42 E M

Note: Version with pre-centering via Inner Conductor Probe.
Centering range: ± 0.3 mm

HFS-810 308 180 A **xx** 43 E
HFS-810 308 180 A **xx** 43 E M
HFS-410 308 180 A **xx** 43 E
HFS-410 308 180 A **xx** 43 E M

Note: Version with pre-centering via Outer conductor.
Centering range: ± 1.0 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

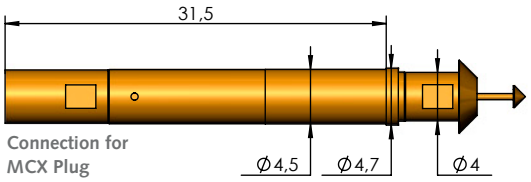
◎ SMA Signal Conductor Jack

up to 4 GHz (50 Ω)

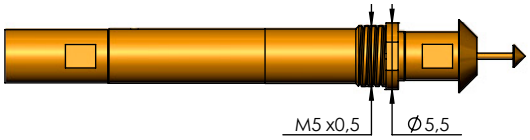
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

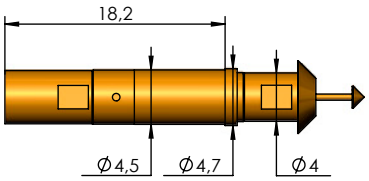
HFS-840 ...



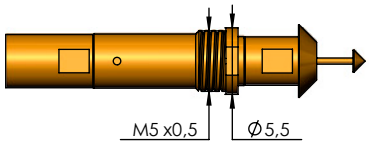
HFS-840 ... M (*)



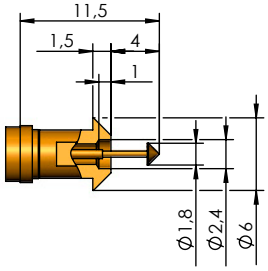
HFS-440 ...

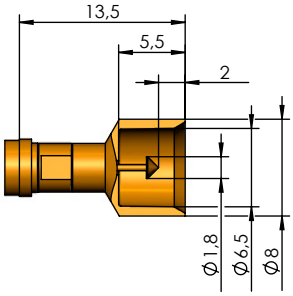


HFS-440 ... M (*)



Available Tip Styles:





Ordering Description:

HFS-840 308 180 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 Probe.
Centering 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.
Centering range: ± 1.0 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

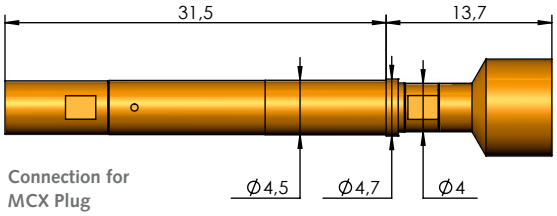
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

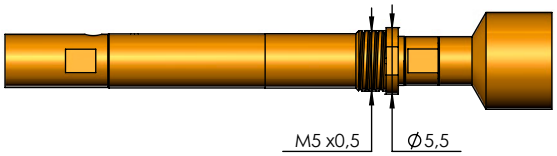
SMA Signal Conductor ◎ Jack

Series:

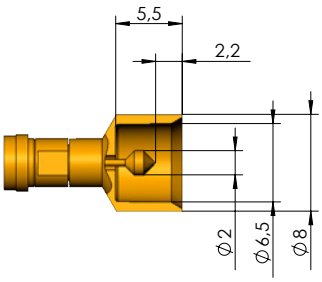
HFS-860 ...



HFS-860 ... M (*)



Available
Tip Styles:



Ordering Description:

HFS-860 308 200 A **xx** 43 E
HFS-860 308 200 A **xx** 43 E M

Note: Version with pre-centering via Outer conductor. Centering range: ± 1.0 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-860 and HFS-860 M

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	0.6 mm
Maximum Stroke:	5.0 mm	1.1 mm

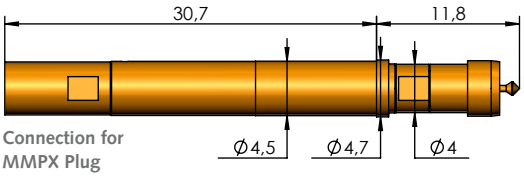
⊙ SMA Signal Conductor Jack

up to 12 GHz (50 Ω)

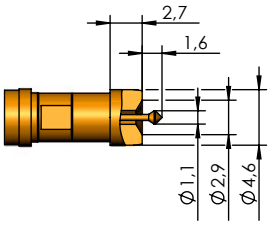
HFS-865

Series:

HFS-865 ...



Available Tip Styles:



Ordering Description:

HFS-865 308 110 A **xx** 42 E1F

Note: Version with centering via Inner Conductor Probe. Centering range: ± 0.05 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-865		
Spring Force of Inner Conductor (N)	1.3	1.3	1.3
Spring Force of Outer Conductor (N)	4.0	6.0	8.0
Character for ordering	**53**	**73**	**93**

Mechanical Data

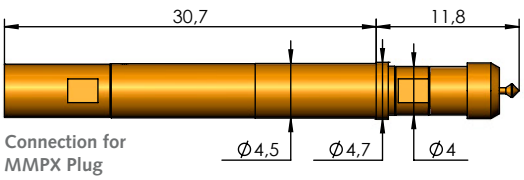
HFS-865

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	1.0 mm
Maximum Stroke:	5.0 mm	1.5 mm

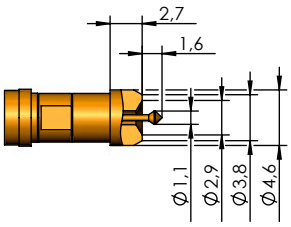
PC 3.5 Signal Conductor ◎ Jack

Series:

HFS-865 ...



Available
Tip Styles:



Ordering Description:

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

Note: Version with centering via Inner Conductor Probe.
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-865		
Spring Force of Inner Conductor (N)	1.3	1.3	1.3
Spring Force of Outer Conductor (N)	4.0	6.0	8.0
Character 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

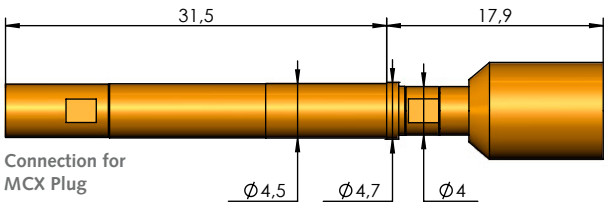
◎ QMA Signal Conductor Jack

up to 6 GHz (50 Ω)

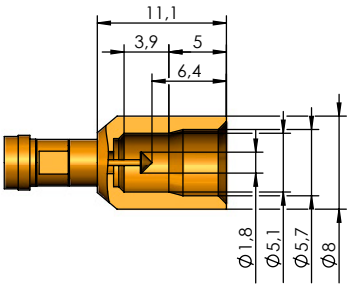
HFS-860 / HFS-860 M

Series:

HFS-860 ...



Available Tip Styles:

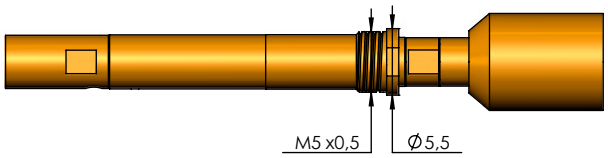


Ordering Description:

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. Centering range: ± 0.8 mm

HFS-860 ... M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-860 and HFS-860 M

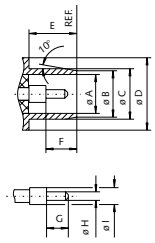
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

Contacting of BMA Connectors

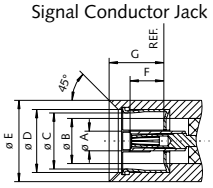
Series BMA

Connection Dimensions

Signal Conductor Plug



Signal Conductor Jack



	Signal Conductor Plug		Signal Conductor Jack	
	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.*		-	-

Example of manufacturer Huber+Suhner:

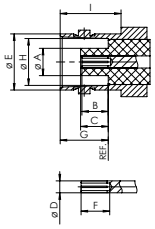
BMA Signal Conductor Plug

Contacting of BNC Connectors

Series BNC

Connection Dimensions

Signal Conductor Plug



	Signal Conductor Plug	
	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*	-

Example of manufacturer Huber+Suhner:

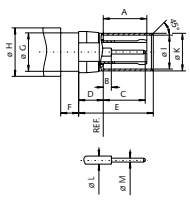
BNC Signal Conductor Jack

Contacting of 1.0 / 2.3 Connectors

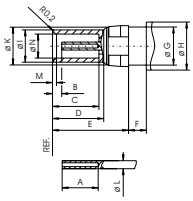
Series 1.0 / 2.3

Connection Dimensions

Signal Conductor Plug



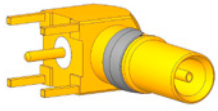
Signal Conductor Jack



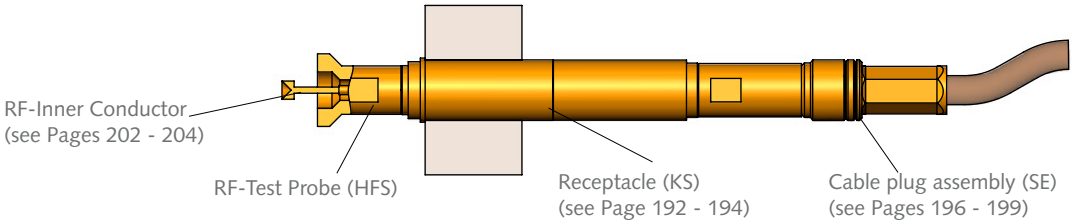
	Signal Conductor Plug		Signal Conductor Jack	
	min.	max.	min.	max.
A	5.40 / *.213*	5.70 / *.224*	4.50 / *.177*	-
B	-	1.15 / *.045*	1.15 / *.045*	1.45 / *.057*
C	5.20 / *.205*	5.50 / *.217*	5.80 / *.228*	5.90 / *.232*
D	3.05 / *.120*	3.20 / *.126*	6.40 / *.252*	6.50 / *.256*
E	9.25 / *.364*	9.35 / *.368*	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*

Example of manufacturer Huber+Suhner:

1.0 / 2.3 Signal Conductor Jack

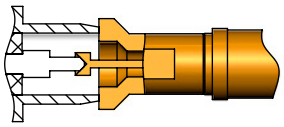


BMA / BNC / 1.0/2.3 Connectors

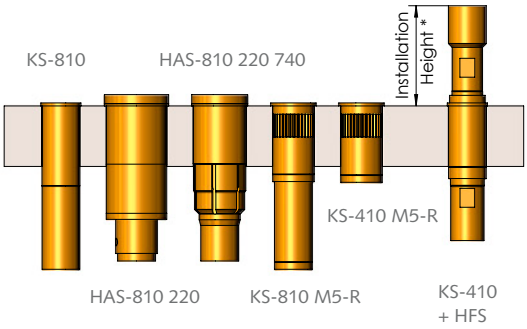


Contacting Example BMA:

Contacting of BMA Signal Conductor Plug
HFS-810 303 150 A 5302 D



Customizing 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)
Variant		*Installation Height HFS in KS	
BMA Signal Conductor Plug	... D / ... D M	11.8 mm	12.9 mm
BNC Signal Conductor Jack	... QS / ... QS M	14.8 mm	15.9 mm
1.0/2.3 Signal Conductor Jack	... T / ... T M	12.8 mm	13.9 mm

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
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range

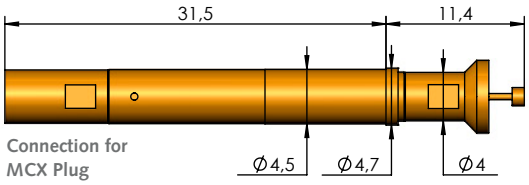
–40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

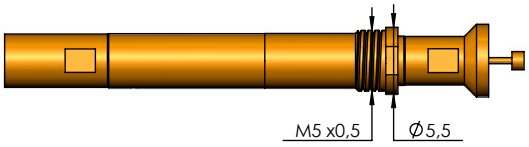
BMA Signal Conductor ⊙ Plug

Series:

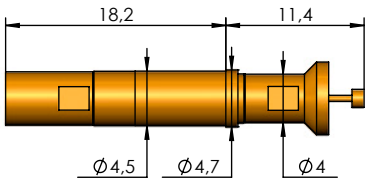
HFS-810 ...



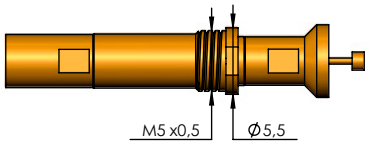
HFS-810 ... M (*)



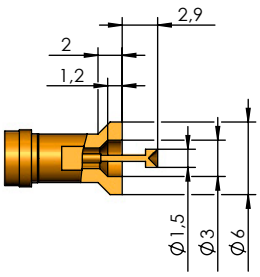
HFS-410 ...



HFS-410 ... M (*)



Available
Tip Styles:



Ordering Description:

HFS-810 303 150 A **xx** 02 D
HFS-810 303 150 A **xx** 02 D M
HFS-410 303 150 A **xx** 02 D
HFS-410 303 150 A **xx** 02 D M

Note: Version with pre-centering via Inner Conductor Probe.
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

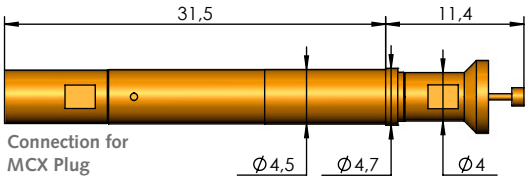
⊙ BMA Signal Conductor Plug

up to 4 GHz (50 Ω)

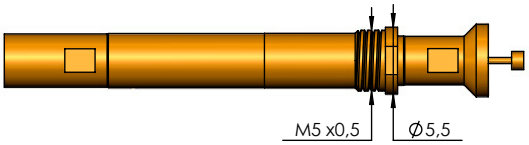
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

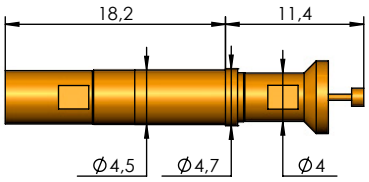
HFS-840 ...



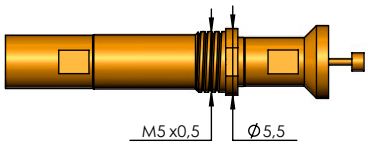
HFS-840 ... M (*)



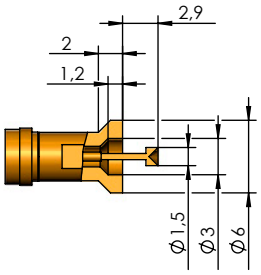
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 303 150 A **xx** 02 D
HFS-840 303 150 A **xx** 02 D M
HFS-440 303 150 A **xx** 02 D
HFS-440 303 150 A **xx** 02 D M

Note: Version with pre-centering via Inner Conductor Probe.
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

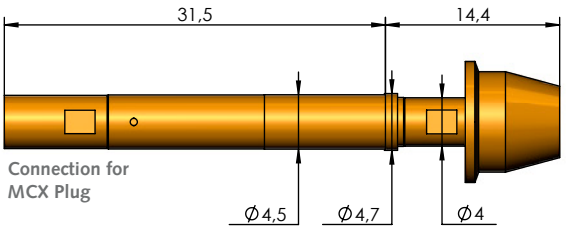
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

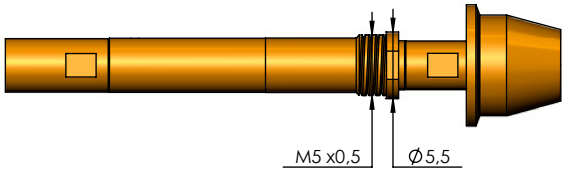
BNC Signal Conductor ◎ Jack

Series:

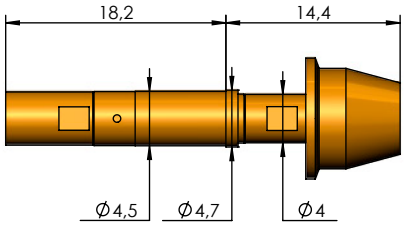
HFS-810 ...



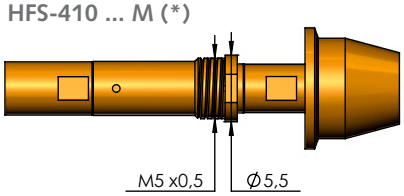
HFS-810 ... M (*)



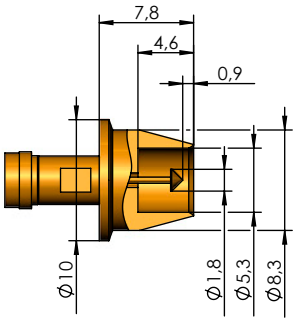
HFS-410 ...



HFS-410 ... M (*)



Available
Tip Styles:



Ordering Description:

HFS-810 358 180 A **xx** 42 QS
HFS-810 358 180 A **xx** 42 QS M
HFS-410 358 180 A **xx** 42 QS
HFS-410 358 180 A **xx** 42 QS M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 1.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

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	2.5 mm

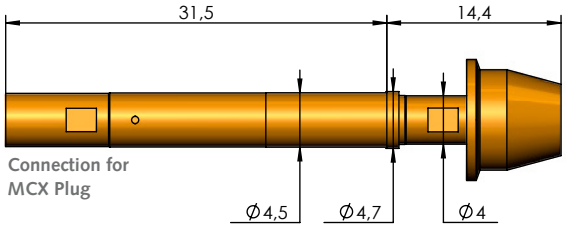
◎ BNC Signal Conductor Jack

up to 4 GHz (50 Ω)

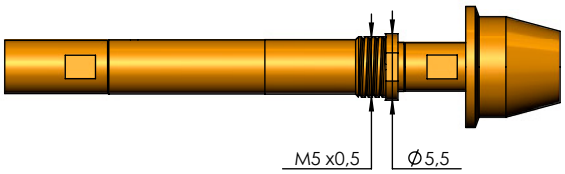
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

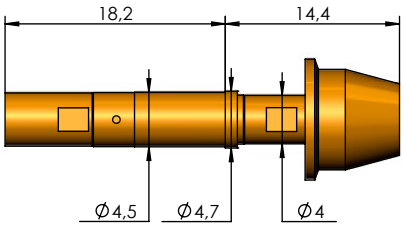
HFS-840 ...



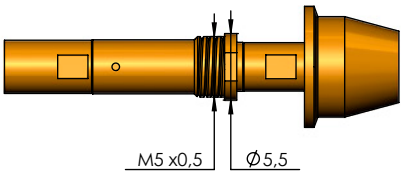
HFS-840 ... M (*)



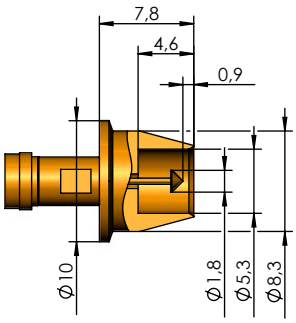
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 358 180 A **xx** 42 QS
HFS-840 358 180 A **xx** 42 QS M
HFS-440 358 180 A **xx** 42 QS
HFS-440 358 180 A **xx** 42 QS M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 1.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data
HFS-840 and HFS-840 M

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.7 mm
Maximum Stroke:	5.0 mm	3.2 mm

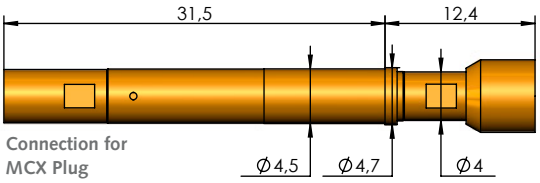
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	2.5 mm

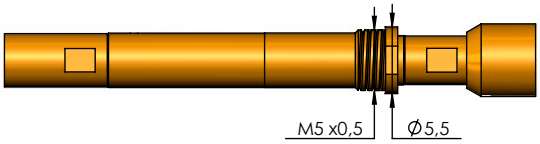
1.0 / 2.3 ◎
Signal Conductor Jack

Series:

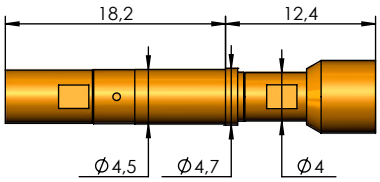
HFS-810 ...



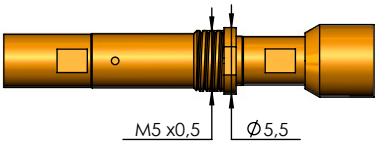
HFS-810 ... M (*)



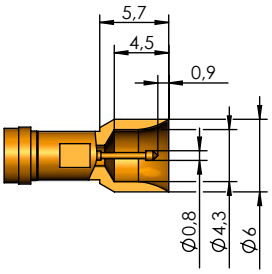
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 308 080 A **xx** 43 T
HFS-810 308 080 A **xx** 43 T M
HFS-410 308 080 A **xx** 43 T
HFS-410 308 080 A **xx** 43 T M

Note:
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

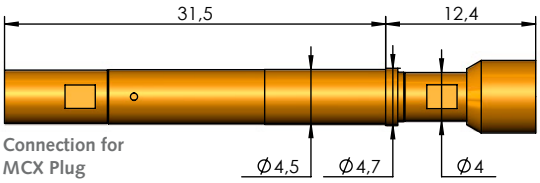
◎ 1.0 / 2.3 Signal Conductor Jack

up to 4 GHz (50 Ω)

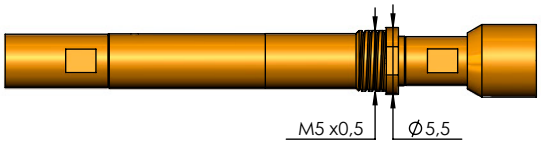
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

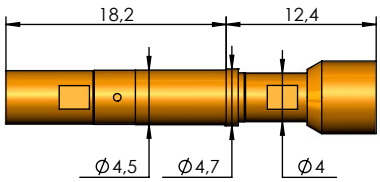
HFS-840 ...



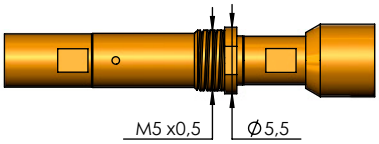
HFS-840 ... M (*)



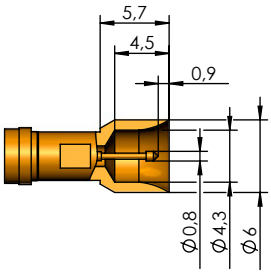
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 308 080 A **xx** 43 T
HFS-840 308 080 A **xx** 43 T M
HFS-440 308 080 A **xx** 43 T
HFS-440 308 080 A **xx** 43 T M

Note:
Centering range: ± 0.6 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

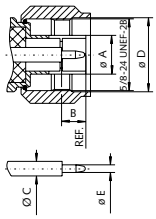
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

Contacting of N Connectors

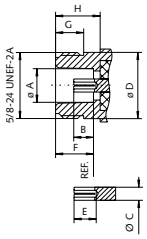
Series N

Connection Dimensions

Signal Conductor Plug



Signal Conductor Jack



	Signal Conductor Plug		Signal Conductor Jack	
	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*

Example of manufacturer Huber+Suhner:

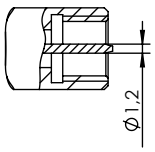
N Signal Conductor Jack

Contacting of FME Connectors

Series FME

Connection Dimensions

Signal Conductor Plug



Example:

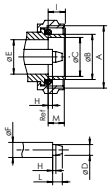
FME Signal Conductor Plug

Contacting of 7/16 Connectors

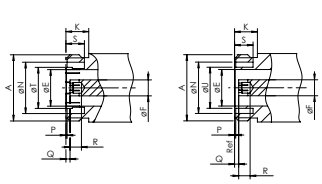
Series 7/16

Connection Dimensions

Signal Conductor Plug



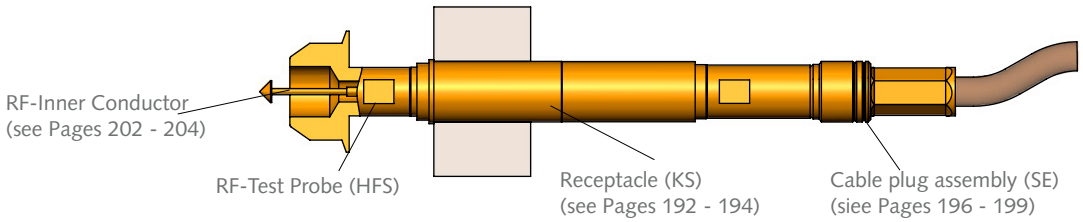
Signal Conductor Jack



	Signal Conductor Plug		Signal Conductor Jack	
	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*

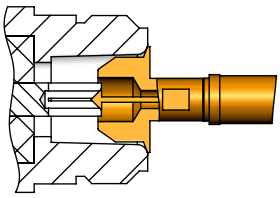
Example of manufacturer Huber+Suhner:

7/16 Signal Conductor Jack

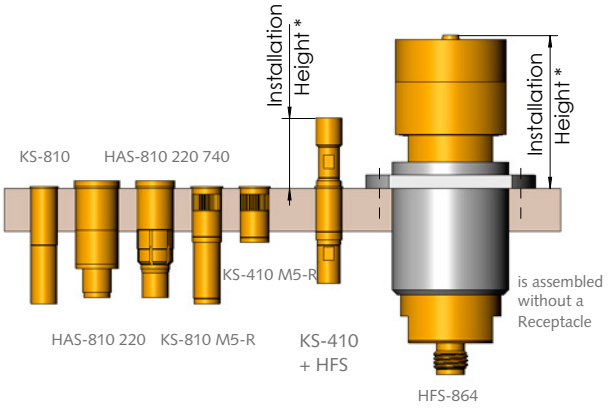


Contacting Example N:

Contacting of N Signal Conductor Jack
HFS-810 358 180 A 5342 Q



Customizing 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
Variant		*Installation Height HFS in KS		
N Signal Conductor Jack	... Q / ... Q M	13.9 mm	15.0 mm	---
	(HFS-860) ... Q / ... Q M	14.7 mm	15.8 mm	---
FME Signal Conductor Plug	... W / ... W M	13.9 mm	15.0 mm	---
7/16 Signal Conductor Jack	...F716	---	---	28.9 mm

Electrical Data

HFS-810 / 810 M **HFS-840 / 840 M**
HFS-410 / 410 M **HFS-440 / 440 M**
HFS-860 / 860 M **HFS-864**

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-864:	up to 7.5 GHz
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range

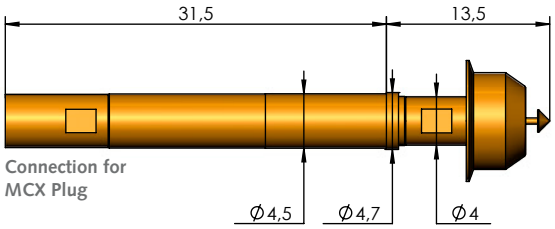
–40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

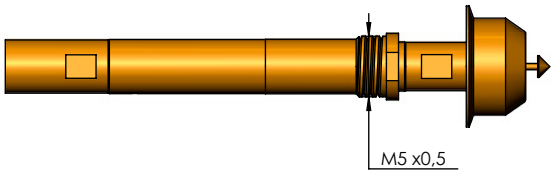
N Signal Conductor ◎ Jack

Series:

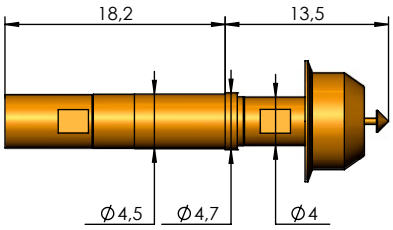
HFS-810 ...



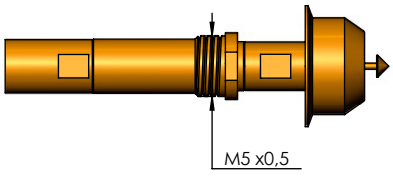
HFS-810 ... M (*)



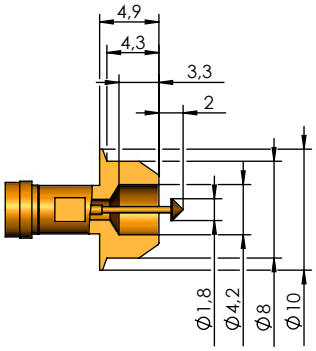
HFS-410 ...



HFS-410 ... M (*)



Available
Tip Styles:



Ordering Description:

HFS-810 358 180 A **xx** 42 Q
HFS-810 358 180 A **xx** 42 Q M
HFS-410 358 180 A **xx** 42 Q
HFS-410 358 180 A **xx** 42 Q M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering Range: ± 0.8 mm

N / FME / 7/16

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data
HFS-810 und 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 und HFS-410 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

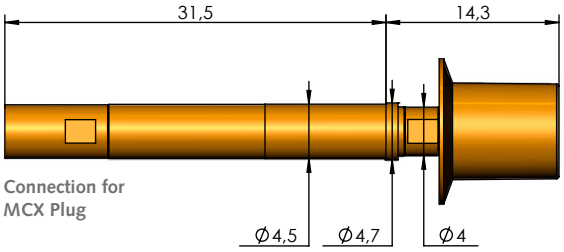
◎ N Signal Conductor Jack

up to 6 GHz (50 Ω)

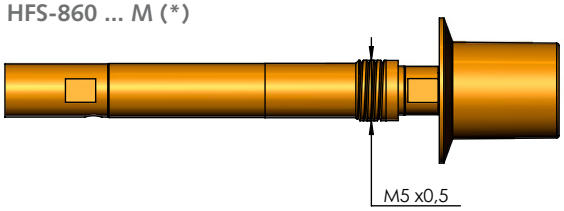
HFS-860 / HFS-860 M

Series:

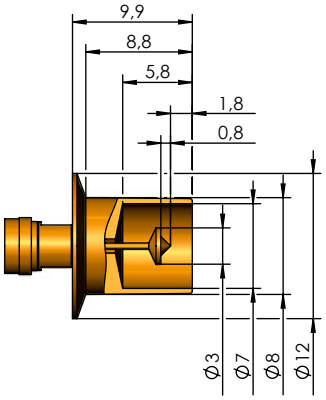
HFS-860 ...



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-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.8 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

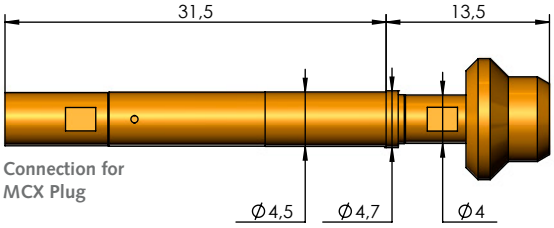
FME Signal Conductor ⊙ Plug

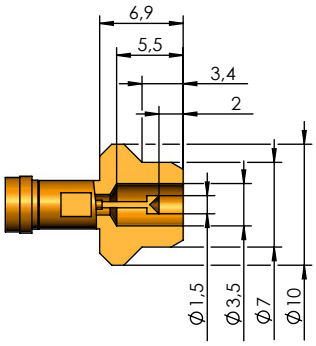
Series:

Available Tip Styles:

Ordering Description:

HFS-810 ...

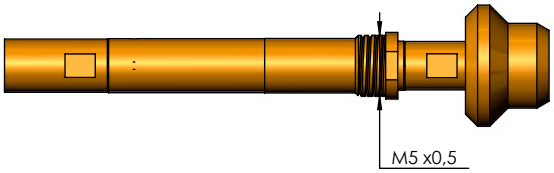




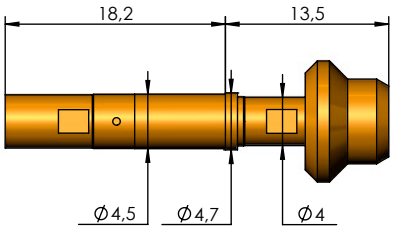
HFS-810 303 150 A **xx** 42 W
HFS-810 303 150 A **xx** 42 W M
HFS-410 303 150 A **xx** 42 W
HFS-410 303 150 A **xx** 42 W M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

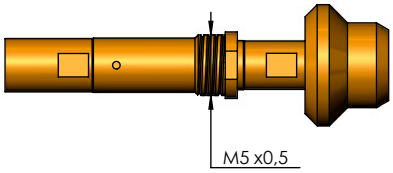
HFS-810 ... M (*)



HFS-410 ...



HFS-410 ... M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

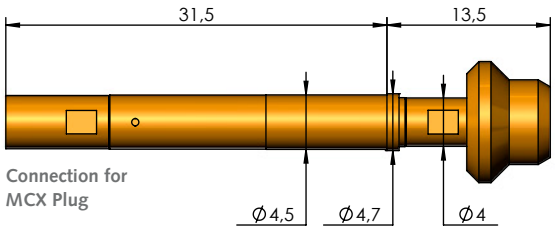
FME Signal Conductor Plug

up to 4 GHz (50 Ω)

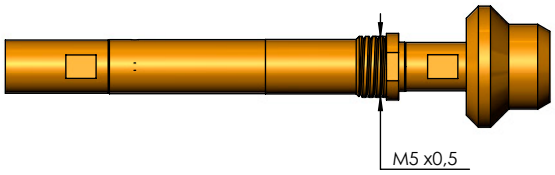
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

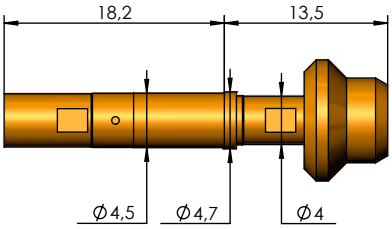
HFS-840 ...



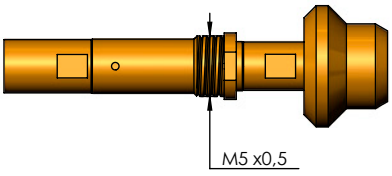
HFS-840 ... M (*)



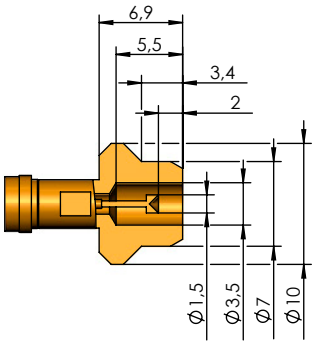
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

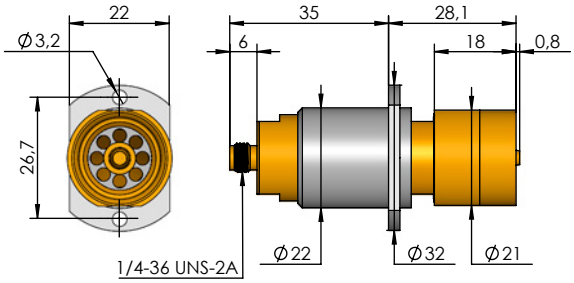
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

7/16 Signal Conductor ◎ Jack

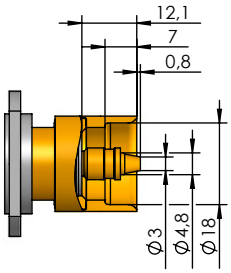
Series:

HFS-864 ...



Connection for
SMA Plug

Available
Tip Styles:



Ordering Description:

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

Note: Version with flange connection.
Centering range: ± 1.0 mm

N / FME / 7/16

	HFS-864
Spring Force of Inner Conductor (N)	5.0
Spring Force of Outer Conductor (N)	23.6
Character for ordering	**286**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

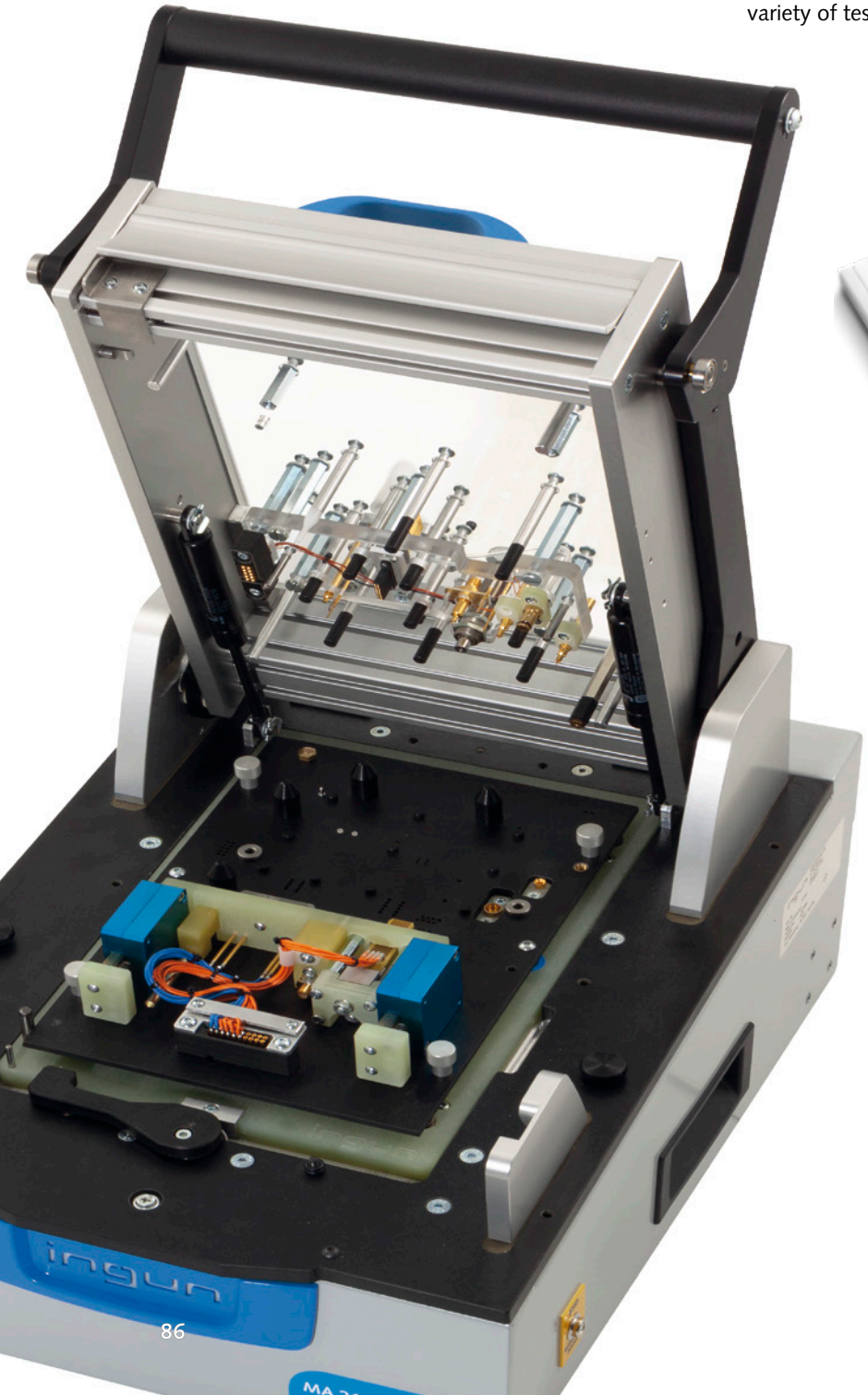
Mechanical Data

HFS-864

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	4.0 mm

The Test Fixtures Catalog

INGUN test fixtures are used by our customers in various industries and enable precise, accurarately repeatable testing of electronic functional units. As a leading company, INGUN offers standardised test fixtures for all common test systems - from manual, pneumatic and vacuum-operated test fixtures to inline exchangeable kits - and an unmatched variety of test fixture accessories.

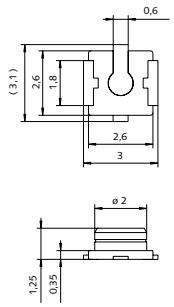


Ask for our new Test Fixtures Catalog or take a look on our Internet homepage www.ingun.com

Contacting of U.FL Connectors

Series U.FL

Connection Dimensions

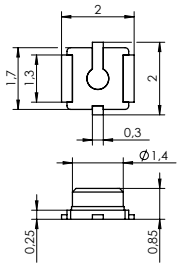


Example:
U.FL Signal Conductor Plug

Contacting of W.FL Connectors

Series W.FL

Connection Dimensions

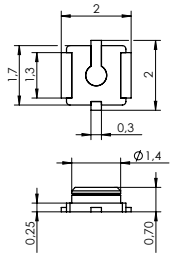


Example:
W.FL Signal Conductor Plug

Contacting of W.FL2 Connectors

Series W.FL 2

Connection Dimensions

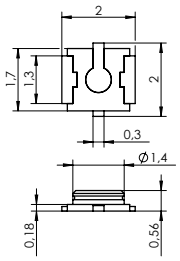


Example:
W.FL 2 Signal Conductor Plug

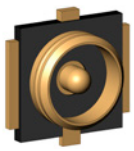
Contacting of X.FL Connectors

Series X.FL

Connection Dimensions



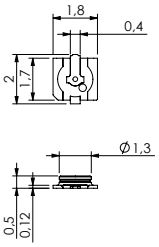
Example:
X.FL Signal Conductor Plug



Contacting of MM5829 Connectors

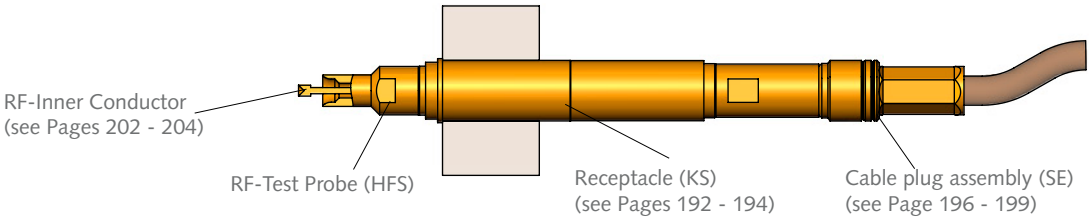
Series MM5829

Connection Dimensions
Signal Conductor Plug



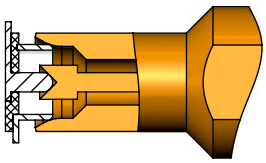
Example:
MM5829 Signal Conductor Plug

U.FL / W.FL / W.FL2 / X.FL / MM5829 Connectors

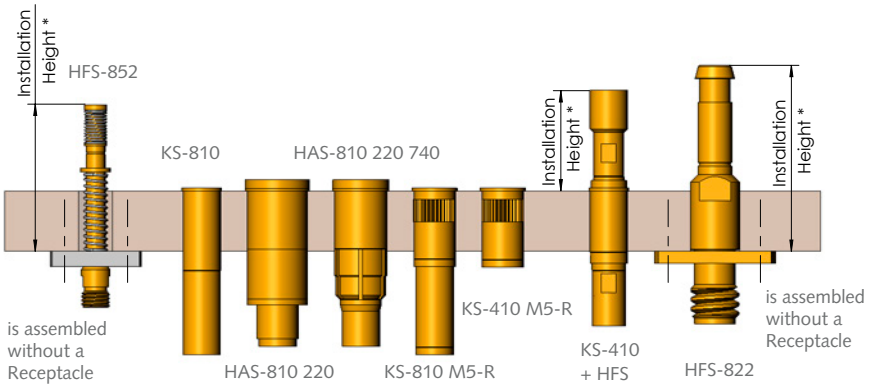


Contacting Example U.FL:

Contacting of U.FL Signal Conductor Plug
HFS-810 303 090 A 5343 Y6



Customizing Example:



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
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	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
Variant		*Installation Height HFS in KS		
U.FL Signal Conductor Plug	...Y6 / ...Y6 M	11.9 mm	13 mm	---
	(HFS-822)	---	---	27.0 mm
	(HFS-852)	---	---	19.3 mm
	(HFS-856)	---	---	22.4 mm
W.FL Signal Conductor Plug	... Y52	9.8 mm	10.9 mm	---
	... XFL-H	---	---	22.4 mm
W.FL 2 Signal Conductor Plug	... Y52	9.8 mm	10.9 mm	---
	... XFL-H	---	---	22.4 mm
X.FL Signal Conductor Plug	... Y52	9.8 mm	10.9 mm	---
	... XFL-H	---	---	22.4 mm
MM5829-Signal Conductor Plug	... MM5829	---	---	23.1 mm

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

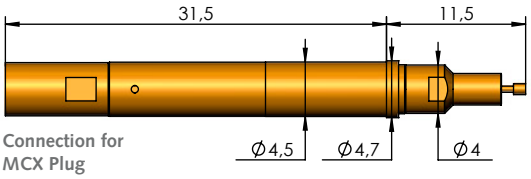
U.FL Signal Conductor Plug

up to 2 GHz (50 Ω)

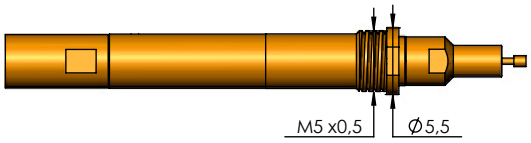
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

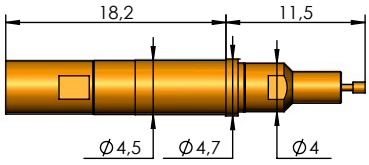
HFS-810 ...



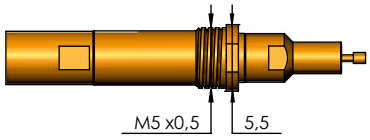
HFS-810 ... M (*)



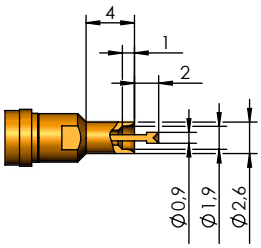
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 303 090 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:
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

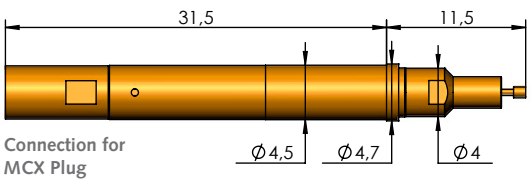
Mechanical Data
HFS-410 and HFS-410 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

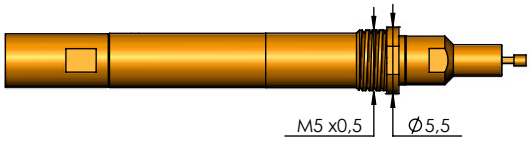
U.FL Signal Conductor ⊙ Plug

Series:

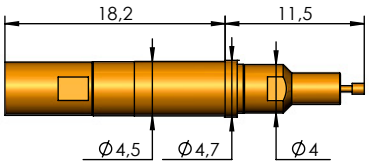
HFS-840 ...



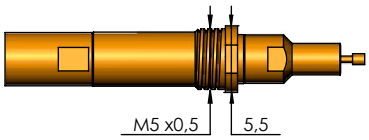
HFS-840 ... M (*)



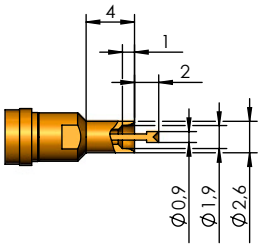
HFS-440 ...



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:
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

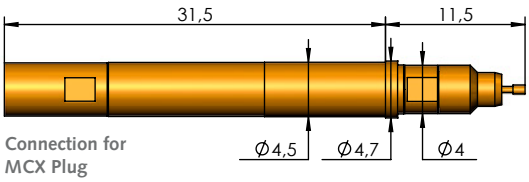
⊙ U.FL Signal Conductor Plug

up to 6 GHz (50 Ω)

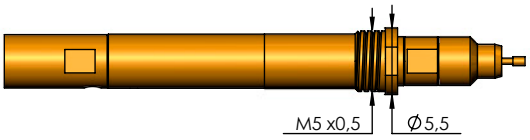
HFS-860 / HFS-860 M

Series:

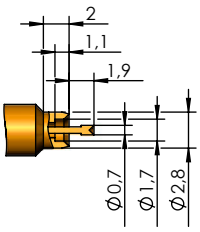
HFS-860 ...



HFS-860 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note:
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

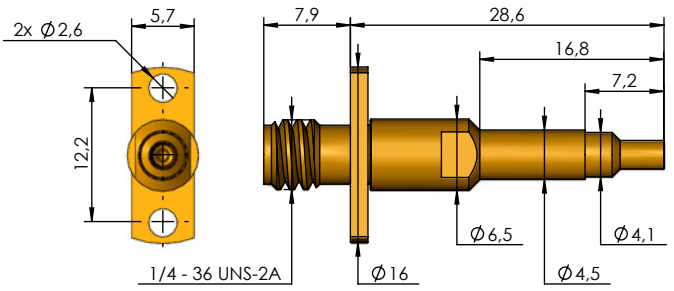
U.FL Signal Conductor Plug

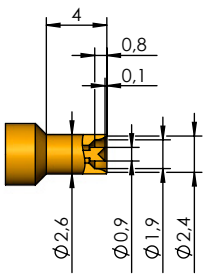
Series:

Available Tip Styles:

Ordering Description:

HFS-822 ...





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

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

Mechanical Data

HFS-822

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	4.0 mm
Maximum Stroke	4.5 mm	4.5 mm

U.FL Signal Conductor Plug

up to 6 GHz (50 Ω)

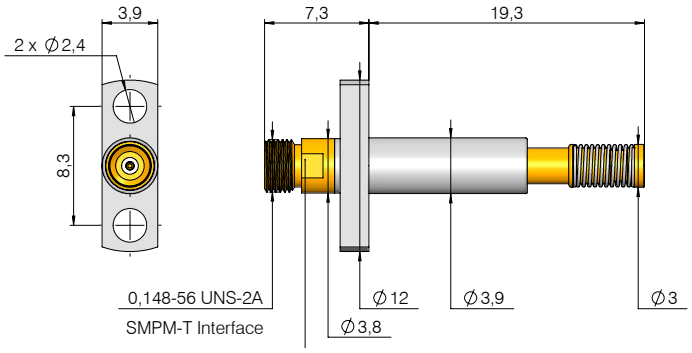
HFS-852

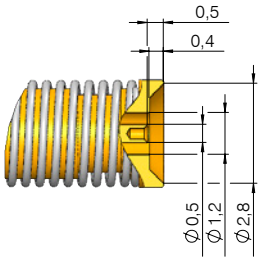
Series:

Available Tip Styles:

Ordering Description:

HFS-852 ...





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

Note: The HFS-852 is float-mounted and moves out during the working stroke movement. Compensation of radial positioning inaccuracies of the connector by up to ± 2,0°. Centering range: ± 0.3 mm

	HFS-852
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	3.0
Character for ordering	**40**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-852

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

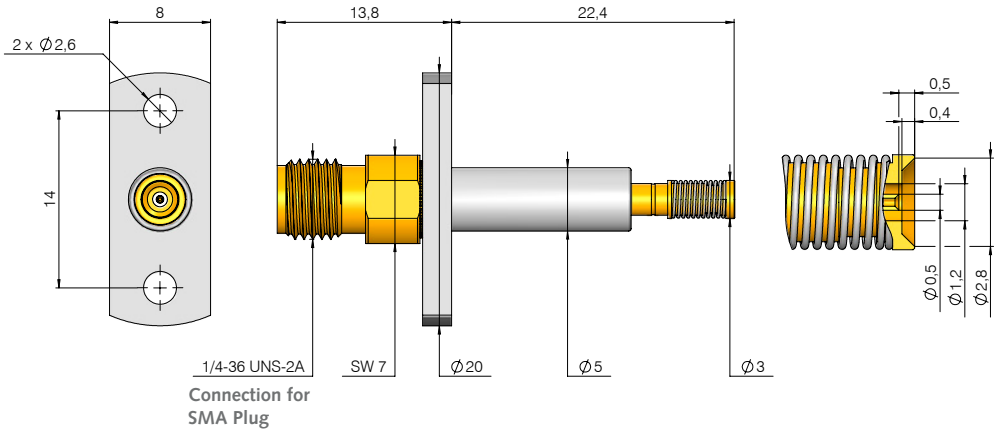
U.FL Signal Conductor ⊙ Plug

Series:

Available Tip Styles:

Ordering Description:

HFS-856 ...



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

Note: The HFS-856 is float-mounted and the connection moves out during the working stroke movement.
Compensation of radial positioning inaccuracies of the connector by up to ± 3,0°.
Centering range: ± 0.3 mm

	HFS-856
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.2
Character for ordering	**55**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-856

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

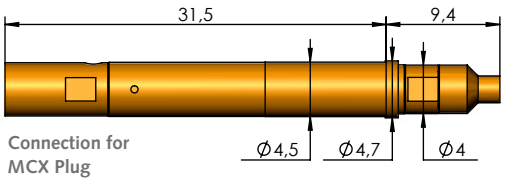
⊙ W.FL / W.FL2 / X.FL Signal Conductor Plug

up to 6 GHz (50 Ω)

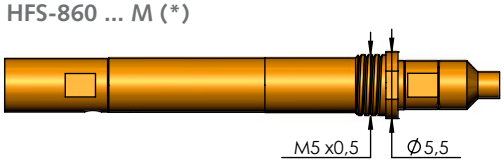
HFS-860 / HFS-860 M

Series:

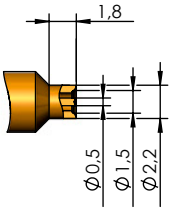
HFS-860 ...



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:
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-860 and HFS-860 M

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	0.2 mm
Maximum Stroke:	5.0 mm	1.8 mm

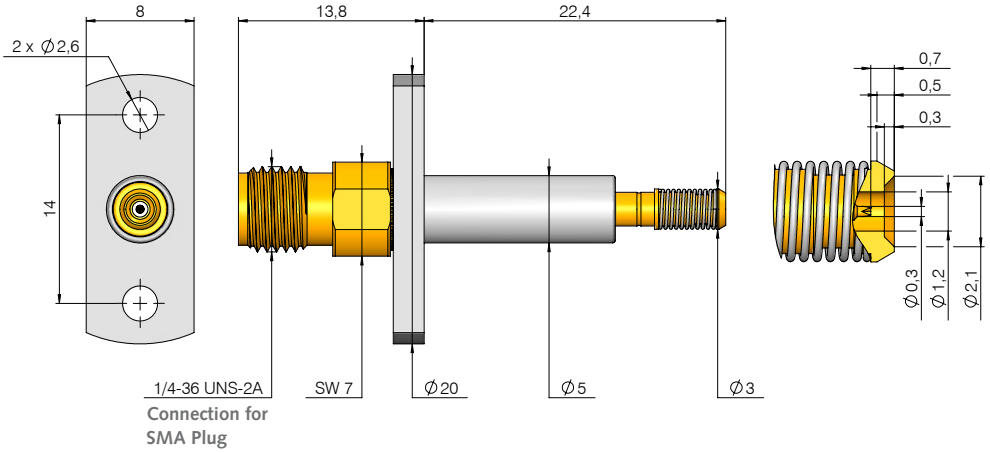
W.FL / W.FL2 / X.FL ⊙ Signal Conductor Plug

Series:

Available Tip Styles:

Ordering Description:

HFS-856 ...



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

Note: The HFS-856 is float-mounted and the connection moves out during the working stroke movement.
Compensation of radial positioning inaccuracies of the connector by up to ± 3,0°.
Centering range: ± 0.3 mm

	HFS-856
Spring Force of Inner Conductor (N)	1.5
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**55**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-856

	Outer Cond.	Inner Cond.
Working Stroke:	4.2 mm	0,9 mm
Maximum Stroke:	5.2 mm	1,5 mm

MM5829
Signal Conductor Plug

up to 6 GHz
(50 Ω)

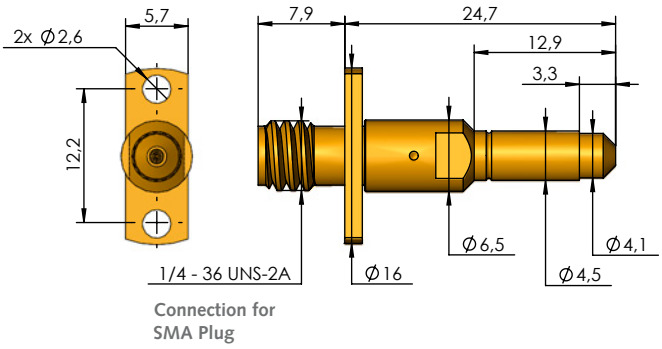
HFS-822

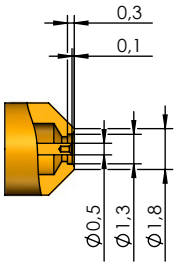
Series:

Available
Tip Styles:

Ordering Description:

HFS-822 ...





HFS-822 303 051 A **xx** 43 MM5829

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.1 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-822
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**50**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

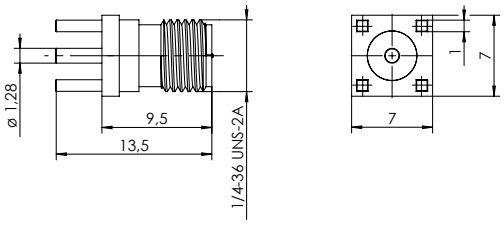
HFS-822

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	2.4 mm	2.4 mm

Contacting of R-SMA Reverse Polarity Connectors

Series R-SMA

Connection Dimensions
Signal Conductor Plug

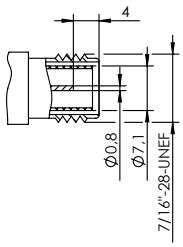


Example:
R-SMA Signal Conductor Plug

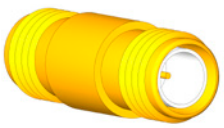
Contacting of R-TNC Reverse Polarity Connectors

Series R-TNC

Connection Dimensions
Signal Conductor Plug

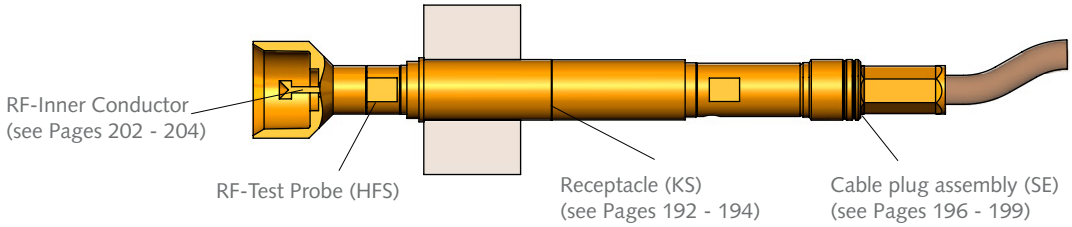


Example:
R-TNC Signal Conductor Plug



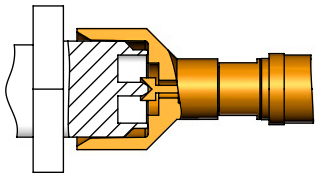
Contents

R-SMA / R-TNC
Reverse Polarity Connectors

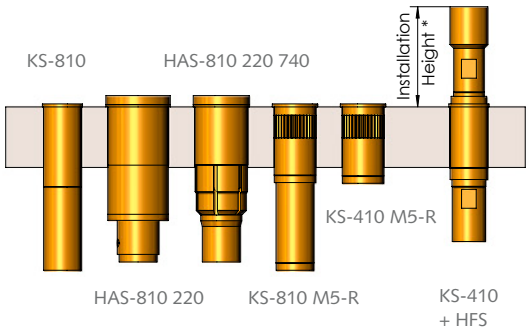


Contacting Example R-SMA:

Contacting of R-SMA Signal Conductor Plug
HFS-860 303 150 A 5343 ER



Customizing 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)
Variant		*Installation Height HFS in KS	
R-SMA Signal Conductor Plug	... ER / ... ER M	14.1 mm	15.2 mm
R-TNC Signal Conductor Plug	... 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:	bis 2 GHz
Frequency Range with HFS-840/440:	bis 4 GHz
Frequency Range with HFS-860:	bis 6 GHz
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable	50 Ω

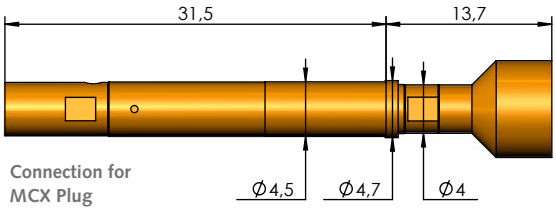
Operating Temperature Range
–40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

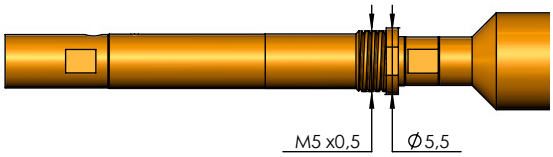
R-SMA Signal Conductor ⊙ Plug

Series:

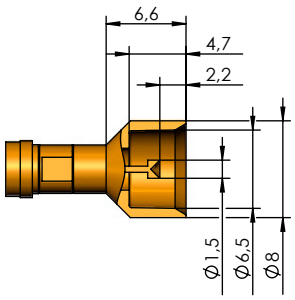
HFS-860 ...



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-centering via Outer conductor. Outer conductor centers itself from the outer side on the Connector.
Centering range: ± 1.0 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

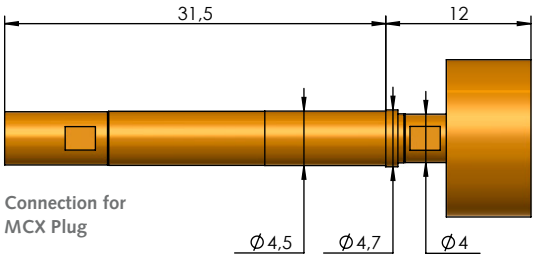
R-TNC Signal Conductor Plug

up to 2 GHz (50 Ω)

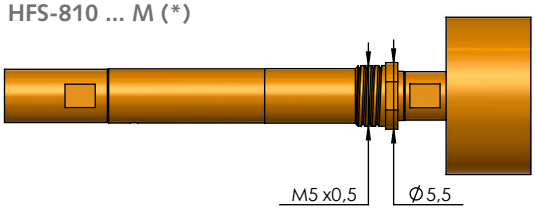
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

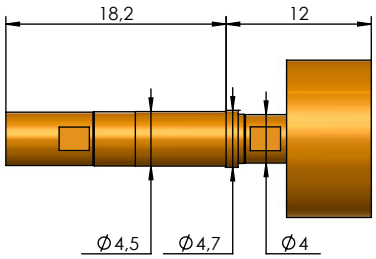
HFS-810 ...



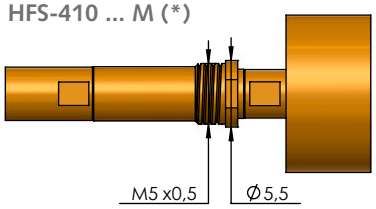
HFS-810 ... M (*)



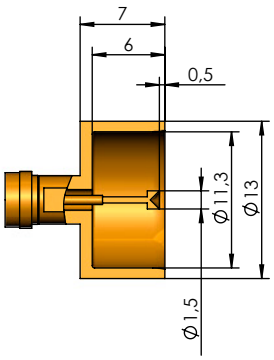
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with pre-centering via Outer conductor. Outer conductor centers itself from the outer side on the Connector.
Centering range: ± 0.8 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data
HFS-810 and HFS-810 M

	Outer Cond.	Inner Cond.
Working Stroke:	3.0 mm	1,7 mm
Maximum Stroke:	4.0 mm	3.7 mm

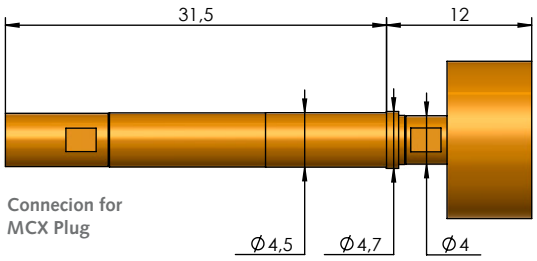
Mechanical Data
HFS-410 and HFS-410 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	1,7 mm
Maximum Stroke:	3.0 mm	3.0 mm

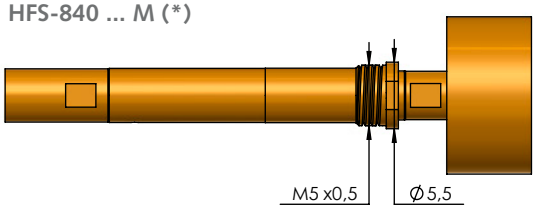
R-TNC Signal Conductor ⊙ Plug

Series:

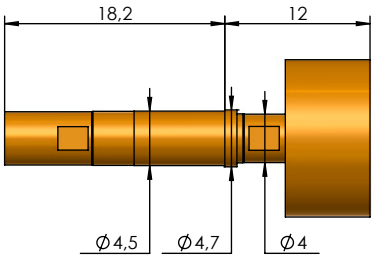
HFS-840 ...



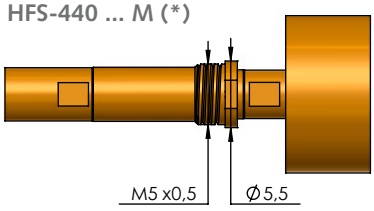
HFS-840 ... M (*)



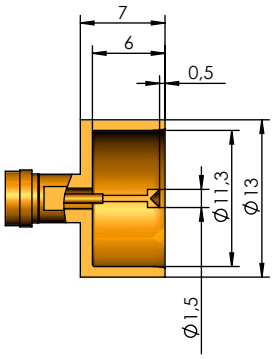
HFS-440 ...



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-centering via Outer conductor. Outer conductor centers itself from the outer side on the Connector.
Centering range: ± 0.8 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data
HFS-840 and HFS-840 M

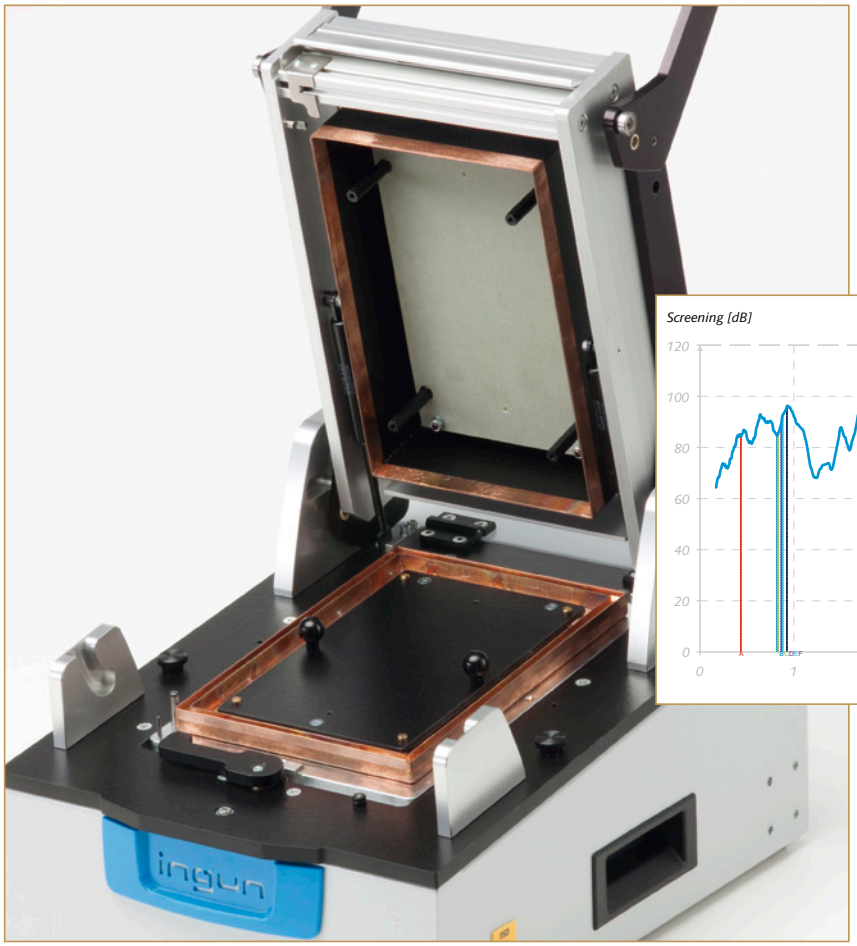
	Outer Cond.	Inner Cond.
Working Stroke:	3.0 mm	1,7 mm
Maximum Stroke:	4.0 mm	3.7 mm

Mechanical Data
HFS-440 and HFS-440 M

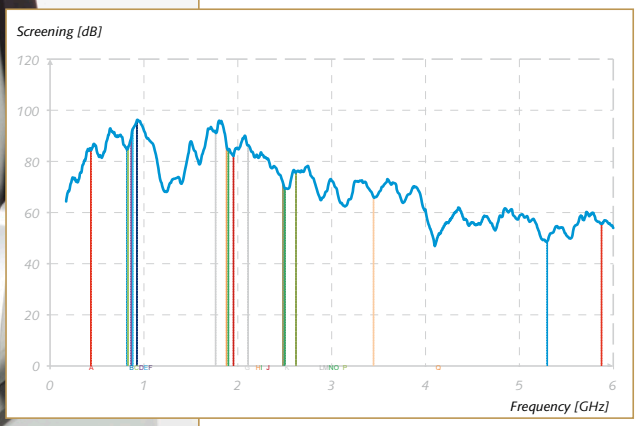
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	1,7 mm
Maximum Stroke:	3.0 mm	3.0 mm

INGUN Radio Frequency Test Fixtures

The INGUN radio frequency Test Fixtures are developed and manufactured in accordance to customer demands. They allow testing of highly sensitive PC-Boards without electro-magnetic noise influences.



Radio frequency Test Fixture based on MA 2111 with ATS 2111/HF



Screening attenuation in the RF range of up to 6 GHz

The UUT is completely shielded to the outside; both for the measurement as well as to protect the operator. Because the attenuation values determine the volume of the test chamber, then these must be known to enable design and manufacturing of the RF Fixture.

The signals, which must be measured on the PC-Board, are passed from the inside through the RF cover to the outside via INGUN RF probes and then on to the Test System.

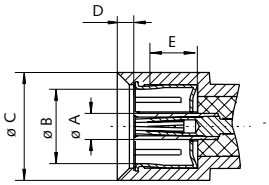
More details about RF Test Fixtures can be found in our Test Fixtures Catalog – or simply call us!

Contacting of IEC Connectors

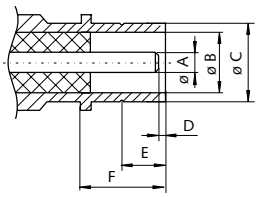
Series IEC

Connection Dimensions

Signal Conductor Jack



Signal Conductor Plug

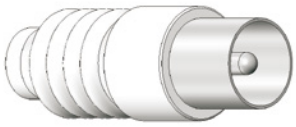


IEC (75 Ohm)				
	Signal Conductor Plug		Signal Conductor Jack	
	min.	max.	min.	max.
A	2.28 / *.089*	2.42 / *.095*	1)	
B	8.05 / *.317*		1)	
C	9.52 / *.375*	9.54 / *.376*	13.0 / *.512* nom.	
D	0.40 / *.016*	1.20 / *.047*	2.2 / *.087* nom.	
E	4.95 / *.195*	5.05 / *1.99*	6.40 / *.252*	6.80 / .268
F	9,10 / *.358*			

1) resilient, dim. to meet electrical and mechanical requirements

Examples:

IEC Signal Conductor Plug



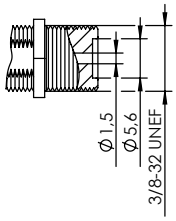
IEC Signal Conductor Jack

Contacting of F Connectors

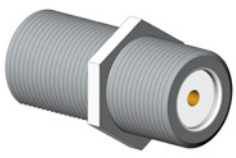
Series F

Connection Dimension

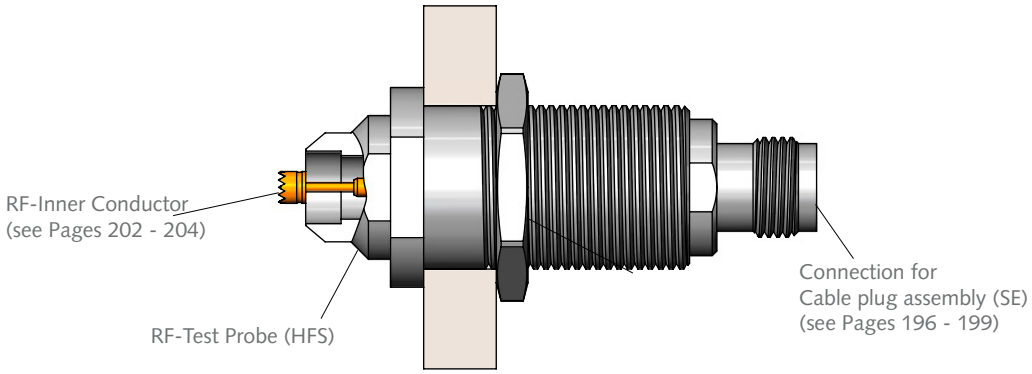
Signal Conductor Jack



Example:
F Signal Conductor Jack

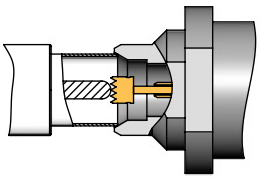


IEC, F Connectors

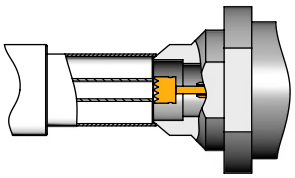


Contacting Example IEC:

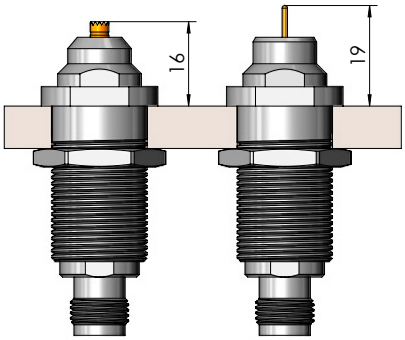
Contacting of IEC Signal Conductor Plug
HFS-409 306 350 A 8343 M



Contacting of IEC Signal Conductor Jack
HFS-409 306 350 A 8342 M



Customizing 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
Current Rating Outer Conductor:	10 A
Current Rating Inner Conductor:	16 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	75 Ω
Impedance Cable:	75 Ω

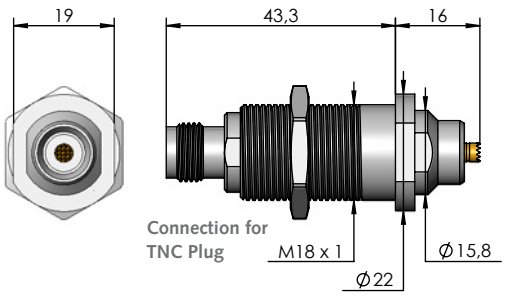
Operating Temperature Range

– 40 up to +80° C

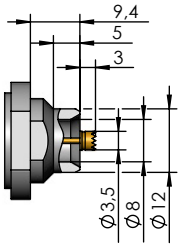
IEC Signal Conductor Plug ⊙
IEC Signal Conductor Jack ◎

Series: Plug

HFS-409 ...



Available Tip Styles:



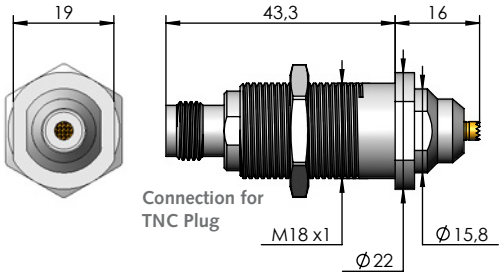
Ordering Description:

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

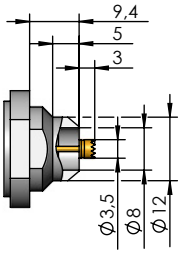
Note: Version with outer centering ring on Connector.
Centering range: ± 0.2 mm

Series: Jack

HFS-409 ...



Available Tip Styles:



Ordering Description:

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

Note: Version with centering on the inner side of the Connector Outer Contact.
Centering range: ± 0.2 mm

IEC / F (75 Ω)

	HFS-409
Spring Force of Inner Conductor (N)	2.3
Spring Force of Outer Conductor (N)	6.0
Character for ordering	**83**

Note:
The RF Probes of 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

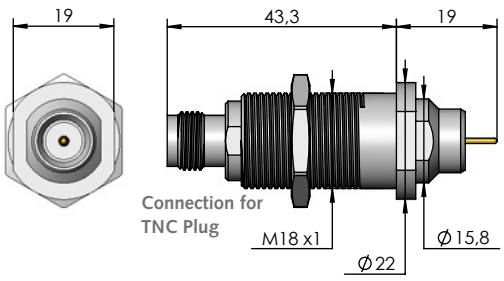
F-Signal Conductor Jack

up to 1.5 GHz (75 Ω)

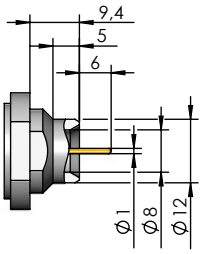
HFS-409

Series:

HFS-409 ...



Available Tip Styles:



Ordering Description:

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

Note: Version with threaded connection. No movement of the connection during stroke movement.
Centering range: ± 0.2 mm

	HFS-409
Spring Force of Inner Conductor (N)	2.3
Spring Force of Outer Conductor (N)	6.0
Character for ordering	**83**

Note:
The RF Probes of 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

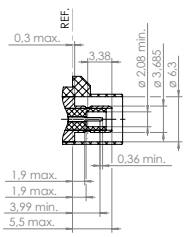
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.3 mm
Maximum Stroke:	5.0 mm	8.0 mm

Contacting of FAKRA Connectors

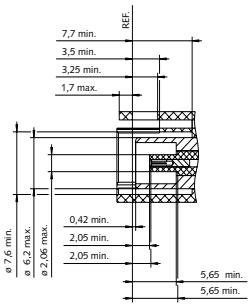
Series FAKRA

Connection Dimensions

Signal Conductor Plug

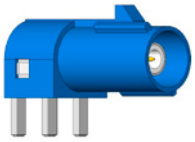


Signal Conductor Jack

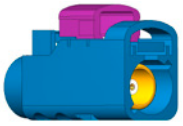


Examples:

FAKRA Signal Conductor Plug



FAKRA Signal Conductor Jack

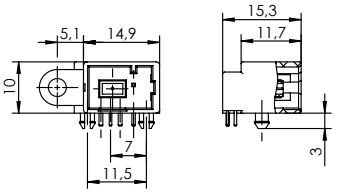


Contacting of GT13 Connectors

Series GT13

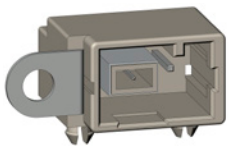
Connection Dimensions

Signal Conductor Plug



Example:

GT13 Signal Conductor Plug

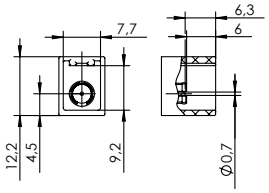


Contacting of GT16 Connectors

Series GT16

Connection Dimensions

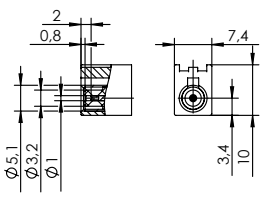
Signal Conductor Plug



Example:

GT16 Signal Conductor Plug

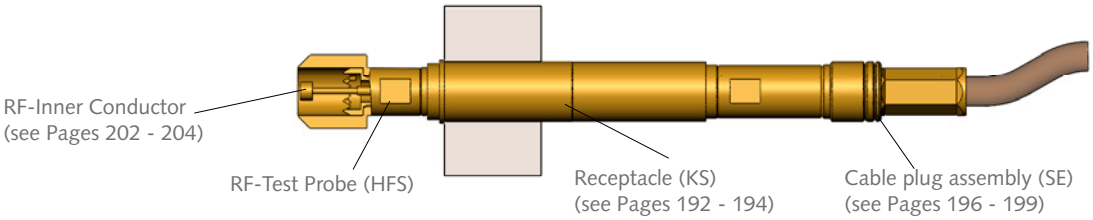
Signal Conductor Jack



GT16 Signal Conductor Jack

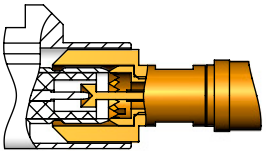
Contents

FAKRA, GT13, GT16 Connectors

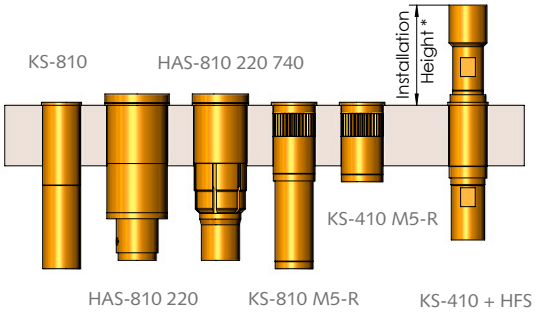


Contacting Example FAKRA:

Contacting of FAKRA Signal Conductor Plug
HFS-810 303 150 A 5342 F



Customizing 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
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable	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)
Variant		*Installation Height HFS in KS	
FAKRA Signal Conductor Plug	...F / ... F M	12.1 mm	13.2 mm
	... FS1 / ... FS1 M		
	... RF3 / ... RF3 M		
FAKRA Signal Conductor Jack	... ZE3 / ... ZE3 M	12.3 mm	13.4 mm
GT13 Signal Conductor Plug	... GT13 / ... GT13 4M	13.9 mm	15.0 mm
GT16 Signal Conductor Plug	... GT16 / ... GT16 M	12.4 mm	13.5 mm
GT16 Signal Conductor Jack	... GT16 F/ ... GT16 F M	11.9 mm	13.0 mm

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

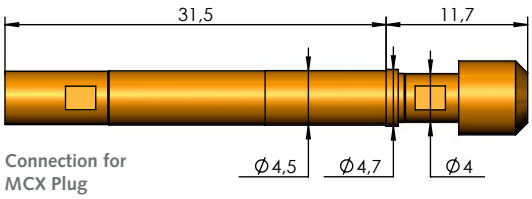
FAKRA Signal Conductor ⊙ Plug

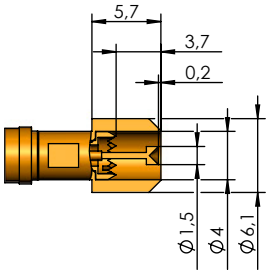
Series:

Available Tip Styles:

Ordering Description:

HFS-810 ...

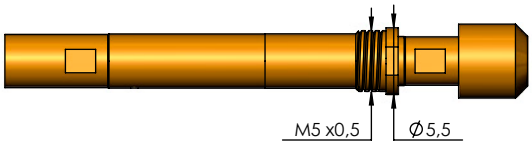


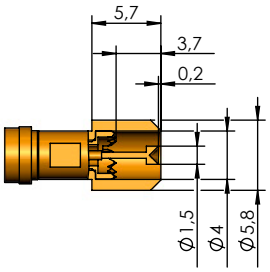


HFS-810 303 150 A **xx** 42 F
HFS-810 303 150 A **xx** 42 F M
HFS-410 303 150 A **xx** 42 F
HFS-410 303 150 A **xx** 42 F M

Note:
Centering range: ± 0.8 mm

HFS-810 ... M (*)

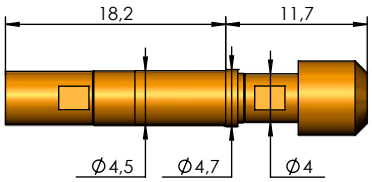


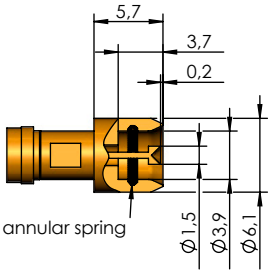


HFS-810 303 150 A **xx** 42 FS1
HFS-810 303 150 A **xx** 42 FS1 M
HFS-410 303 150 A **xx** 42 FS1
HFS-410 303 150 A **xx** 42 FS1 M

Note: For Connector casing with smaller inside diameter the outer diameter of the Plunger was reduced from Ø 6.1 mm to Ø 5.8 mm.
Centering range: ± 0.8 mm

HFS-410 ...

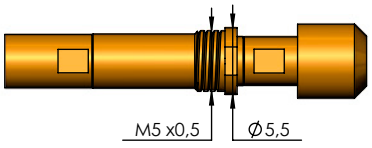




HFS-810 303 150 A **xx** 42 RF3
HFS-810 303 150 A **xx** 42 RF3 M
HFS-410 303 150 A **xx** 42 RF3
HFS-410 303 150 A **xx** 42 RF3 M

Note: Version with Circular Spring inside the Outer conductor. For FAKRA Connectors with tight manufacturing tolerances or protruding dielectric. Due to the insertion force of the circular spring
recommended for spring forces of the Outer Conductor at working stroke ≥ 6,0 N.
Centering range: ± 0.5 mm

HFS-410 ... M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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 Plug

up to 4 GHz (50 Ω)

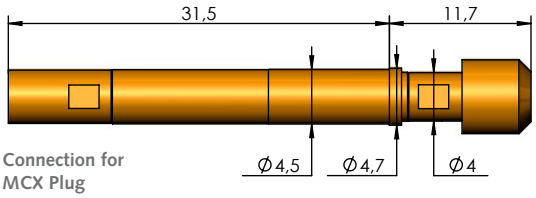
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

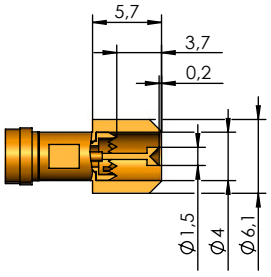
Series:

Available Tip Styles:

Ordering Description:

HFS-840 ...

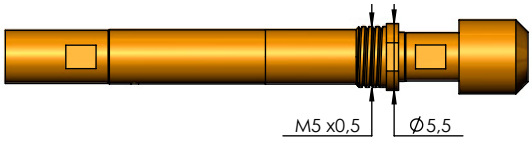


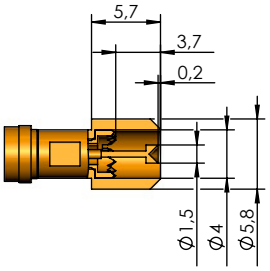


HFS-840 303 150 A **xx** 42 F
HFS-840 303 150 A **xx** 42 F M
HFS-440 303 150 A **xx** 42 F
HFS-440 303 150 A **xx** 42 F M

Note:
Centering range: ± 0.8 mm

HFS-840 ... M (*)

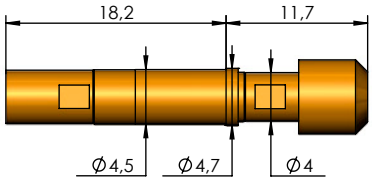


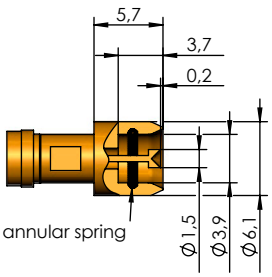


HFS-840 303 150 A **xx** 42 FS1
HFS-840 303 150 A **xx** 42 FS1 M
HFS-440 303 150 A **xx** 42 FS1
HFS-440 303 150 A **xx** 42 FS1 M

Note: For Connector casing with smaller inside diameter the outer diameter of the Plunger was reduced from Ø 6.1 mm to Ø 5.8 mm.
Centering range: ± 0.8 mm

HFS-440 ...

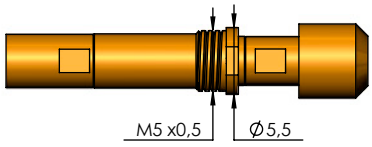




HFS-840 303 150 A **xx** 42 RF3
HFS-840 303 150 A **xx** 42 RF3 M
HFS-440 303 150 A **xx** 42 RF3
HFS-440 303 150 A **xx** 42 RF3 M

Note: Version with Circular Spring inside the Outer conductor. For FAKRA Connectors with tight manufacturing tolerances or protruding dielectric. Due to the insertion force of the circular spring recommended for spring forces of the Outer Conductor at working stroke ≥ 6,0 N.
Centering range: ± 0.5 mm

HFS-440 ... M (*)



INGUN UTILITY MODEL INGUN

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

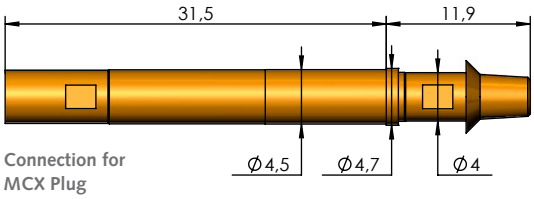
Mechanical Data
HFS-440 and HFS-440 M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

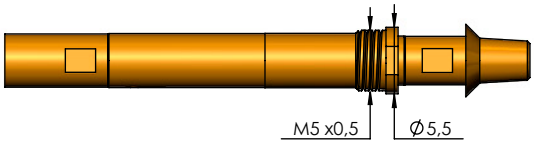
FAKRA Signal Conductor ◎ Jack

Series:

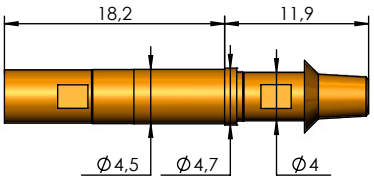
HFS-810 ...



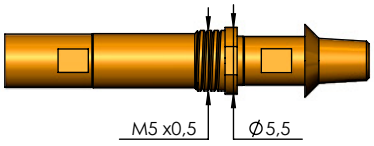
HFS-810 ... M (*)



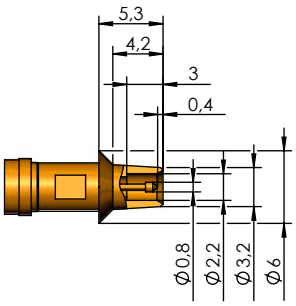
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 308 080 A **xx** 42 ZE3
HFS-810 308 080 A **xx** 42 ZE3 M
HFS-410 308 080 A **xx** 42 ZE3
HFS-410 308 080 A **xx** 42 ZE3 M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

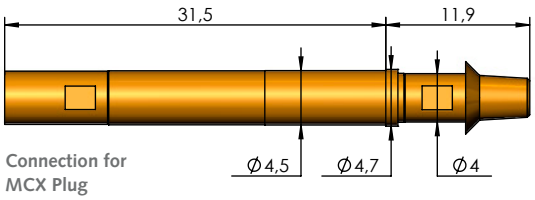
◎ FAKRA Signal Conductor Jack

up to 4 GHz (50 Ω)

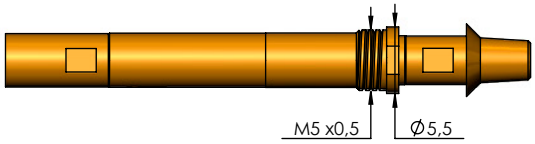
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

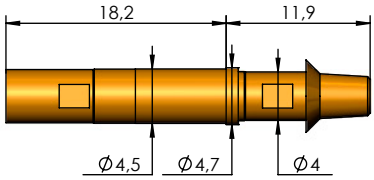
HFS-840 ...



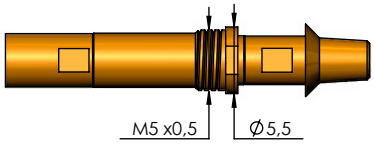
HFS-840 ... M (*)



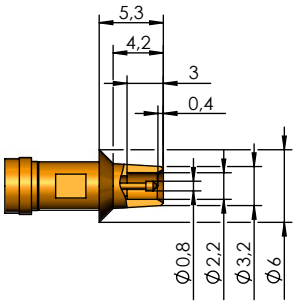
HFS-440 ...



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-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

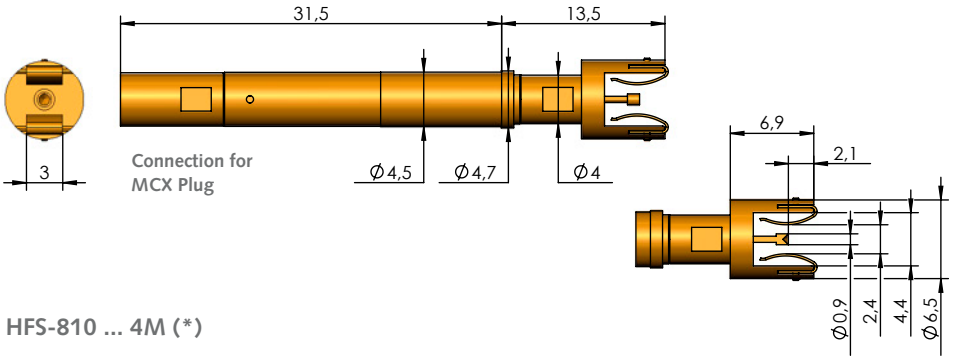
GT13 Signal Conductor ⊙ Plug

Series:

Available Tip Styles:

Ordering Description:

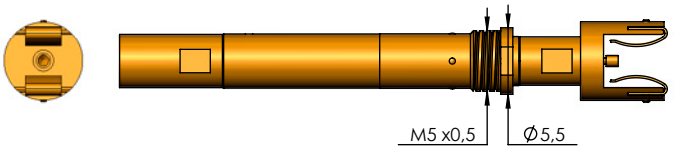
HFS-810 ...



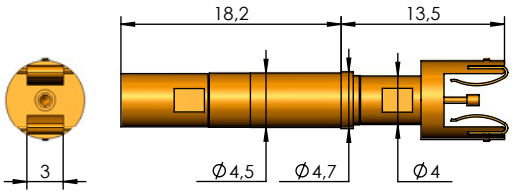
HFS-810 303 090 A **xx** 40 GT13
HFS-810 303 090 A **xx** 40 GT13 4M
HFS-410 303 090 A **xx** 40 GT13
HFS-410 303 090 A **xx** 40 GT13 4M

Note: The rectangular Ground Contact of the Connector is contacted by means of the encompassing contact lamellas. The Probes should be aligned accordingly.
Centering range: ± 0.3 mm

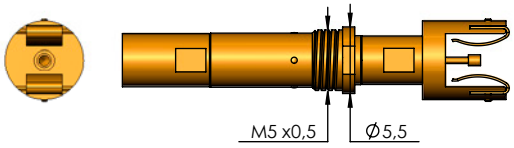
HFS-810 ... 4M (*)



HFS-410 ...



HFS-410 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-810 HFS-810 4M				HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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

Mechanical Data
HFS-410 and HFS-410 4M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

GT13 Signal Conductor Plug

up to 4 GHz (50 Ω)

HFS-840 / HFS-840 4M
HFS-440 / HFS-440 4M

Series: INGUN UTILITY MODEL

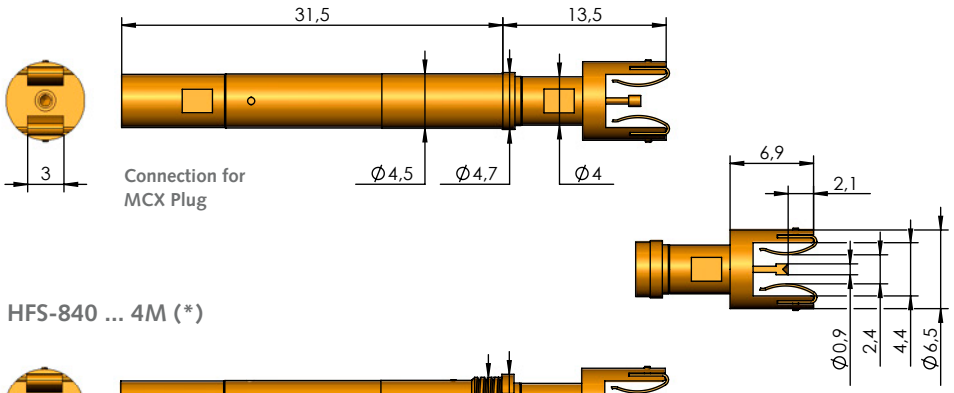
Available Tip Styles:

Ordering Description:

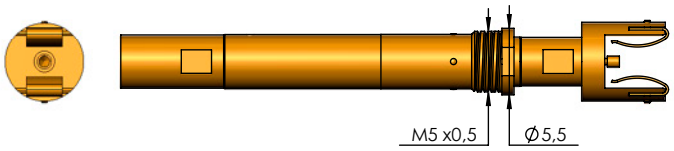
HFS-840 303 090 A **xx** 40 GT13
HFS-840 303 090 A **xx** 40 GT13 4M
HFS-440 303 090 A **xx** 40 GT13
HFS-440 303 090 A **xx** 40 GT13 4M

Note: The rectangular Ground Contact of the Connector is contacted by means of the encompassing contact lamellas. The Probes should be aligned accordingly.
Centering range: ± 0.3 mm

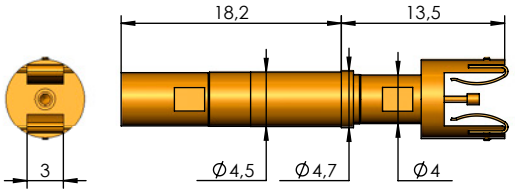
HFS-840 ...



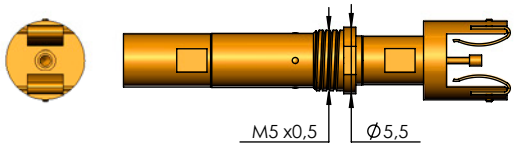
HFS-840 ... 4M (*)



HFS-440 ...



HFS-440 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-840 HFS-840 4M				HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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

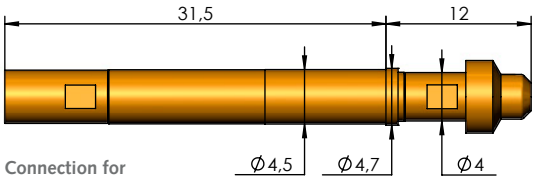
Mechanical Data
HFS-440 and HFS-440 4M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

GT16 Signal Conductor ⊙ Plug

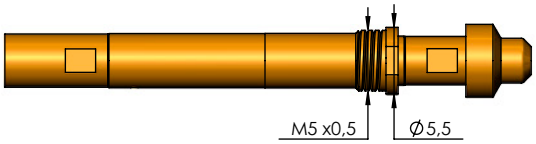
Series:

HFS-810 ...

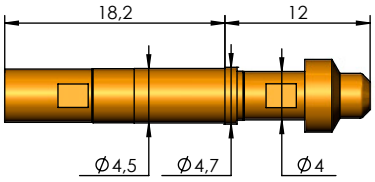


Connection for MCX Plug

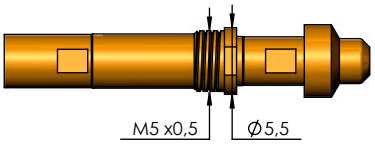
HFS-810 ... M (*)



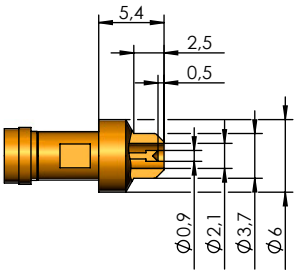
HFS-410 ...



HFS-410 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-810 303 090 A **xx** 42 GT16
HFS-810 303 090 A **xx** 42 GT16 M
HFS-410 303 090 A **xx** 42 GT16
HFS-410 303 090 A **xx** 42 GT16 M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.5 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

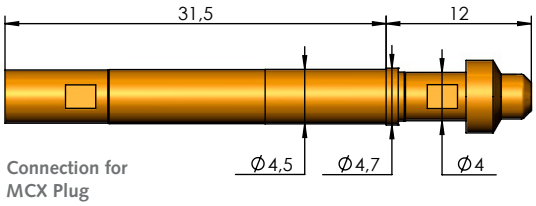
⊙ GT16 Signal Conductor Plug

up to 4 GHz (50 Ω)

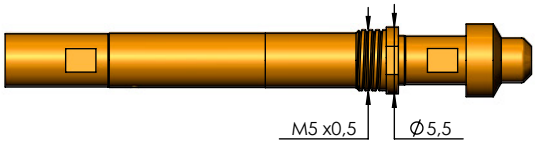
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

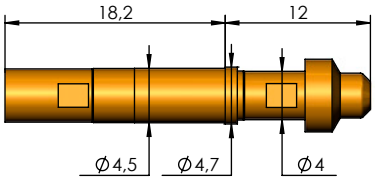
HFS-840 ...



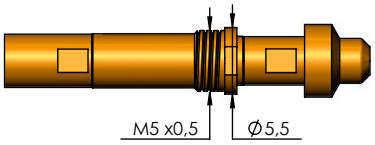
HFS-840 ... M (*)



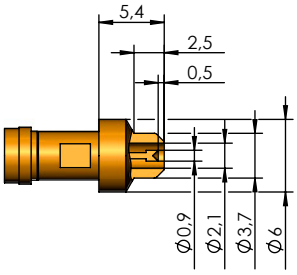
HFS-440 ...



HFS-440 ... M (*)



Available Tip Styles:



Ordering Description:

HFS-840 303 090 A **xx** 42 GT16
HFS-840 303 090 A **xx** 42 GT16 M
HFS-440 303 090 A **xx** 42 GT16
HFS-440 303 090 A **xx** 42 GT16 M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Centering range: ± 0.5 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

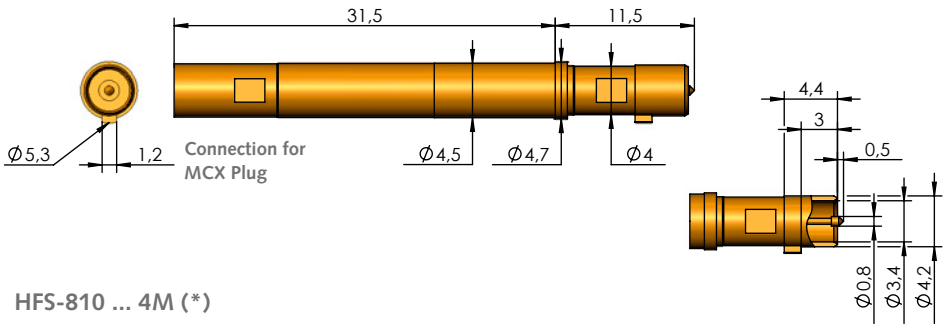
GT16 Signal Conductor ◎ Jack

Series:

Available Tip Styles:

Ordering Description:

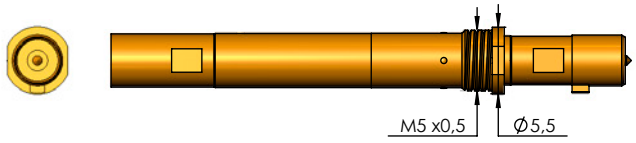
HFS-810 ...



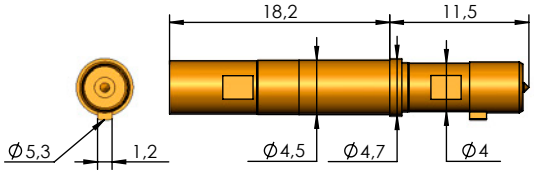
HFS-810 308 080 A **xx** 42 GT16-F
HFS-810 308 080 A **xx** 42 GT16-F 4M
HFS-410 308 080 A **xx** 42 GT16-F
HFS-410 308 080 A **xx** 42 GT16-F 4M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Ground contact is achieved via the contact lug on the outer diameter of the Outer conductor. Centering range: ± 0.5 mm

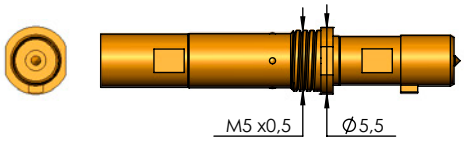
HFS-810 ... 4M (*)



HFS-410 ...



HFS-410 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-810 HFS-810 4M				HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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

◎ GT16 Signal Conductor Jack

up to 4 GHz (50 Ω)

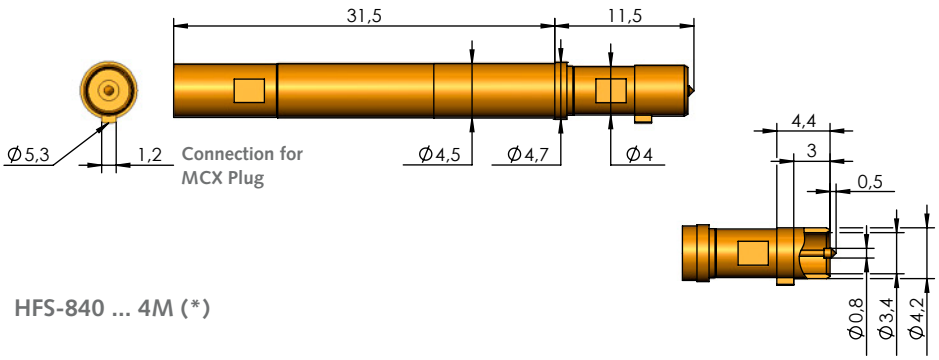
HFS-840 / HFS-840 M
HFS-440 / HFS-440 M

Series:

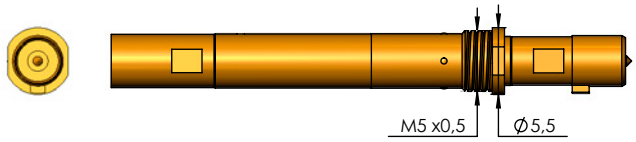
Available Tip Styles:

Ordering Description:

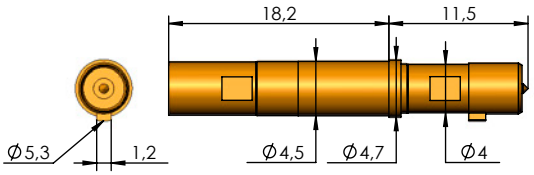
HFS-840 ...



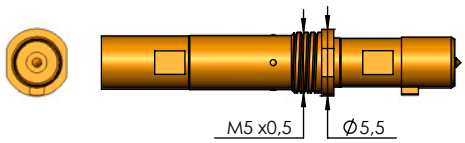
HFS-840 ... 4M (*)



HFS-440 ...



HFS-440 ...4M (*)



HFS-840 308 080 A **xx** 42 GT16-F
HFS-840 308 080 A **xx** 42 GT16-F 4M
HFS-440 308 080 A **xx** 42 GT16-F
HFS-440 308 080 A **xx** 42 GT16-F 4M

Note: Version with pre-centering on the inner side of the Connector Outer Contact. Ground contact is achieved via the contact lug on the outer diameter of the Outer conductor. Centering range: ± 0.5 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-840 HFS-840 4M				HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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

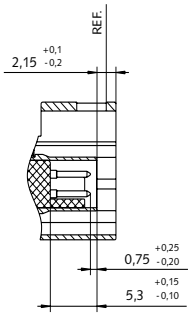
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

Contacting of HSD Connectors for differential signal transmission

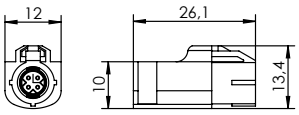
Series HSD

Connection Dimensions

Signal Conductor Plug

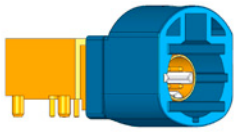


Signal conductor Jack



Example:

HSD Signal Conductor Plug



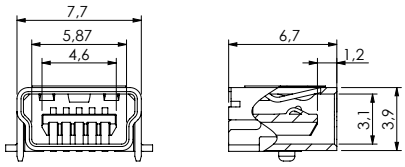
HSD Signal Conductor Jack

Contacting of USB Mini Connectors for differential signal transmission

Series USB Mini

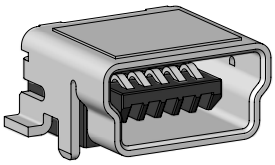
Connection Dimensions

Signal Conductor Plug



Example:

USB Mini Signal Conductor Plug

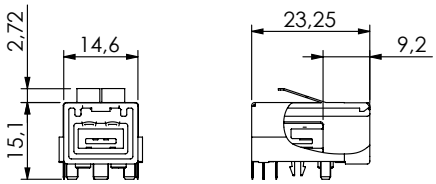


Contacting of MX38 Connectors for differential signal transmission

Series MX38

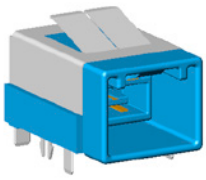
Connection Dimensions

Signal Conductor Jack



Example:

MX38 Signal Conductor Jack

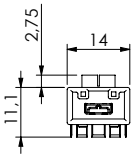


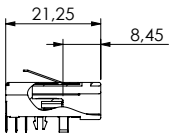
Contents

Contacting of MX48 Connectors for differential signal transmission

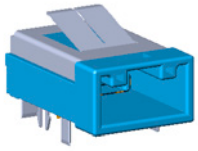
Series MX48

Connection Dimensions
Signal Conductor Jack





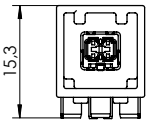
Example:
MX48 Signal Conductor Jack

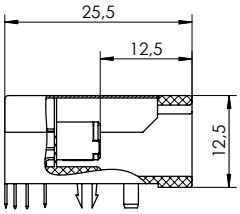


Contacting of MX49 Connectors for differential signal transmission

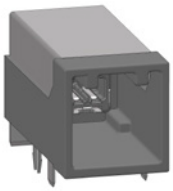
Series MX49

Connection Dimensions
Signal Conductor Jack





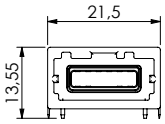
Example:
MX49 Signal Conductor Jack

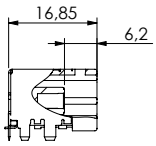


Contacting of MX62 Connectors for differential signal transmission

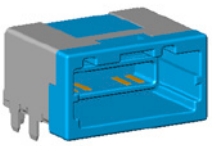
Series MX62

Connection Dimensions
Signal Conductor Jack





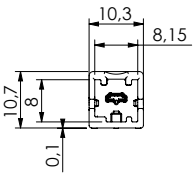
Example:
MX62 Signal Conductor Jack

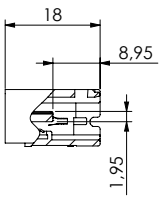


Contacting of MX68 Connectors for differential signal transmission

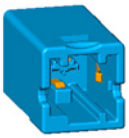
Series MX68

Connection Dimensions
Signal Conductor Jack

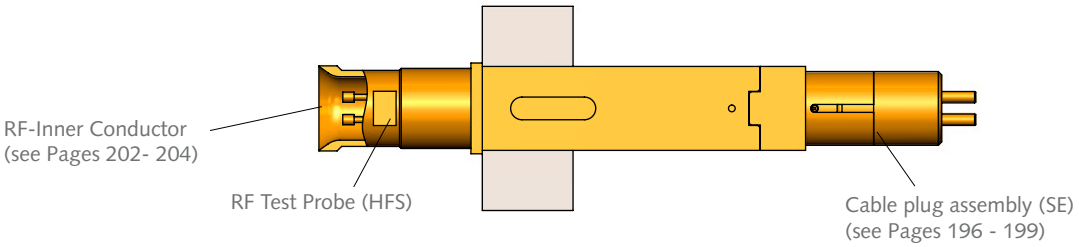




Example:
MX68 Signal Conductor Jack

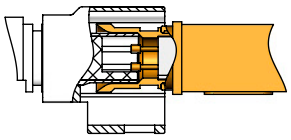


HSD / USB-Mini / MX-Connectors for differential signal transmission

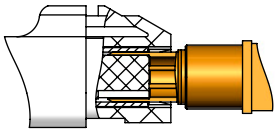


Contacting Example HSD:

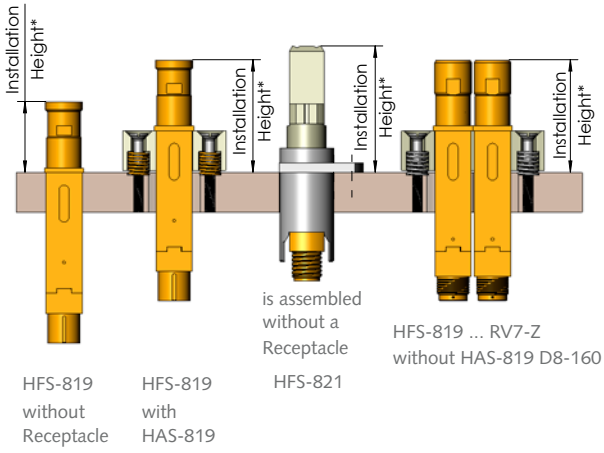
Contacting of HSD Signal Conductor Plug
HFS-819 303 090 A 12743-V2



Contacting of HSD Signal Conductor Jack
HFS-819 355 051 A 12742-V4



Customizing Example:



Installation Height in Receptacle		HAS-819	HAS-819 D8-160	without KS
Variant		*Installation Height HFS in KS		
HSD-Signal Conductor Plug	... 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 Jack	... V8	25.8 mm	---	17.3 mm
	... V8-Z			
USB Mini Signal Conductor Jack	... USB-Mini	---	---	22.4 mm
MX38-Signal Conductor Jack	... MX38	---	---	27.0 mm
MX48-Signal Conductor Jack	... MX48	---	---	27.4mm
MX49-Signal Conductor Jack	... USB-T	---	---	25.7 mm
MX62-Signal Conductor Jack	...MX62	---	---	28.7 mm
MX68-Signal Conductor Jack	... MX68	---	---	27.7 mm

Electrical Data

HFS-819 HFS-821	
Data transmission with HFS-819:	Gbit/s
Data transmission with HFS-821:	Gbit/s
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	≤ 10 mΩ
Impedance Test Probe:	100 Ω

Operating Temperature Range

–40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

HSD Signal Conductor Plug

GBit/s
(100 Ω)

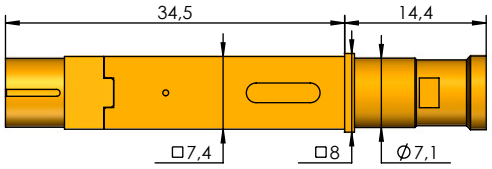
HFS-819
with Plug Connection

Series:

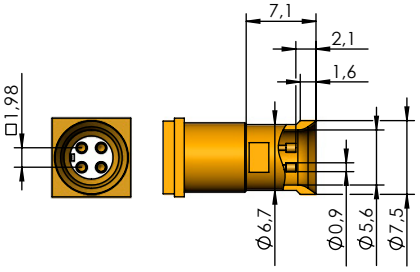
Available Tip Styles:

Ordering Description:

HFS-819 ... with Plug Connection

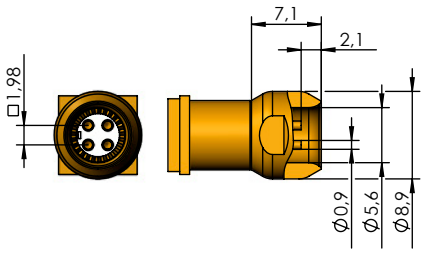


Connection for Plug SE-819-V2



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).
Centering range: ± 0.8 mm



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

Note: Version with enlarged 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).
Centering range: ± 1.0 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note:
The series HFS-819 is non-rotatable and has a position detection marking. This design enables contacting of coded 9-pole Connectors. The HFS-819 can be either directly pressed into a mounting plate without usage of a Receptacle or float-assembled by means of the flex-mounting Receptacle HAS-819 (see Receptacles pages 192 - 194).

	HFS-819	
Spring Force of Inner Conductor (N)	4 x 1.3	4 x 1.3
Spring Force of Outer Conductor (N)	7.5	15.5
Character 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

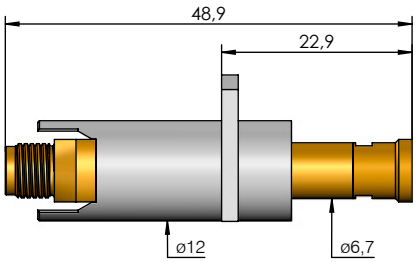
HSD Signal Conductor Plug

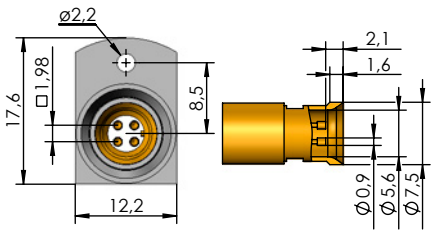
Series:

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:
Centering range: ± 1,0 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note:
The series HFS-819 is non-rotatable and has a position detection marking. This design enables contacting of coded 4-pole Connectors. The HFS-819 can be either directly pressed into a mounting plate without usage of a Receptacle or float-assembled by means of the flex-mounting Receptacle HAS-819 (see Receptacles pages 192 - 194).

	HFS-819	
Spring Force of Inner Conductor (N)	4 x 1.3	4 x 1.3
Spring Force of Outer Conductor (N)	7.5	15.5
Character 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

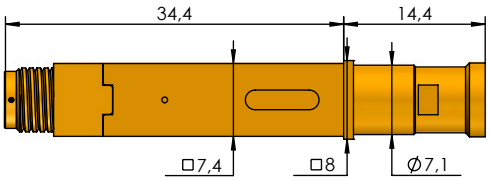
HSD Signal Conductor Plug

GBit/s
(100 Ω)

HFS-819
with Screw-in Connection

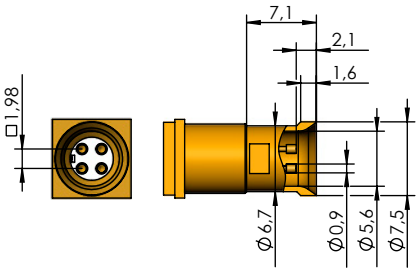
Series:

HFS-819 ... with Screw-in Connection



Connection for Screw-in Plug
SE-819-V5-Z

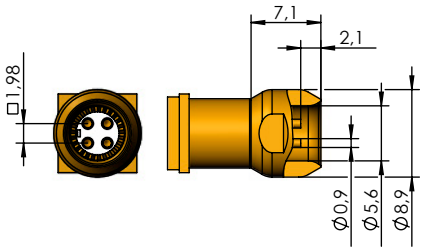
Available
Tip Styles:



Ordering Description:

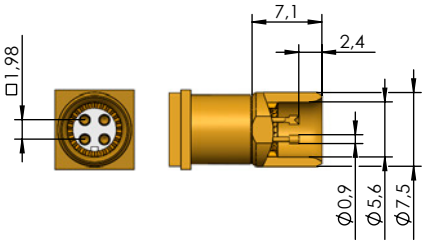
HFS-819 303 090 A **xxx** 43 V2-Z

Note: Version with passive tip-style on Outer conductor and Inner Conductor with tip-style 03 (inverse cone).
Centering range: ± 0.8 mm



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

Note: Version with enlarged 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).
Centering range: ± 1.0 mm



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

Note: Version with reduced 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).
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note:
The series HFS-819 is non-rotatable and has a position detection marking. This design enables contacting of coded 4-pole Connectors. The HFS-819 can be either directly pressed into a mounting plate without usage of a Receptacle or float-assembled by means of the flex-mounting Receptacle HAS-819. (See Receptacles pages 192 - 194).

	HFS-819	
Spring Force of Inner Conductor (N)	4 x 1.3	4 x 1.3
Spring Force of Outer Conductor (N)	7.5	15.5
Character 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 Plug

Series:

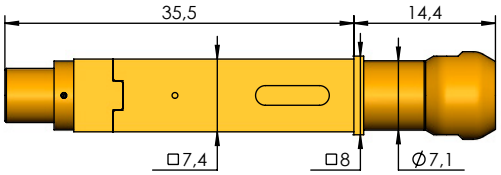
Available Tip Styles:

Ordering Description:

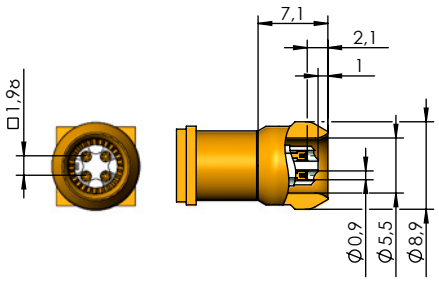
HFS-819 319 090 A **xxx** 43 RV5-H3

Note:
Centering range: ± 1,0 mm

HFS-819 ... with Connection for HSD Jack



Note: Connection for HSD signal conductor jack, available from Rosenberger Ltd., ordering-no. LD5-131-1000-Z.
Please consider: the plastic housing of the jack has to be removed.



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note:
The series HFS-819 is non-rotatable and has a position detection marking. This design enables contacting of coded 4-pole Connectors. The HFS-819 can be either directly pressed into a mounting plate without usage of a Receptacle or float-assembled by means of the flex-mounting Receptacle HAS-819 (see Receptacles pages 192 - 194).

	HFS-819	
Spring Force of Inner Conductor (N)	4 x 1.3	4 x 1.3
Spring Force of Outer Conductor (N)	7.5	15.5
Character 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 Jack

GBit/s (100 Ω)

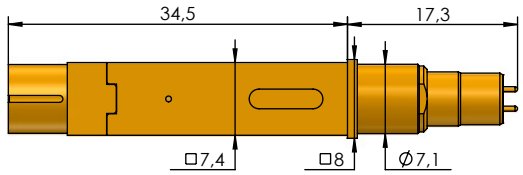
HFS-819 with Plug Connection
HFS-819 with Screw-in Connection

Series:

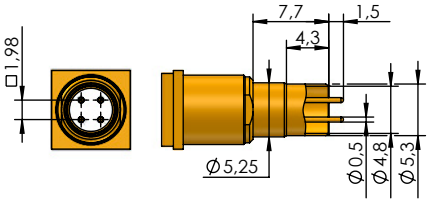
Available Tip Styles:

Ordering Description:

HFS-819 ... V8 with Plug Connection



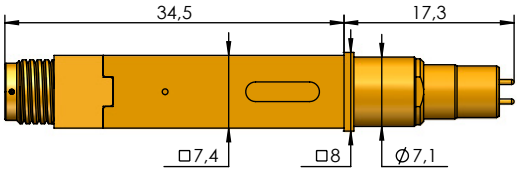
Connection for Plug
SE-819-V2



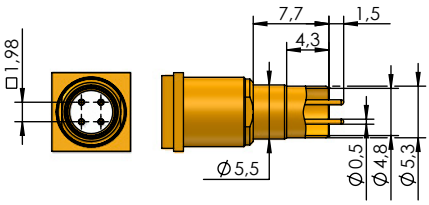
HFS-819 355 051 A **xxx** 42 V8

Note: Version with Plug Connection.
Centering 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.
Centering range: ± 0.2 mm

	HFS-819	
Spring Force of Inner Conductor (N)	4 x 1.3	4 x 1.3
Spring Force of Outer Conductor (N)	7.5	15.5
Character for ordering	**127**	**207**

Note:
The series HFS-819 is non-rotatable and has a position detection marking. This design enables contacting of coded 4-pole Connectors. The HFS-819 can be either directly pressed into a mounting plate without usage of a Receptacle or float-assembled by means of the flex-mounting Receptacle HAS-819 (see Receptacles pages 192 - 194).

Mechanical Data

HFS-819

	Outer Cond.	Inner Cond.
Working Stroke:	5.0 mm	2.0 mm
Maximum Stroke:	6.0 mm	3.7 mm

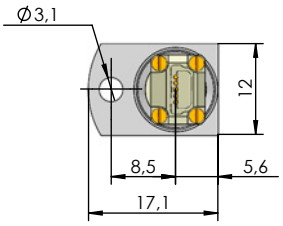
USB Mini Signal Conductor Jack

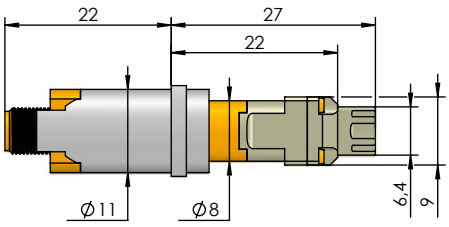
Series:

Available Tip Styles:

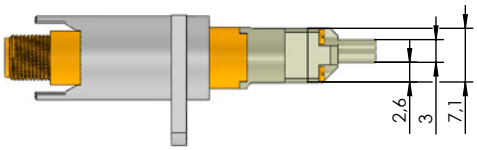
Ordering Description:

HFS-821 ...





Connection for screw-in Plug
SE-821 USB-Mini



HFS-821 313 050 A **xx** 05 USB-Mini

Note: The series HFS-821 is non-rotatable. With this it can be aligned to a USB Mini Connector. Apart from this it is float-mounted 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°.
Centering range: ± 0.6 mm

Digital

	HFS-821
Spring Force of Inner Conductor (N)	Inner conductor not spring-loaded
Spring Force of Outer Conductor (N)	10.0
Character for ordering	**99**

Note:
The RF Probes series HFS-821 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)

MX38 Signal Conductor Jack

GBit/s (100 Ω)

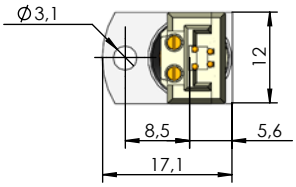
HFS-821

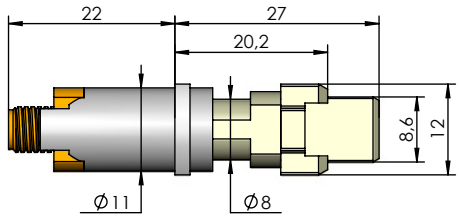
Series:

Available Tip Styles:

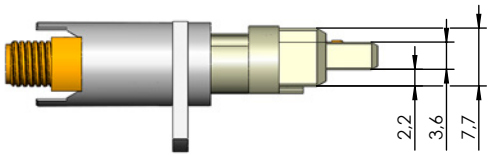
Ordering Description:

HFS-821 ...





Connection for MX38 Plug



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

Note: The series HFS-821 is non-rotatable. With this it can be aligned to a MX38 Connector. Apart from this it is float-mounted 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°. Centering range: ± 0.6 mm

	HFS-821
Spring Force of Inner Conductor (N)	Inner conductor not spring-loaded
Spring Force of Outer Conductor (N)	10.0
Character for ordering	**99**

Note:
The RF Probes series HFS-821 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)

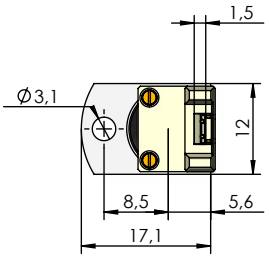
MX48 Signal Conductor Jack

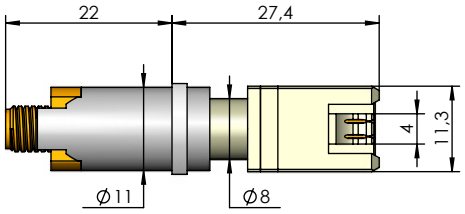
Series:

Available Tip Styles:

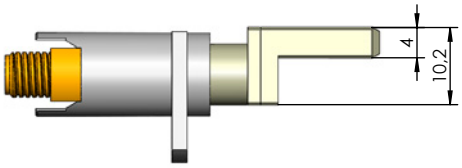
Ordering Description:

HFS-821 ...





Connection
for MX48 Plug



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

Note: The series HFS-821 is non-rotatable. With this it can be aligned to a MX48 Connector. Apart from this it is float-mounted 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°. Centering range: ± 0.6 mm

	HFS-821
Spring Force of Inner Conductor (N)	Inner conductor not spring-loaded
Spring Force of Outer Conductor (N)	10.0
Character for ordering	**99**

Note:
The RF Probes series HFS-821 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)

Digital

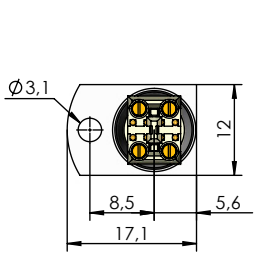
MX49 Signal Conductor Jack

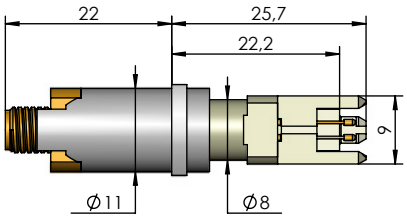
GBit/s (100 Ω)

HFS-821

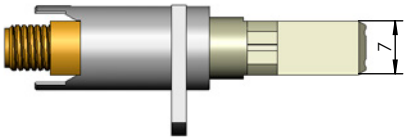
Series:

HFS-821 ...





Connection for Screw-in Plug SE-821 MX49



Ordering Description:

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

Note: The series HFS-821 is non-rotatable. With this it can be aligned to a MX49 Connector. Apart from this it is float-mounted and can balance out an axial off-set of ± 1.0 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°. Centering range: ± 0.6 mm

	HFS-821
Spring Force of Inner Conductor (N)	Inner conductor not spring-loaded
Spring Force of Outer Conductor (N)	10.0
Character for ordering	**99**

Note:
The RF Probes series HFS-821 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	

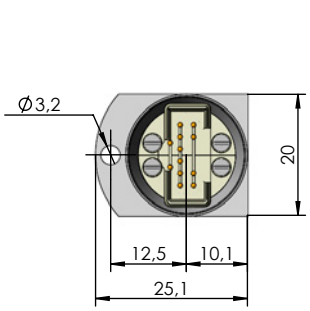
Mechanical Data
HFS-821

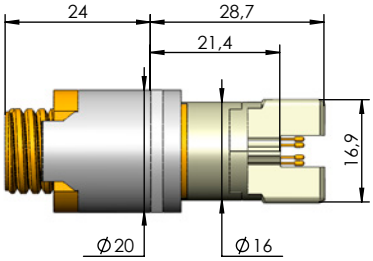
Axial off-set:	± 1.0 mm
Radial positioning:	± 3.5° (after min. 0.5 mm Stroke)

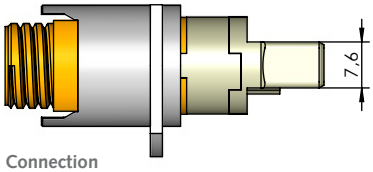
MX62 Signal Conductor Jack

Series:

HFS-821 ...







Connection
SE-821 MX62

Ordering Description:

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

Note: The series HFS-821 is non-rotatable. With this it can be aligned to a MX62 Connector. Apart from this it is float-mounted 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°. Centering range: ± 0.7 mm

Digital

	HFS-821
Spring Force of Inner Conductor (N)	Inner conductor not spring-loaded
Spring Force of Outer Conductor (N)	10.0
Character for ordering	**99**

Note:
The RF Probes series HFS-821 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)

MX68 Signal Conductor Jack

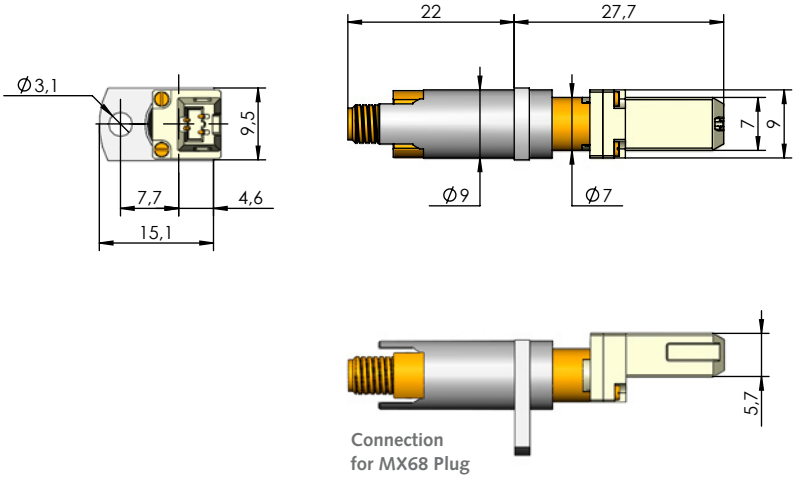
GBit/s
(100 Ω)

HFS-821

Series:

INGUN PATENTED INGUN

HFS-821 ...



Ordering Description:

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

Note: The series HFS-821 is non-rotatable. With this it can be aligned to a MX68 Connector. Apart from this it is float-mounted 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°. Centering range: ± 0.5 mm

	HFS-821
Spring Force of Inner Conductor (N)	Inner conductor not spring-loaded
Spring Force of Outer Conductor (N)	10.0
Character for ordering	**99**

Note:
The RF Probes series HFS-821 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	

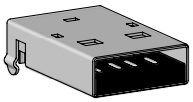
Mechanical Data
HFS-821

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

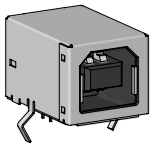
Contacting of USB Connectors for differential signal transmission

Examples:

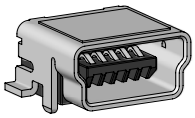
4-channel, Type A
Signal Conductor Jack



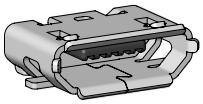
4-channel, Type B
Signal Conductor Jack



Mini, 4-channel, Type B
Signal Conductor Jack



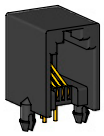
Micro, 4-channel, Type B
Signal Conductor Jack



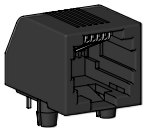
Contacting of RJ Connectors for differential signal transmission

Examples:

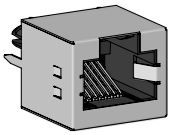
RJ-10, 4-channel
Signal Conductor Jack



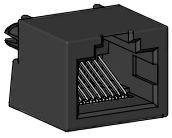
RJ-12, 6-channel
Signal Conductor Jack



RJ-45, 8-channel
Signal Conductor Jack



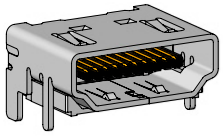
RJ-50, 10-channel
Signal Conductor Jack



Contacting of HDMI-, TAE- und DC Connectors for differential signal transmission

Examples:

HDMI, 19-channel
Signal Conductor Jack



TAE, 6-channel
Signal Conductor Jack

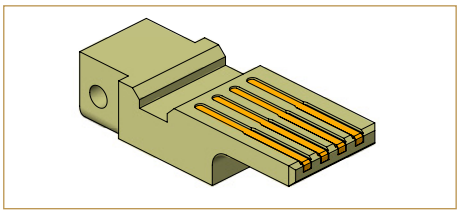
DC-Power, Ø 2,1
Signal Conductor Jack

Contents

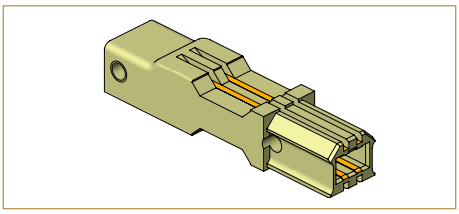
◎ USB Signal Conductor Jack

GBit/s
(100 Ω)

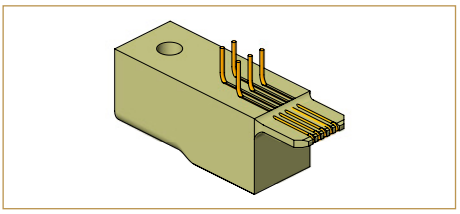
PS-USB



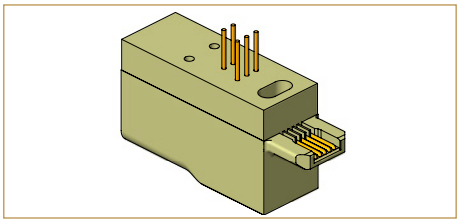
Description	USB connector, type A
Plug	Four-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	21071
Connection cycles	Approx. 100.000



Description	USB connector, type B
Plug	Four-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	17829
Connection cycles	Approx. 100.000



Description	USB connector Mini, type B
Plug	Five-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	21072
Connection cycles	Approx. 70.000



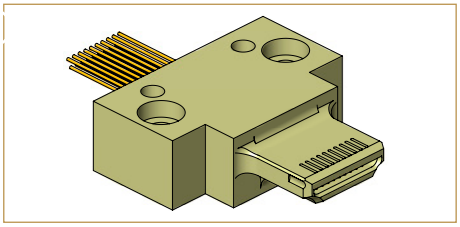
Description	USB connector Micro, type B
Plug	Five-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	34816
Connection cycles	Approx. 50.000

Note: The test plug are designed for purely an electrical continuity check. The transmission of a higher data rate is possible, but only using particular arrangements such as the use of a PC board with additional electronics. This arrangement is beyond our capabilities and is normally realized by our customers themselves.

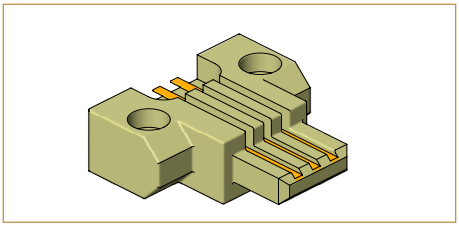
◎ HDMI-, TAE-, DC-Power-Signal Conductor Jack

GBit/s
(100 Ω)

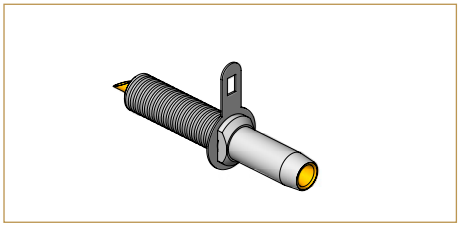
PS-HDMI
PS-TAE
PS-Power DC



Description	HDMI connector
Plug	Nineteen-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	34814
Connection cycles	Approx. 100.000

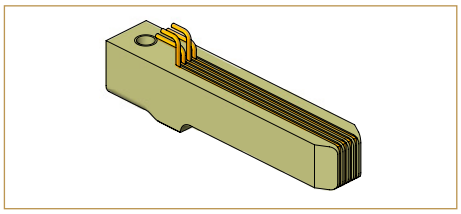


Description	TAE connector
Plug	Six-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	34847

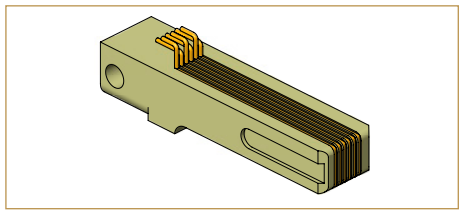


Description	Power DC connector, Ø 2,1
Plug	Two-terminal
Electrical design	Max. 12 V
Article number	35640

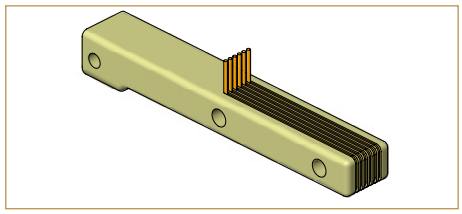
RJ Signal Conductor ◎ Jack



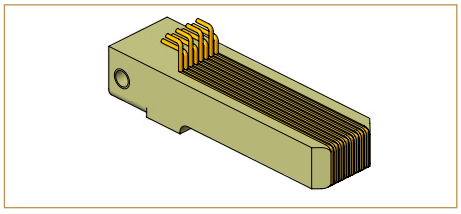
Description	RJ-10 connector
Plug	Four-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	17824
Connection cycles	Approx. 200.000



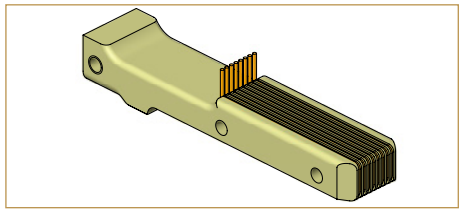
Description	RJ-12 connector
Plug	Six-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	17825
Connection cycles	Approx. 200.000



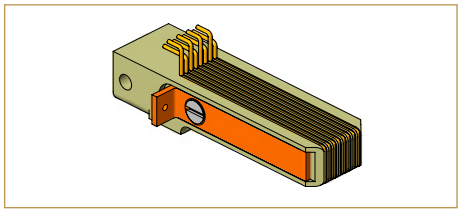
Description	RJ-12 connector, extended L-58 mm
Plug	Six-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	35427
Connection cycles	Approx. 200.000



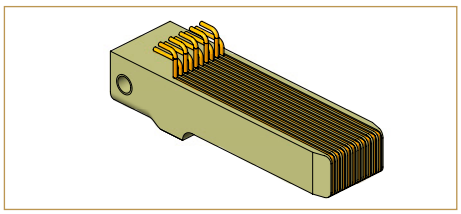
Description	RJ-45 connector
Plug	Eight-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	17826
Connection cycles	Approx. 200.000



Description	RJ-45 connector extended L-58 mm
Plug	Eight-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	35428
Connection cycles	Approx. 200.000



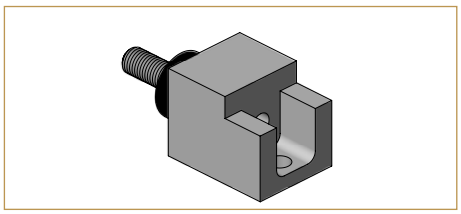
Description	RJ-45 connector with shield check
Plug	Eight-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	41164
Connection cycles	Approx. 200.000



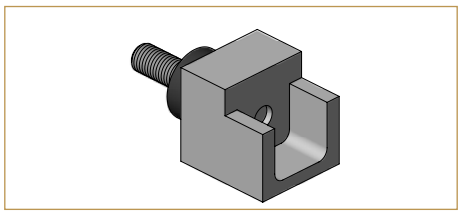
Description	RJ-50 connector
Plug	Ten-terminal
Casing material	High performance plastic
Electrical design	max. 25 VAC / 60 VDC
Article number	17827
Connection cycles	Approx. 200.000

Note: The test plug are designed for purely an electrical continuity check. The transmission of a higher data rate is possible, but only using particular arrangements such as the use of a PC board with additional electronics. This arrangement is beyond our capabilities and is normally realized by our customers themselves.

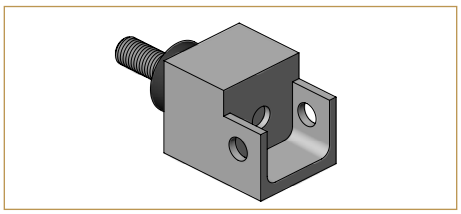
Test Plug Mounting



Description	Mounting adapter for four-terminal plug
Article number	17830



Description	Mounting adapter for six-terminal plug
Article number	18198



Description	Mounting adapter for ten-terminal plug
Article number	18199

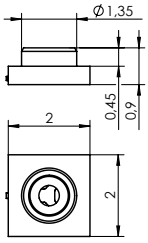
Applied Radio Frequency Technology

The radio frequency probes from INGUN are used especially when radio frequency signals must be measured.

Contacting of MM8030 Switch Connectors

Series MM8030

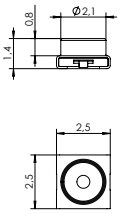
Connection Dimensions



Example:
MM8030 Switch

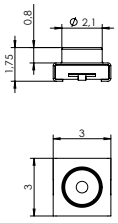
Contacting of MM8130 / MM8430 Switch Connectors

Series MM8130



Example:
MM8130 Switch

Series MM8430

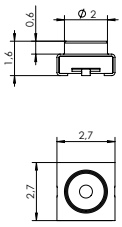


Example:
MM8430 Switch

Contacting of MS-156 (HF) / MS-156 C Switch Connectors

Series MS-156 (HF)

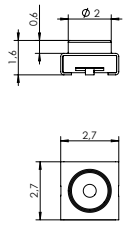
Connection Dimensions



Example:
MS-156 (HF) Switch

Series MS-156 C

Connection Dimensions

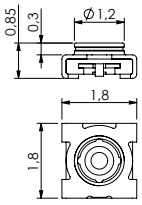


Example:
MS-156 C Switch

Contacting of MS-180 Switch Connectors

Series MS-180

Connection Dimensions

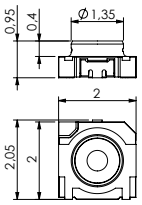


Example:
MS-180 Switch

Contacting of Pico II, PN 1551372-1 Switch Connectors

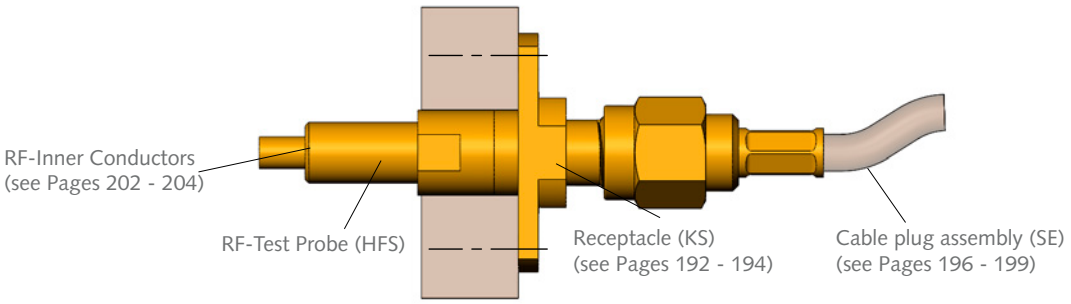
Series PN 1551372-1

Connection Dimensions



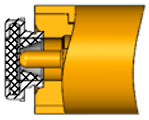
Example:
Pico II, PN 1551372-1 Switch

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

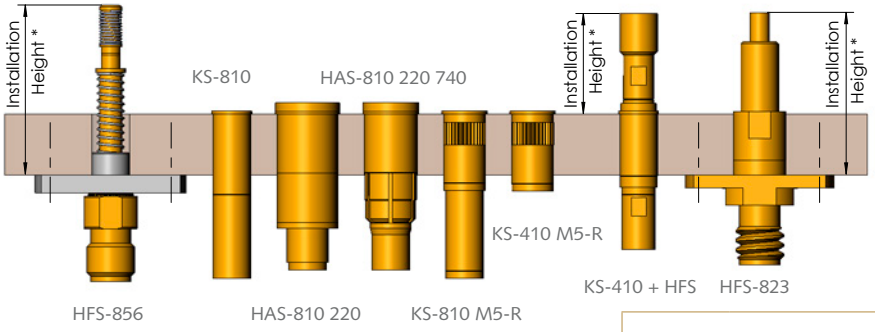


Contacting Example MM8030:

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



Customizing Example:



Electrical Data

HFS-823	**HFS-856**
HFS-860 / 860 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:	up to 12 GHz
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor	≤ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable	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
Variant		*Installation Height HFS in KS		
MM8030 Switch	... MM310	---	---	21.4 mm
	... MM8030	---	---	22.4 mm
	... MM1 / ...MM1 M	9.4 mm	10.5 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

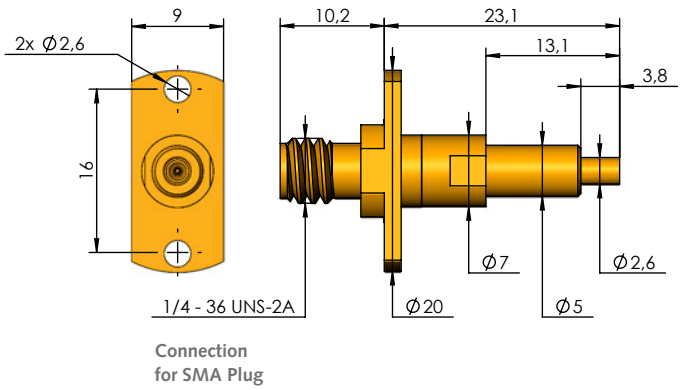
Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

Series:

Available
Tip Styles:

Ordering Description:

HFS-823 ...



Connection
for SMA Plug

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

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-823
Spring Force of Inner Conductor (N)	2.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**60**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-823

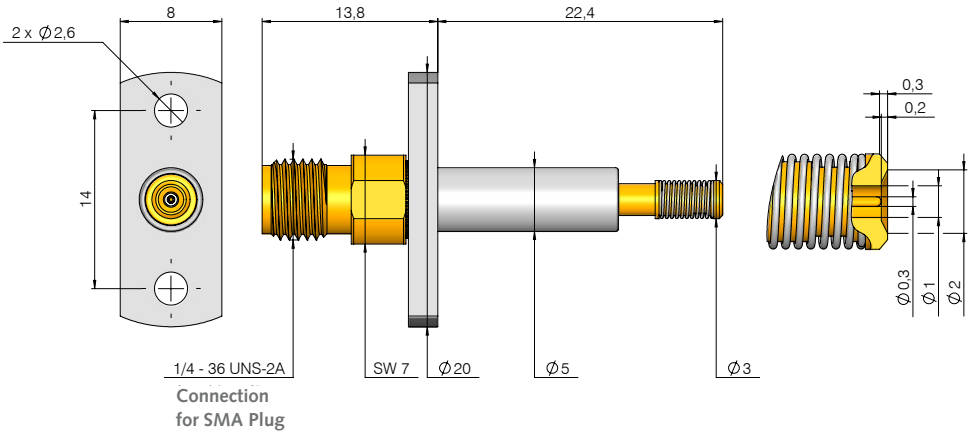
	Outer Cond.	Inner Cond.
Working Stroke:	0.8 mm	0.3 mm
Maximum Stroke:	1.5 mm	1.1 mm

Series:

Available Tip Styles:

Ordering Description:

HFS-856 ...



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

Note: The HFS-856 is float-mounted and the connection moves out during the working stroke movement.
Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.
Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

	HFS-856
Spring Force of Inner Conductor (N)	1.5
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**55**

Mechanical Data

HFS-856

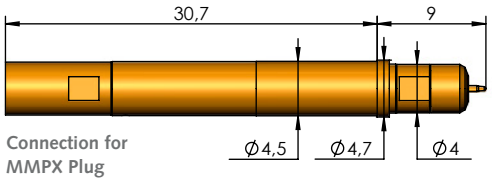
	Outer Cond.	Inner Cond.
Working Stroke:	4.2 mm	0.8 mm
Maximum Stroke:	5.2 mm	2.0 mm

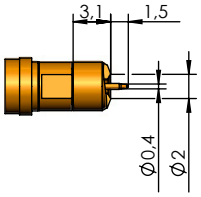
Series:

Available
Tip Styles:

Ordering Description:

HFS-865 ...





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

Note:
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-865		
Spring Force of Inner Conductor (N)	1.3	1.3	1.3
Spring Force of Outer Conductor (N)	4.0	6.0	8.0
Character for ordering	**53**	**73**	**93**

Mechanical Data

HFS-865

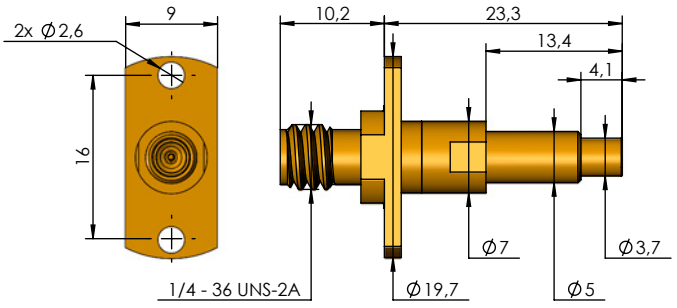
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	1.0 mm
Maximum Stroke:	5.0 mm	1.5 mm

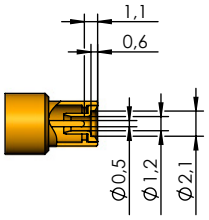
Series:

Available Tip Styles:

Ordering Description:

HFS-823 ...





HFS-823 305 051 A **xx** 43 MM036

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-823
Spring Force of Inner Conductor (N)	2.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**60**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-823

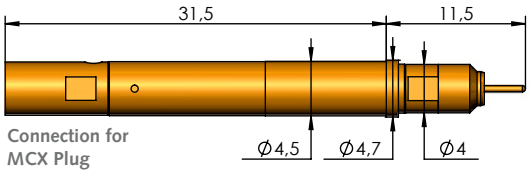
	Outer Cond.	Inner Cond.
Working Stroke:	1.8 mm	0.3 mm
Maximum Strokeb:	3.4 mm	1.1 mm

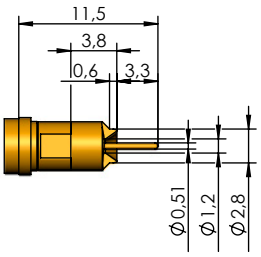
Series:

Available
Tip Styles:

Ordering Description:

HFS-860 ...

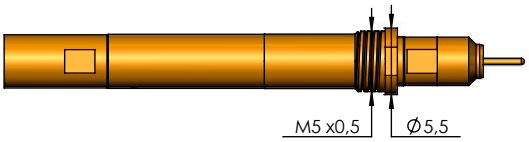


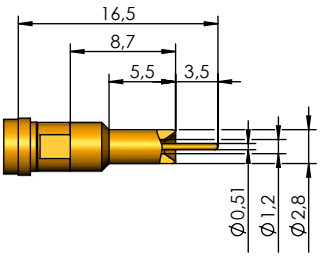


HFS-860 305 051 A **xx** 43 Y80
HFS-860 305 051 A **xx** 43 Y80 M

Note:
Centering range: ± 0.2 mm

HFS-860 ... M (*)





HFS-860 305 051 A **xx** 43 Y82
HFS-860 305 051 A **xx** 43 Y82 M

Note: Version with Installation Height 16.5 mm for applications with raised Component Height and Guide Plate.
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-860 and HFS-860 M

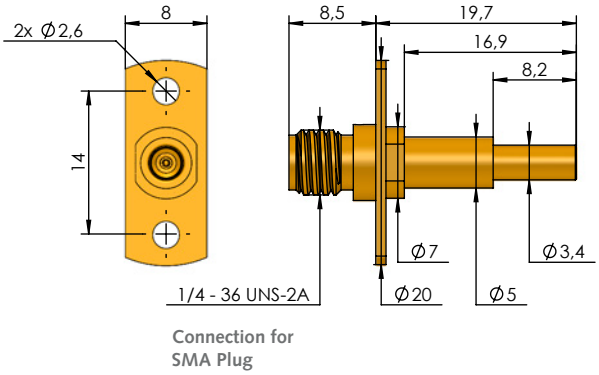
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

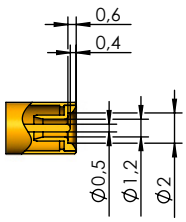
Series:

Available Tip Styles:

Ordering Description:

HFS-823 ...

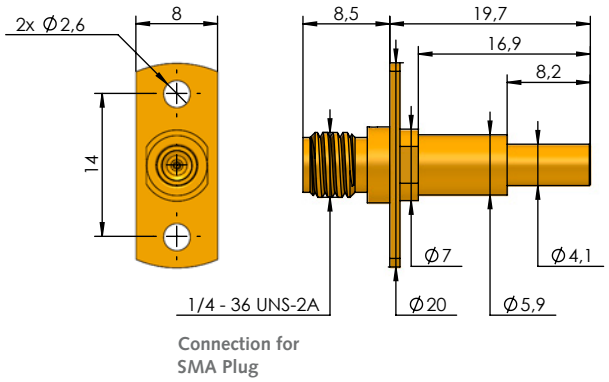


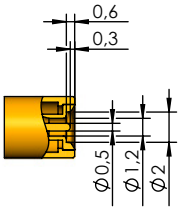


HFS-823 305 051 A **xx** 43 MS03

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.3 mm

HFS-823 ...





HFS-823 305 051 A **xx** 43 MS06

Note: Version with flange connection. No movement of the connection during stroke movement.
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-823
Spring Force of Inner Conductor (N)	2.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**60**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data
HFS-823 (MS03)

	Outer Cond.	Inner Cond.
Working Stroke:	1.8 mm	0.7 mm
Maximum Stroke:	2.4 mm	1.1 mm

Mechanical Data
HFS-823 (MS06)

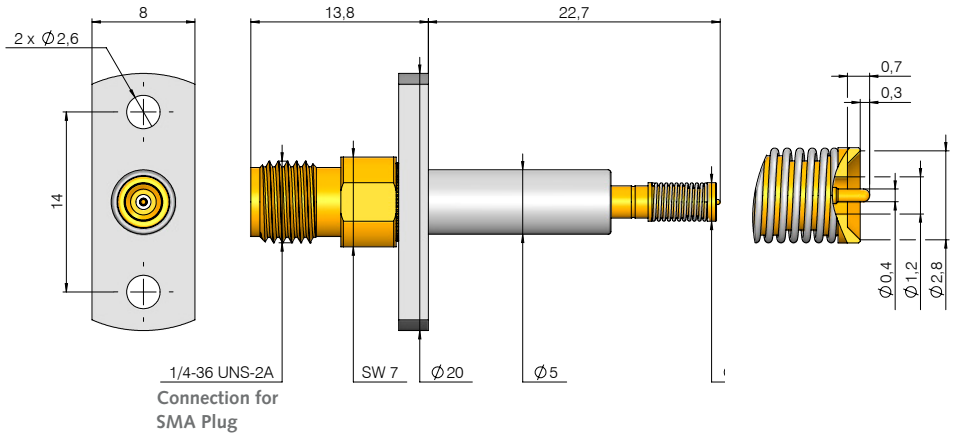
	Outer Cond.	Inner Cond.
Working Stroke:	1.7 mm	0.7 mm
Maximum Stroke:	2.3 mm	1.3 mm

Series:

Available Tip Styles:

Ordering Description:

HFS-856 ...



HFS-856 305 040 A **xx** 3 MS156-H

Note: The HFS-856 is float-mounted and the connection moves out during the working stroke movement.
Compensation of radial positioning inaccuracies of the connector by up to ± 3.0°.
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-856
Spring Force of Inner Conductor (N)	1.5
Spring Force of Outer Conductor (N)	4.8
Character for ordering	**63**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-856

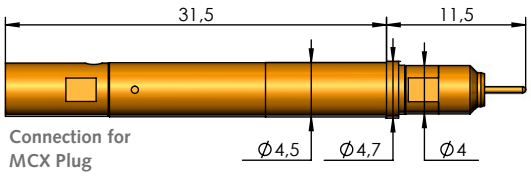
	Outer Cond.	Inner Cond.
Working Stroke:	4.2 mm	0.8 mm
Maximum Strokeb:	5.2 mm	2.0 mm

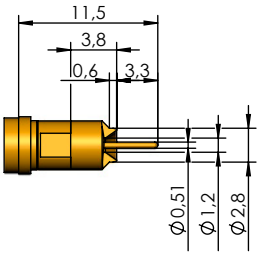
Series:

Available Tip Styles:

Ordering Description:

HFS-860 ...

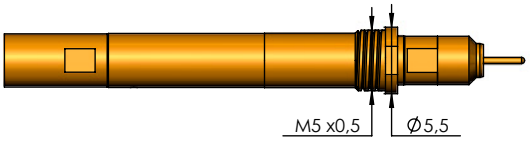


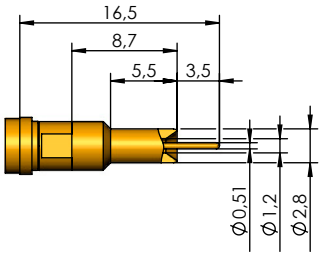


HFS-860 305 051 A **xx** 43 Y80
HFS-860 305 051 A **xx** 43 Y80 M

Note:
Centering range: ± 0.2 mm

HFS-860 ... M (*)





HFS-860 305 051 A **xx** 43 Y82
HFS-860 305 051 A **xx** 43 Y82 M

Note: Version with Installation Height 16.5 mm for applications with raised Component Height and Guide Plate.
Centering range: ± 0.2 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-860 HFS-860 M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-860 and HFS-860 M

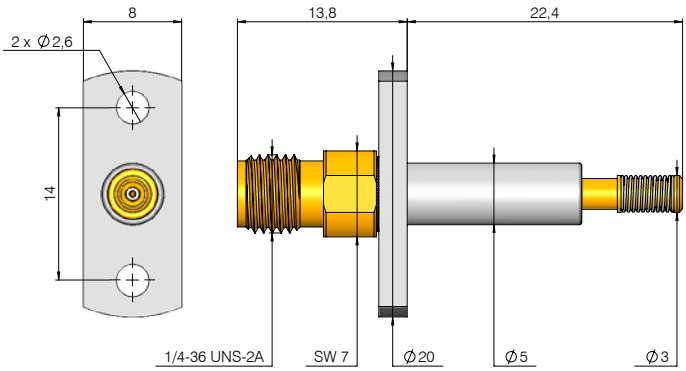
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

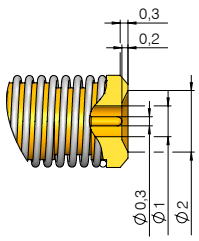
Series:

Available Tip Styles:

Ordering Description:

HFS-856 ...





HFS-856 305 030 A **xx** 43 MS180-H

Note: The HFS-856 is float-mounted and the connection moves out during the working stroke movement.
Compensation of radial positioning inaccuracies of the connector by up to ± 3,0°.
Centering range: ± 0.4 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-856
Spring Force of Inner Conductor (N)	1.5
Spring Force of Outer Conductor (N)	4.8
Character for ordering	**63**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-856

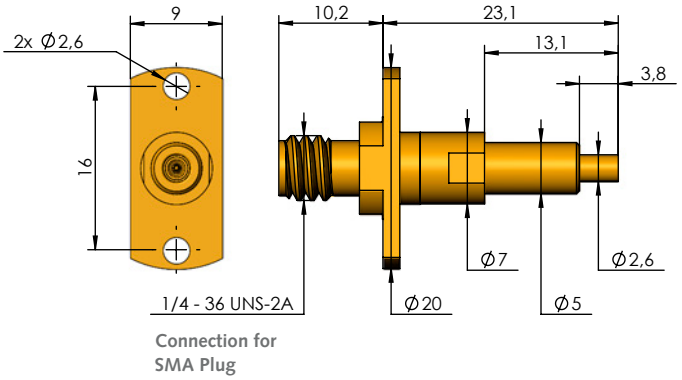
	Outer Cond.	Inner Cond.
Working Stroke:	4.2 mm	0.8 mm
Maximum Strokeb:	5.2 mm	2.0 mm

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.
Centering range: ± 0.3 mm

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-823
Spring Force of Inner Conductor (N)	2.0
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**60**

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

For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data

HFS-823

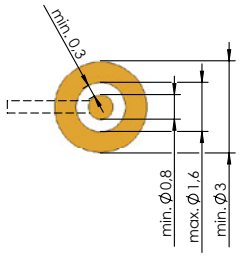
	Outer Cond.	Inner Cond.
Working Stroke:	0.8 mm	0.3 mm
Maximum Strokeb:	1.5 mm	1.1 mm

Applied Radio Frequency Technology

The radio frequency probes from INGUN are used especially when radio frequency signals must be measured.

Contacting of PCB-Layout with closed Ground Ring

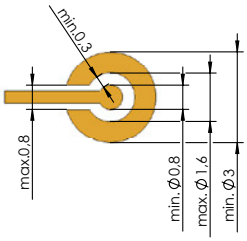
Signal guiding to inwards (Multilayer)



PCB coax closed

Contacting of PCB-Layout with Ground Ring open on one side

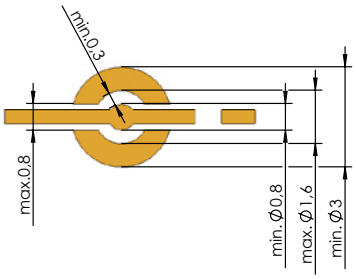
Signal guiding outwards



PCB coax open

Contacting of PCB-Layout with kidney-shaped Ground Ring

Through Signal guiding outwards



PCB coax kidney-shaped

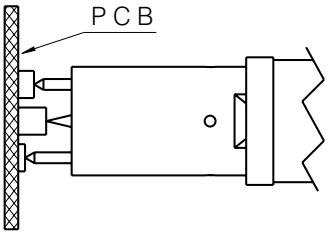
Contents

PCB coax closed (50 Ω)

PCB coax open (50 Ω)

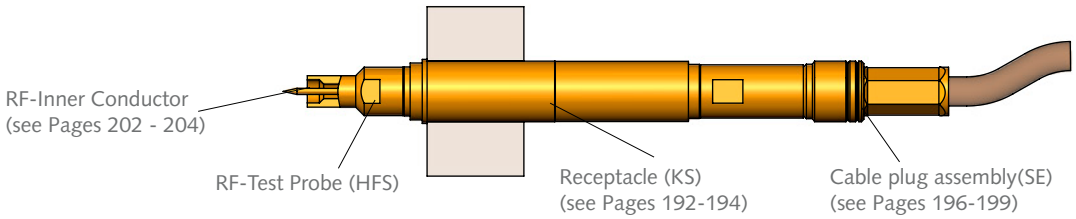
PCB coax kidney-shaped (50 Ω)

Contacting of PCB-Layout with different levels

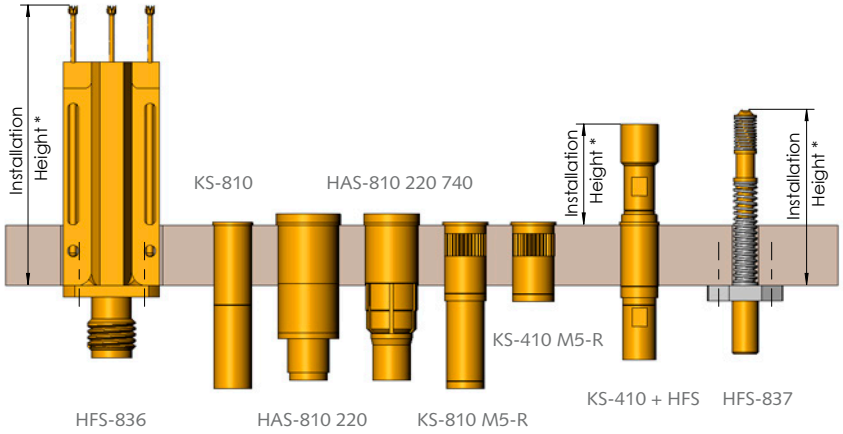


HFS-Variants for PCB-Layouts	Signal (S)	Ground (G)
PCB-SG	1	1
PCB-GSG	1	2
PCB-GGSGG	1	4

PCB-Layout



Customizing 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
Current Rating Outer Conductor:		8 - 10 A
Current Rating Inner Conductor:		2 - 3 A
R_i typical Inner Conductor:		≤ 10 mΩ
Impedance Test Probe:		50 Ω
	at HFS-858	75 Ω
Impedance Cable:		50 Ω
	at HFS-858	75 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)
Variant		*Installation Height 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 side	

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

PCB test point

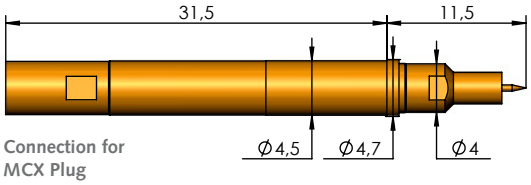
PCB-coax closed

up to 2 GHz (50 Ω)

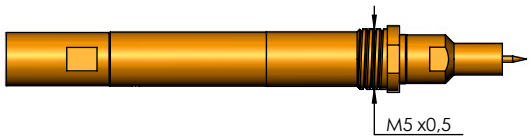
HFS-810 / HFS-810 M
HFS-410 / HFS-410 M

Series:

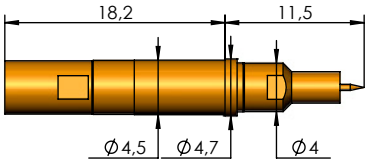
HFS-810 ...



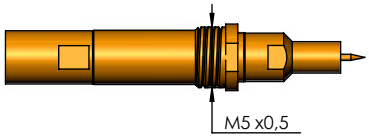
HFS-810 ... M (*)



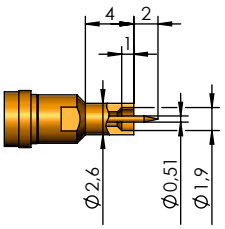
HFS-410 ...

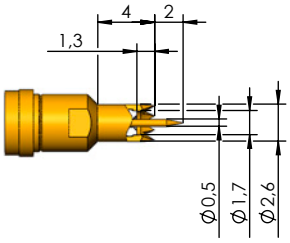


HFS-410 ... M (*)



Available Tip Styles:





Ordering Description:

HFS-810 201 051 A **xx** 02
HFS-810 201 051 A **xx** 02 M
HFS-410 201 051 A **xx** 02
HFS-410 201 051 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
HFS-410 201 051 A **xx** 06
HFS-410 201 051 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 used when contacting contaminated PC-Boards.

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 M				HFS-410 HFS-410 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

Mechanical Data
HFS-810 and HFS-810 M

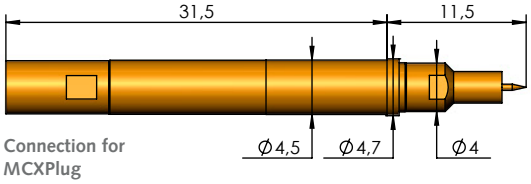
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

Mechanical Data
HFS-410 and HFS-410 M

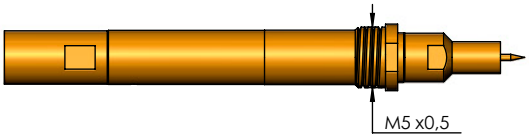
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

Series:

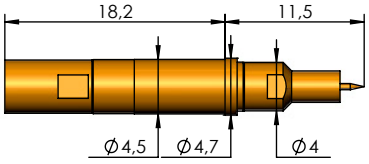
HFS-840 ...



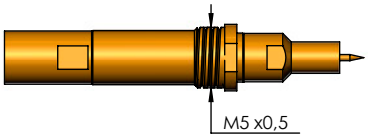
HFS-840 ... M (*)



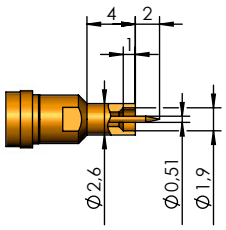
HFS-440 ...

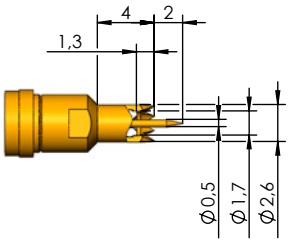


HFS-440 ... M (*)



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 used when contacting contaminated PC-Boards.

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-840 HFS-840 M				HFS-440 HFS-440 M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

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

PCB test point

PCB-coax open

up to 2 GHz (50 Ω)

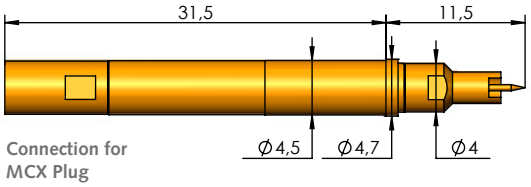
HFS-810 / HFS-810 4M
HFS-410 / HFS-410 4M

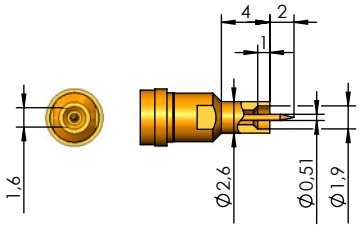
Series:

Available Tip Styles:

Ordering Description:

HFS-810 ...

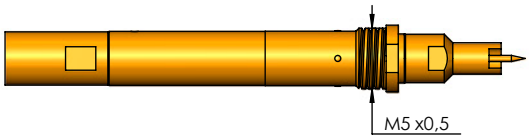


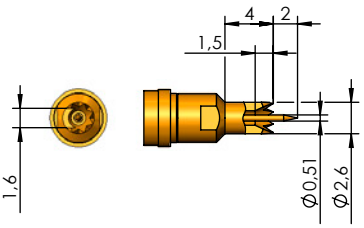


HFS-810 201 051 A **xx** 02 S
HFS-810 201 051 A **xx** 02 S 4M
HFS-410 201 051 A **xx** 02 S
HFS-410 201 051 A **xx** 02 S 4M

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 used when contacting clean PC-Boards.

HFS-810 ... 4M (*)

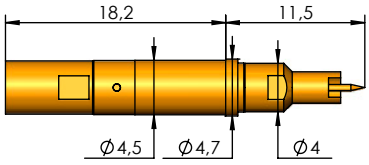




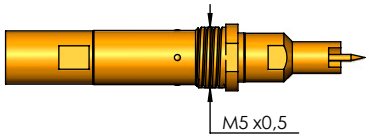
HFS-810 201 051 A **xx** 06 S
HFS-810 201 051 A **xx** 06 S 4M
HFS-410 201 051 A **xx** 06 S
HFS-410 201 051 A **xx** 06 S 4M

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 used when contacting contaminated PC-Boards.

HFS-410 ...



HFS-410 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-810 HFS-810 4M				HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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

Mechanical Data
HFS-410 and HFS-410 4M

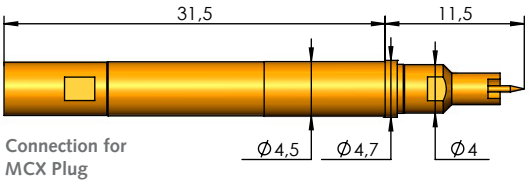
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

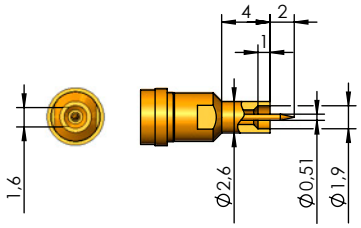
Series:

Available
Tip Styles:

Ordering Description:

HFS-840 ...

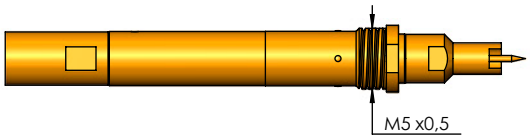


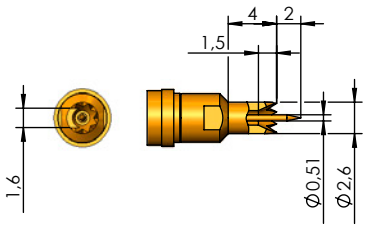


HFS-840 201 051 A **xx** 02 S
HFS-840 201 051 A **xx** 02 S 4M
HFS-440 201 051 A **xx** 02 S
HFS-440 201 051 A **xx** 02 S 4M

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 used when contacting clean PC-Boards.

HFS-840 ... 4M (*)

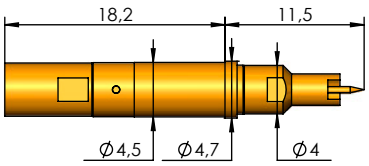




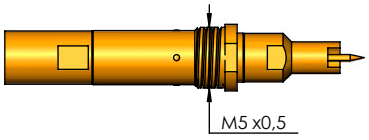
HFS-840 201 051 A **xx** 06 S
HFS-840 201 051 A **xx** 06 S 4M
HFS-440 201 051 A **xx** 06 S
HFS-440 201 051 A **xx** 06 S 4M

Note: To contact open Ground Rings with signal guiding to the outer side. The slit tip-style 06 S (serrated - slit) of the Outer conductor is used when contacting contaminated PC-Boards.

HFS-440 ...



HFS-440 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-840 HFS-840 4M				HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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 test point

PCB-coax open

up to 6 GHz (50 Ω)

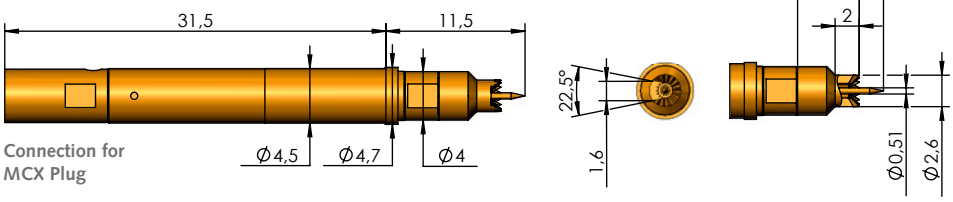
HFS-860 / HFS-860 4M

Series:

Available Tip Styles:

Ordering Description:

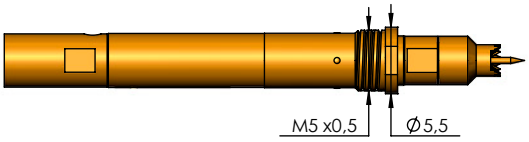
HFS-860 ...



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 used when contacting contaminated PC-Boards.

HFS-860 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-860 HFS-860 4M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Mechanical Data

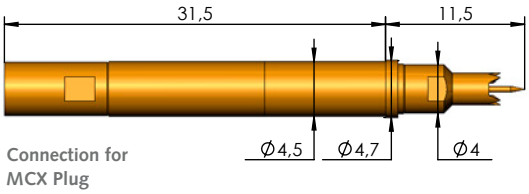
HFS-860 and HFS-860 M

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

PCB-coax kidney-shaped

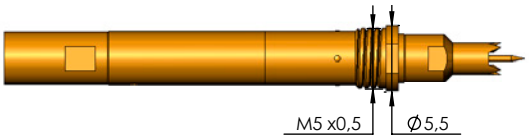
Series:

HFS-810 ...

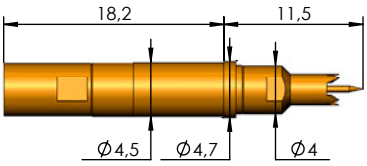


Connection for
MCX Plug

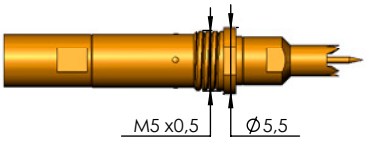
HFS-810 ... 4M (*)



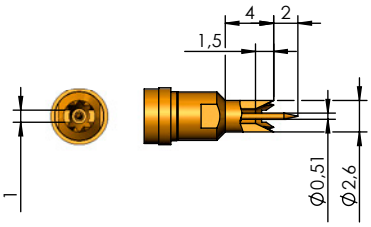
HFS-410 ...



HFS-410 ... 4M (*)



Available
Tip Styles:



Ordering Description:

HFS-810 201 051 A **xx** 06 P
HFS-810 201 051 A **xx** 06 P 4M
HFS-410 201 051 A **xx** 06 P
HFS-410 201 051 A **xx** 06 P 4M

Note: For contacting kidney-shaped Ground Rings with through signal guiding.

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810 HFS-810 4M				HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

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

Mechanical Data
HFS-410 and HFS-410 4M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

PCB test point

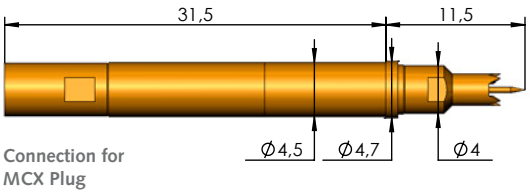
PCB-coax kidney-shaped

up to 4 GHz (50 Ω)

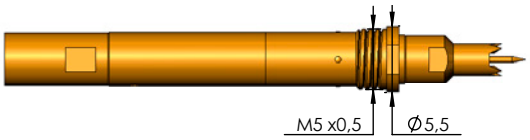
HFS-840 / HFS-840 4M
HFS-440 / HFS-440 4M

Series:

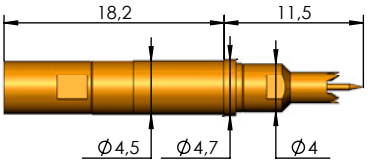
HFS-840 ...



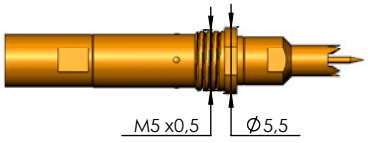
HFS-840 ... 4M (*)



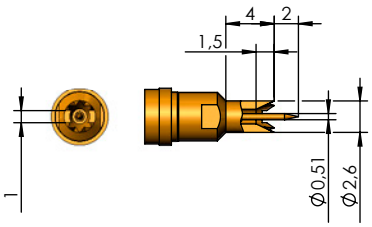
HFS-440 ...



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 through signal guiding.

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-840 HFS-840 4M				HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0	1.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0	4.0
Character for ordering	**53**	**80**	**93**	**99**	**50**

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

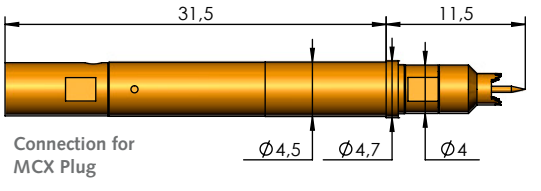
	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	2.0 mm
Maximum Stroke:	3.0 mm	3.0 mm

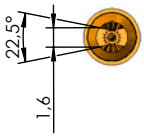
Series:

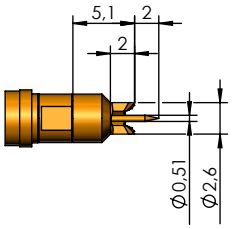
Available
Tip Styles:

Ordering Description:

HFS-860 ...



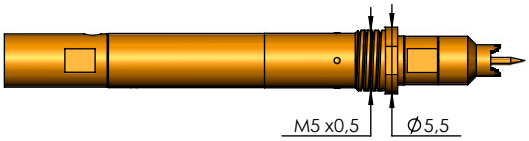




HFS-860 201 051 A **xx** 06 P
HFS-860 201 051 A **xx** 06 P 4M

Note: For contacting kidney-shaped Ground Rings with through signal guiding.

HFS-860 ... 4M (*)



Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-860 HFS-860 4M			
Spring Force of Inner Conductor (N)	1.3	2.0	1.3	2.0
Spring Force of Outer Conductor (N)	4.0	6.0	8.0	8.0
Character for ordering	**53**	**80**	**93**	**99**

Mechanical Data

HFS-860 and HFS-860 4M

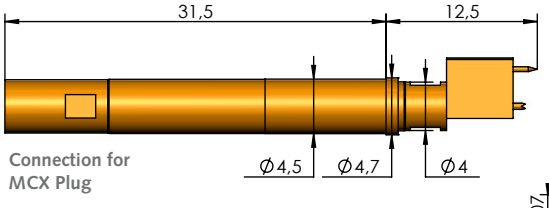
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

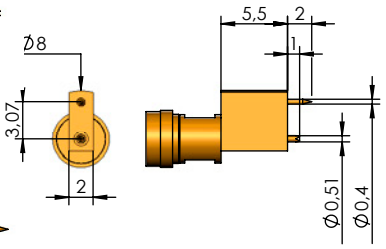
Series:

Available Tip Styles:

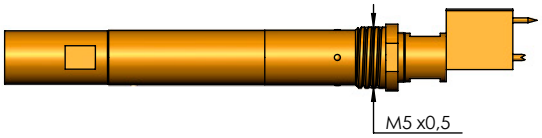
Ordering Description:

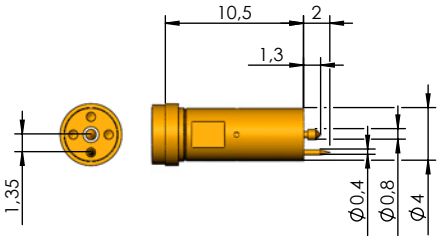
HFS-810 ...



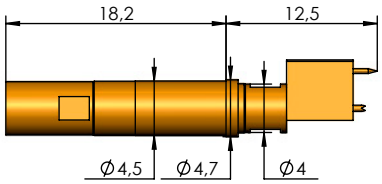


HFS-810 ... 4M (*)

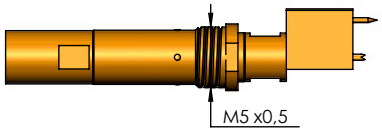




HFS-410 ...



HFS-410 ... 4M (*)



HFS-810 204 051 A **xx** 02 V1-AS3
HFS-810 204 051 A **xx** 02 V1-AS3 4M
HFS-410 204 051 A **xx** 02 V1-AS3
HFS-410 204 051 A **xx** 02 V1-AS3 4M

Note: (Version 1)
For contacting Ground Pads with different heights. Outer conductor (Ground) with one spring-loaded tip, (tip-style 01 spear-point), 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
HFS-810 358 080 A **xx** 02 V2-00S 4M
HFS-410 358 080 A **xx** 02 V2-00S
HFS-410 358 080 A **xx** 02 V2-00S 4M

Note: (Version 2) **
For contacting Ground Pads with different heights. Outer conductor (Ground) with one spring-loaded tip, (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N.

	HFS-810 HFS-810 4M			HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded			
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	0.8	0.8	0.8	0.8
Spring Force of Outer Conductor Body (N)	4.0	6.0	8.0	4.0
Character for ordering	**48**	**68**	**88**	**48**

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-810 and HFS-810 4M

	Outer Cond. Body	Outer Cond. Point (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	

Mechanical Data
HFS-410 and HFS-410 4M

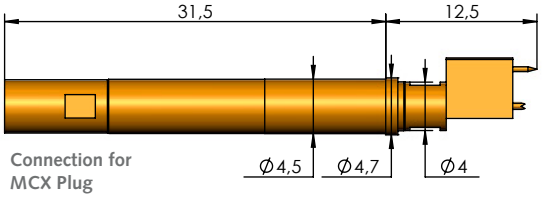
	Outer Cond. Body	Outer Cond. Point (Ground)	Inner Cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

Series:

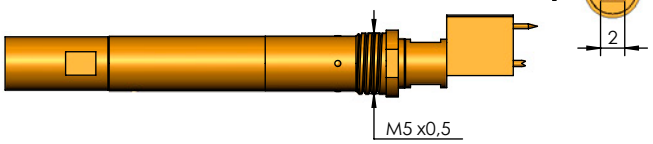
Available Tip Styles:

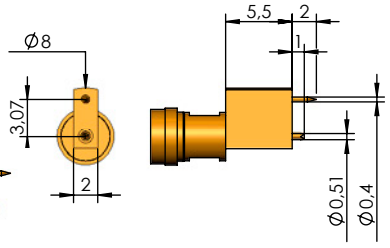
Ordering Description:

HFS-840 ...



HFS-840 ... 4M (*)

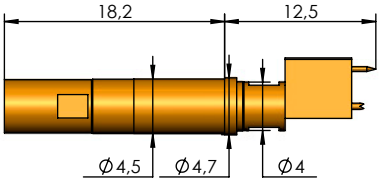


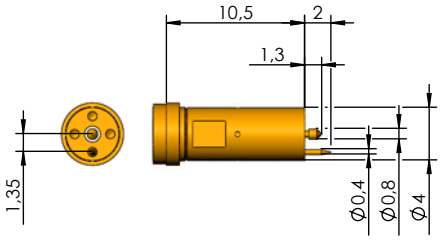


HFS-840 204 051 A **xx** 02 V1-AS3
HFS-840 204 051 A **xx** 02 V1-AS3 4M
HFS-440 204 051 A **xx** 02 V1-AS3
HFS-440 204 051 A **xx** 02 V1-AS3 4M

Note: (Version 1)
For contacting Ground Pads with different heights. Outer conductor (Ground) with one spring-loaded tip, (tip-style 01 spear-point), 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-440 ...

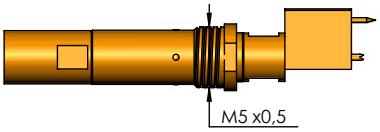




HFS-840 358 080 A **xx** 02 V2-00S
HFS-840 358 080 A **xx** 02 V2-00S 4M
HFS-440 358 080 A **xx** 02 V2-00S
HFS-440 358 080 A **xx** 02 V2-00S 4M

Note: (Version 2) **
For contacting Ground Pads with different heights. Outer conductor (Ground) with one spring-loaded tip, (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N.

HFS-440 ... 4M (*)



	HFS-840 HFS-840 4M			HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded			
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	0.8	0.8	0.8	0.8
Spring Force of Outer Conductor Body (N)	4.0	6.0	8.0	4.0
Character for ordering	**48**	**68**	**88**	**48**

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-840 and HFS-840 4M

	Outer cond. Body	Outer cond. Point (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	

Mechanical Data
HFS-440 and HFS-440 4M

	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

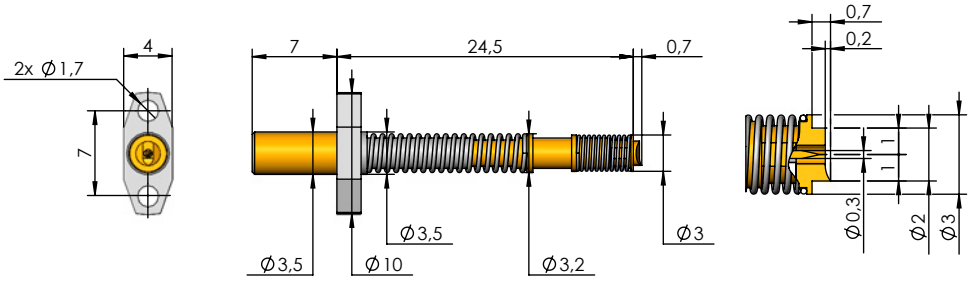
PCB test point

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 rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-837
Spring Force of Inner Conductor (N) (Signal)	1.0
Spring Force of Outer Conductor (N) (Ground)	3.8
Character for ordering	**48**

Note:
The RF test probes in the HFS-837 series are positioned and fixed with two screws using a flange connection.

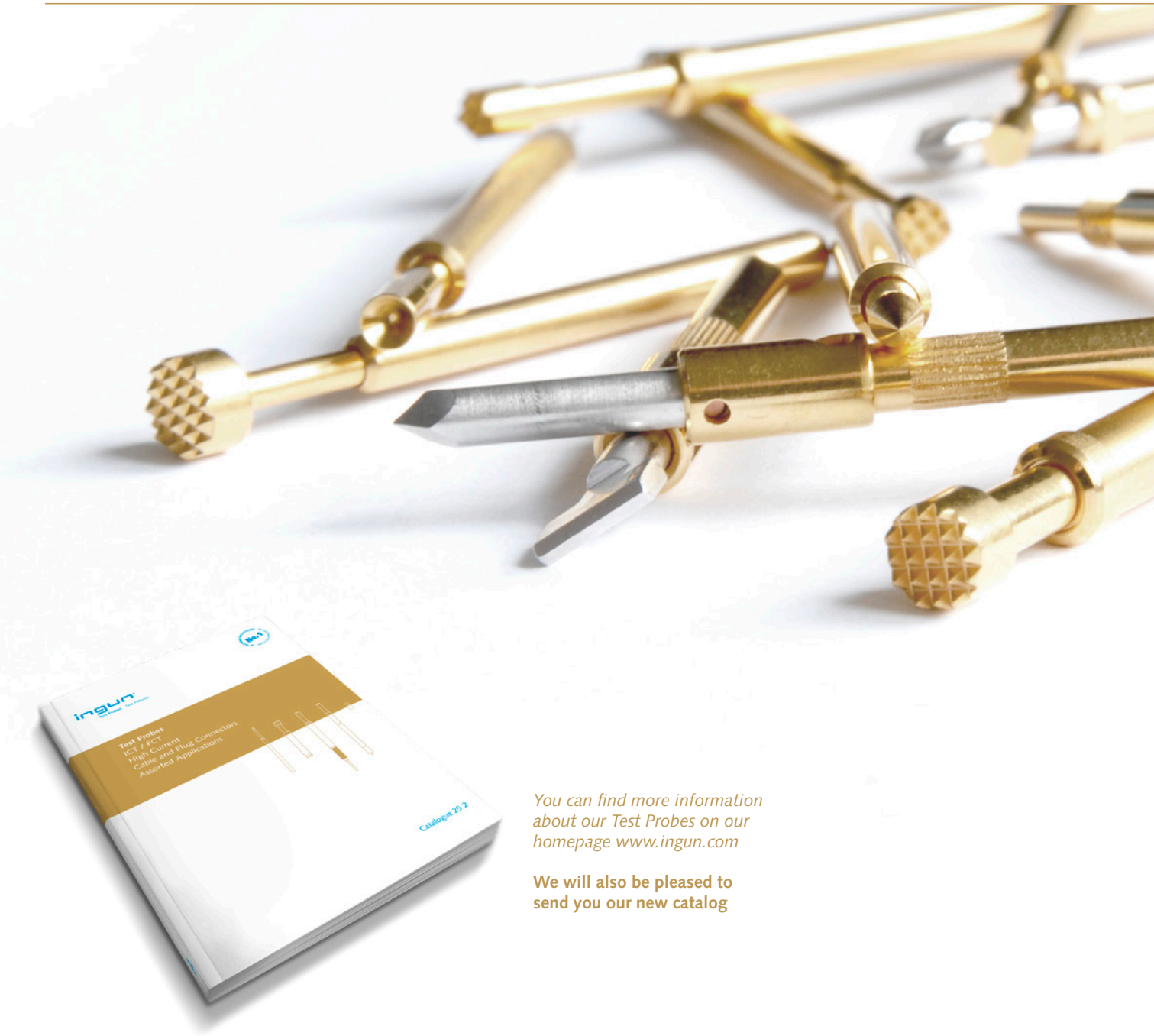
For use with high packing density.

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

The Test Probes Catalog



You can find more information about our Test Probes on our homepage www.ingun.com

We will also be pleased to send you our new catalog

The Test Probe Catalog with a large choice of Cable Test Probes

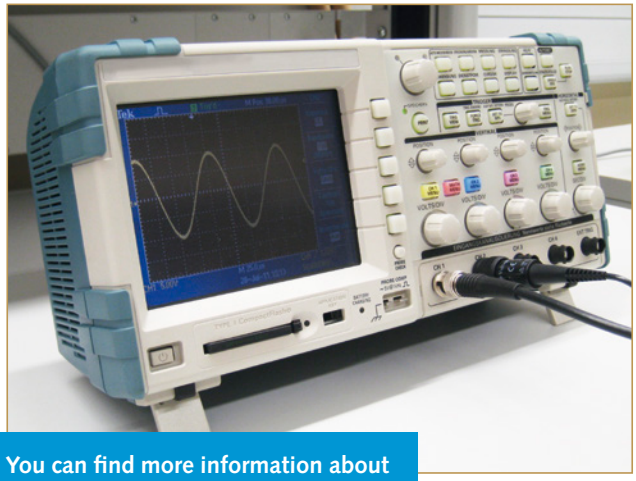
In the new catalog you will find the largest choice of Test Probes: High-current Probes, Fine-pitch Probes, Short-stroke Probes, Interface Probes, Rotating Probes, Switching Probes, Pneumatic Probes and many more.

Apart from this there is a separate section with numerous new Test Probes for Cable Harness Testing – from Screw-in High-current Probes through to Push-back Probes.

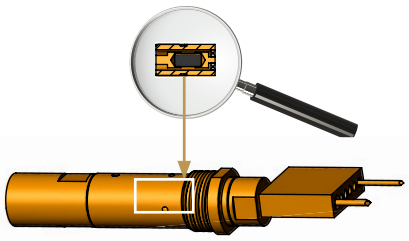
RF Probes with Integrated Filter

INGUN RF Probes with an Integrated Filter are generally used when the signal to be measured is picked up directly from the PCB conductor and, if possible, must not be influenced. This is achieved, among other, with an integrated ohmic Resistor near the probe tip, the value of which is derived from an applicable division ratio. A standard division factor of 1/10 is used. Further division factors are available on request.

Due to its mechanical design the INGUN RF probe with its integrated filter can be used for very broad-banded applications. A further advantage in comparison with conventional Oscilloscope Probing Tips is the fact that the ground-connection can be kept as short as possible and therefore parasitic coupling can be reduced to a very low extent. The RF Probe is especially suitable for carrying out automatic tests on PC-Boards using an Oscilloscope.



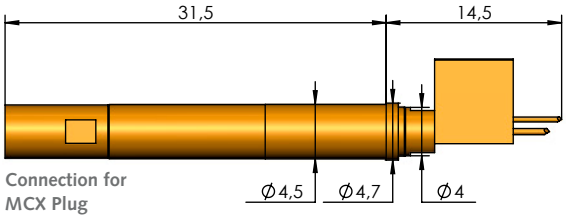
You can find more information about our RF Products with Integrated Filter on page 169. Further variants can be implemented upon request.



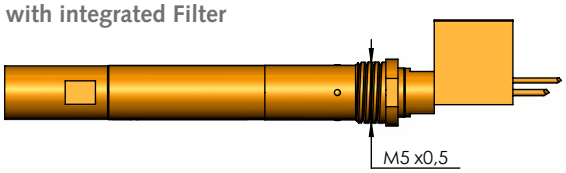
HFS with integrated Filter
Example: HFS-440 007 051 A 4807 P5-AS 4M

Series:

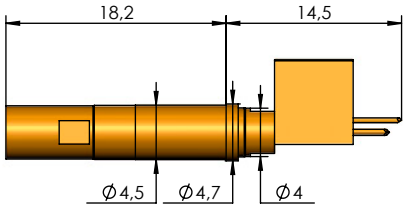
HFS-840 ... with integrated Filter



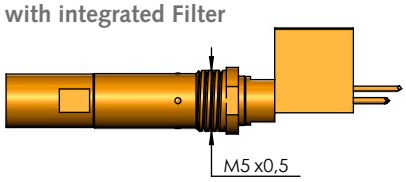
HFS-840 ... 4M (*) with integrated Filter



HFS-440 ... with integrated Filter

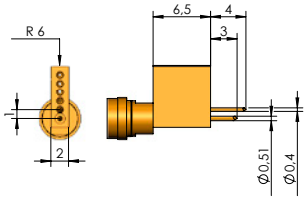


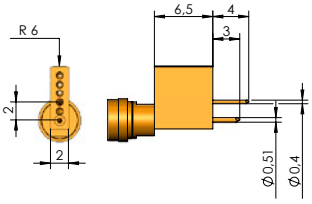
HFS-440 ... 4M (*) with integrated Filter

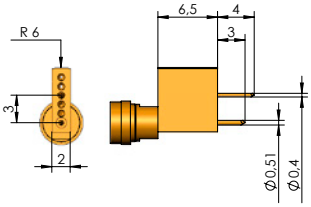


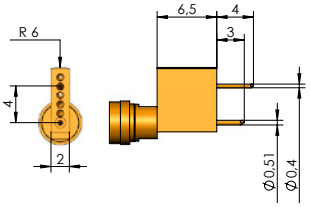
Further variants with Filter can be implemented on request.

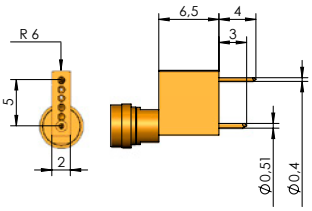
Available Tip Styles:











Ordering Description:

HFS-840 007 051 A **xx** 07 P1-AS
HFS-840 007 051 A **xx** 07 P1-AS 4M
HFS-440 007 051 A **xx** 07 P1-AS
HFS-440 007 051 A **xx** 07 P1-AS 4M

Version with 1.0 mm Conductor Pitch

HFS-840 007 051 A **xx** 07 P2-AS
HFS-840 007 051 A **xx** 07 P2-AS 4M
HFS-440 007 051 A **xx** 07 P2-AS
HFS-440 007 051 A **xx** 07 P2-AS 4M

Version with 2.0 mm Conductor Pitch

HFS-840 007 051 A **xx** 07 P3-AS
HFS-840 007 051 A **xx** 07 P3-AS 4M
HFS-440 007 051 A **xx** 07 P3-AS
HFS-440 007 051 A **xx** 07 P3-AS 4M

Version with 3.0 mm Conductor Pitch

HFS-840 007 051 A **xx** 07 P4-AS
HFS-840 007 051 A **xx** 07 P4-AS 4M
HFS-440 007 051 A **xx** 07 P4-AS
HFS-440 007 051 A **xx** 07 P4-AS 4M

Version with 4.0 mm Conductor Pitch

HFS-840 007 051 A **xx** 07 P5-AS
HFS-840 007 051 A **xx** 07 P5-AS 4M
HFS-440 007 051 A **xx** 07 P5-AS
HFS-440 007 051 A **xx** 07 P5-AS 4M

Version with 5.0 mm Conductor Pitch

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-840 HFS-840 4M			HFS-440 HFS-440 4M	
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded				
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	0.8	0.8	0.8	0.8	0.8
Spring Force of Outer Conductor Body (N)	4.0	6.0	8.0	3.0	4.0
Character for ordering	**48**	**68**	**88**	**38**	**48**

Mechanical Data

	HFS-840 and HFS-840 4M		HFS-440 and HFS-440 M
	Outer cond. Body	**Outer cond. Point (Ground)**	**Inner Cond. (Signal)**
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

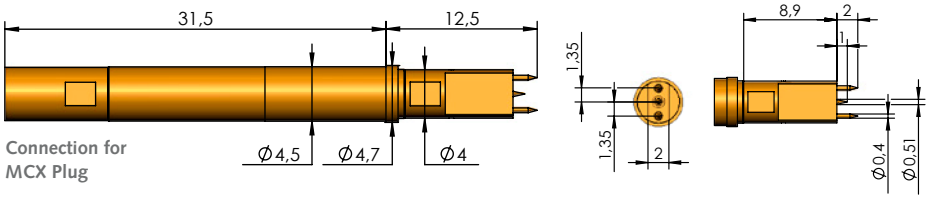
PCB test point

Series:

Available Tip Styles:

Ordering Description:

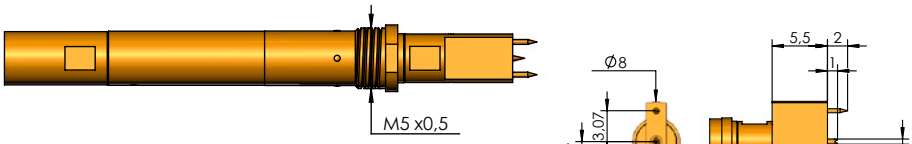
HFS-810 ...



HFS-810 201 051 A **xx** 29 V2
HFS-810 201 051 A **xx** 29 V2 4M
HFS-410 201 051 A **xx** 29 V2
HFS-410 201 051 A **xx** 29 V2 4M

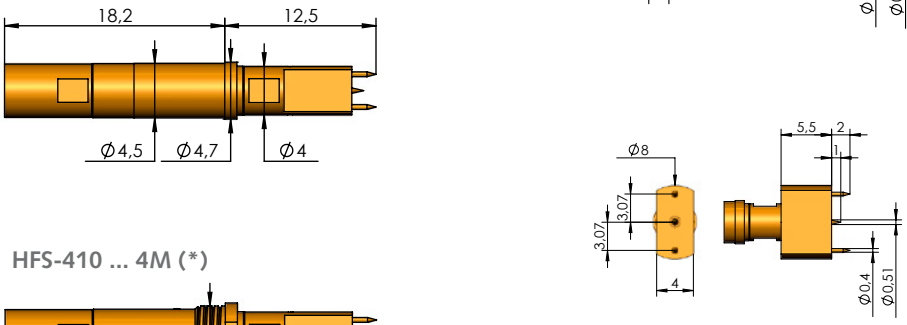
HFS-810 204 051 A **xx** 29 V2-S2
HFS-810 204 051 A **xx** 29 V2-S2 4M
HFS-410 204 051 A **xx** 29 V2-S2
HFS-410 204 051 A **xx** 29 V2-S2 4M

HFS-810 ... 4M (*)



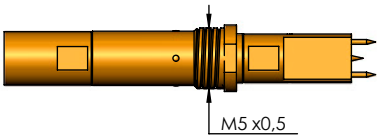
Note: (Version 1 ** + Version 2)
For contacting ground pads with different heights. Outer conductor (Ground) with two spring-loaded tip (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N. Width of Outer conductor 2.0 mm and asymmetric for applications with high component density.

HFS-410 ...



HFS-810 201 051 A **xx** 29 V2-S1
HFS-810 201 051 A **xx** 29 V2-S1 4M
HFS-410 201 051 A **xx** 29 V2-S1
HFS-410 201 051 A **xx** 29 V2-S1 4M

HFS-410 ... 4M (*)



Note: (Version 3 ***)
For contacting ground pads with different heights. Outer conductor (Ground) with one spring-loaded tip respectively one rigid tip (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N. Width of Outer conductor 4.0 mm and asymmetric for applications with high component density.

Version 1 + 2	HFS-810 HFS-810 4M		HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	2 x 0.8	2 x 0.8	2 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**76**	**96**	**56**

Version 3 ***	HFS-810 HFS-810 4M			HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded			
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	0.8	0.8	0.8	0.8
Spring Force of Outer Conductor Body (N))	4.0	6.0	8.0	4.0
Character for ordering	**48**	**68**	**88**	**48**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-810 and HFS-810 4M

	Outer cond. Body	Outer cond. Point (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	

Mechanical Data
HFS-410 and HFS-410 4M

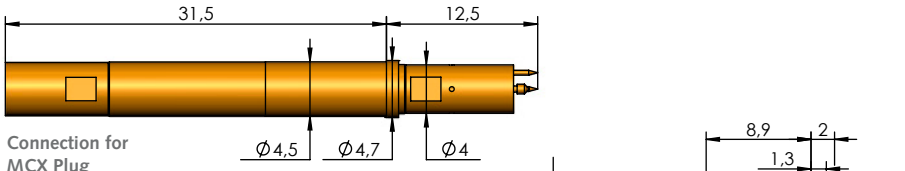
	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

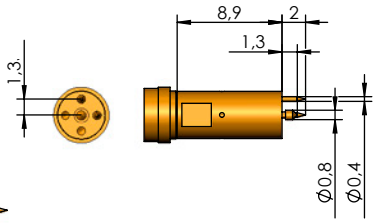
Series:

Available Tip Styles:

Ordering Description:

HFS-810 ...

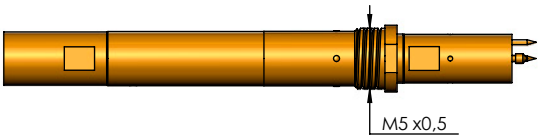


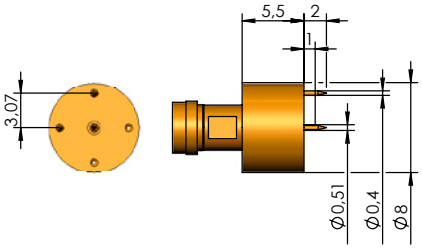


HFS-810 358 080 A **xx** 02 V2-09S
HFS-810 358 080 A **xx** 02 V2-09S 4M
HFS-410 358 080 A **xx** 02 V2-09S
HFS-410 358 080 A **xx** 02 V2-09S 4M

Note: (Version 1 **)
For contacting Ground Pads with different heights. Outer conductor (Ground) with two spring-loaded tips, 90° off-set, tip-style 01, spear-point, working stroke 1.0 mm, spring force 0.8 N.

HFS-810 ... 4M (*)

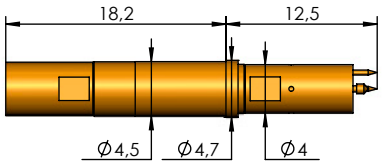




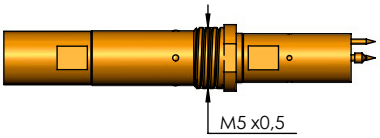
HFS-810 204 051 A **xx** 02 V2
HFS-810 204 051 A **xx** 02 V2 4M
HFS-410 204 051 A **xx** 02 V2
HFS-410 204 051 A **xx** 02 V2 4M

Note: (Version 2)
For contacting Ground Pads with different heights. Outer conductor (Ground) with two spring-loaded tips, 90° off-set, tip-style 01, spear-point, working stroke 1.0 mm, spring force 0.8 N.

HFS-410 ...



HFS-410 ... 4M (*)



	HFS-810 HFS-810 4M		HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	2 x 0.8	2 x 0.8	2 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**76**	**96**	**56**

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-810 and HFS-810 4M

	Outer cond. Body	Outer cond. Point (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	

Mechanical Data
HFS-410 and HFS-410 4M

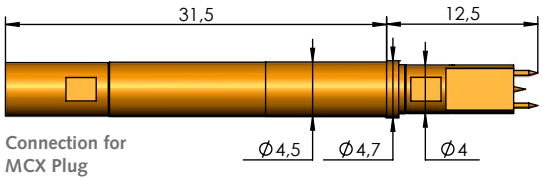
	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

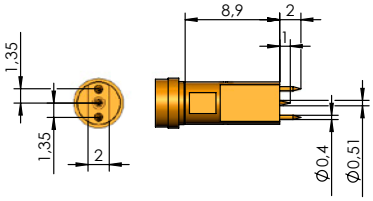
Series:

Available Tip Styles:

Ordering Description:

HFS-840 ...

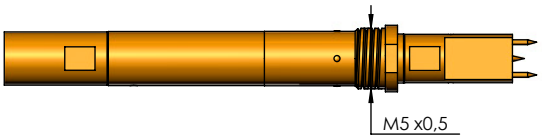


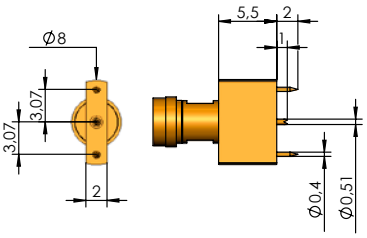


HFS-840 201 051 A **xx** 29 V2
HFS-840 201 051 A **xx** 29 V2 4M
HFS-440 201 051 A **xx** 29 V2
HFS-440 201 051 A **xx** 29 V2 4M

HFS-840 204 051 A **xx** 29 V2-S2
HFS-840 204 051 A **xx** 29 V2-S2 4M
HFS-440 204 051 A **xx** 29 V2-S2
HFS-440 204 051 A **xx** 29 V2-S2 4M

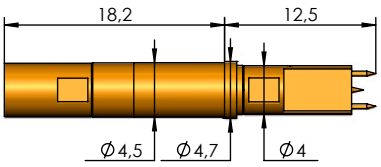
HFS-840 ... 4M (*)



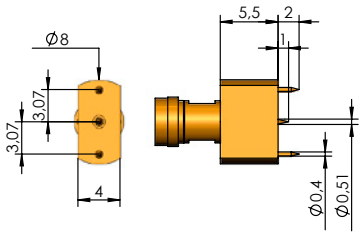


Note: (Version 1 ** + Version 2)
For contacting ground pads with different heights. Outer conductor (Ground) with two spring-loaded tip (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N. Width of Outer conductor 2.0 mm and asymmetric for applications with high component density.

HFS-440 ...

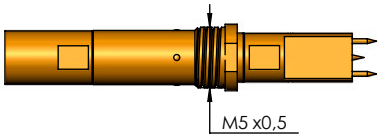


HFS-840 201 051 A **xx** 29 V2-S1
HFS-840 201 051 A **xx** 29 V2-S1 4M
HFS-440 201 051 A **xx** 29 V2-S1
HFS-440 201 051 A **xx** 29 V2-S1 4M



Note: (Version 3 ***)
For contacting ground pads with different heights. Outer conductor (Ground) with one spring-loaded tip respectively one rigid tip (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N. Width of Outer conductor 4.0 mm and asymmetric for applications with high component density.

HFS-440 ... 4M (*)



Version 1 + 2	HFS-840 HFS-840 4M		HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	2 x 0.8	2 x 0.8	2 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**76**	**96**	**56**

Version 3 ***	HFS-840 HFS-840 4M			HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded			
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	0.8	0.8	0.8	0.8
Spring Force of Outer Conductor Body (N)	4.0	6.0	8.0	4.0
Character for ordering	**48**	**68**	**88**	**48**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-840 and HFS-840 4M

	Outer cond. Body	Outer cond. Point (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	

Mechanical Data
HFS-440 and HFS-440 4M

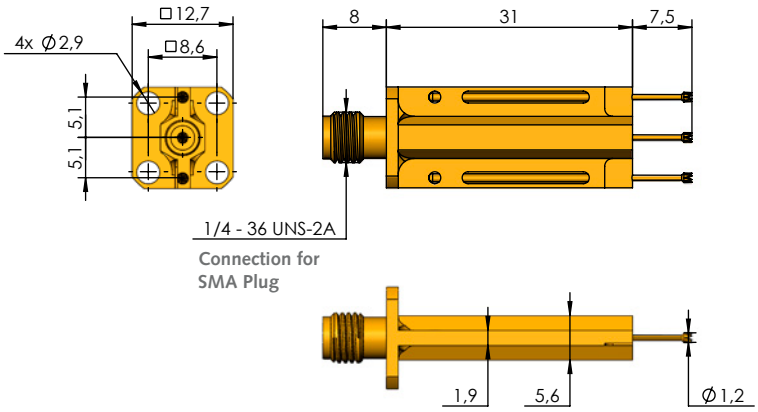
	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

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 inner and outer conductor.
Pitch distance: 5.1 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-836
Spring Force of Inner Conductor (N) (Signal)	1.5
Spring Force of Outer Conductor (N) (Ground)	2 x 1.5
Character for ordering	**45**

Note:
The RF test probes in the HFS-836 series are positioned and fixed with two screws using a flange connection.

For use with high packing 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

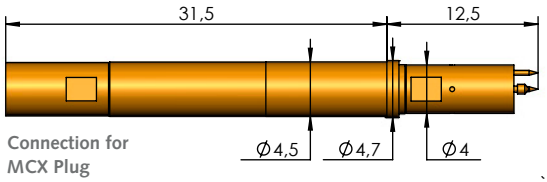
PCB test point

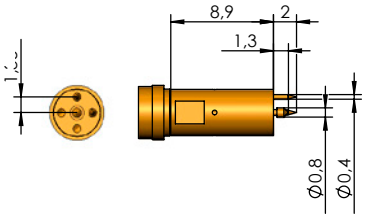
Series:

Available Tip Styles:

Ordering Description:

HFS-840 ...

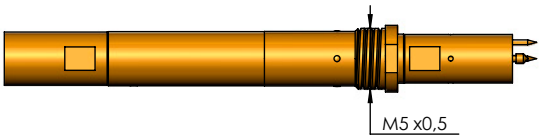




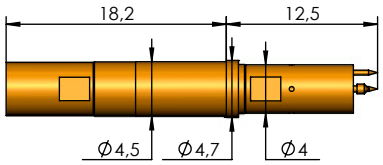
HFS-840 358 080 A **xx** 02 V2-09S
HFS-840 358 080 A **xx** 02 V2-09S 4M
HFS-440 358 080 A **xx** 02 V2-09S
HFS-440 358 080 A **xx** 02 V2-09S 4M

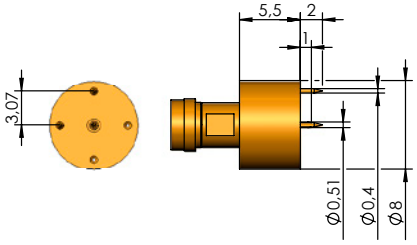
Note: (Version 1 **)
For contacting Ground Pads with different heights. Outer conductor (Ground) with two spring-loaded tips, 90° off-set, tip-style 01, spear-point, working stroke 1.0 mm, spring force 0.8 N.

HFS-840 ... 4M (*)



HFS-440 ...

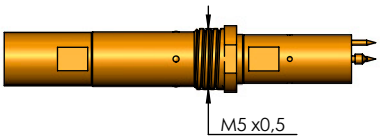




HFS-840 204 051 A **xx** 02 V2
HFS-840 204 051 A **xx** 02 V2 4M
HFS-440 204 051 A **xx** 02 V2
HFS-440 204 051 A **xx** 02 V2 4M

Note: (Version 2)
For contacting Ground Pads with different heights. Outer conductor (Ground) with two spring-loaded tips, 90° off-set, tip-style 01, spear-point, working stroke 1.0 mm, spring force 0.8 N.

HFS-440 ... 4M (*)



	HFS-840 HFS-840 4M		HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	2 x 0.8	2 x 0.8	2 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**76**	**96**	**56**

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-840 and HFS-840 4M

	Outer cond. Body	Outer cond. Point (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	

Mechanical Data
HFS-440 and HFS-440 4M

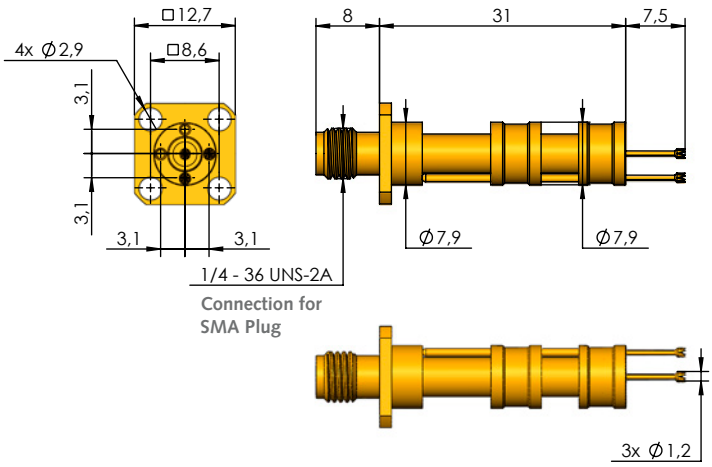
	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

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 inner and outer conductor.
Pitch distance: 3.05 mm

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-836
Spring Force of Inner Conductor (N) (Signal)	1.5
Spring Force of Outer Conductor (N) (Ground)	2 x 1.5
Character for ordering	**45**

Note:
The RF test probes in the HFS-836 series are positioned and fixed with two screws using a flange connection.

For use with high packing density.

Mechanical Data

HFS-836

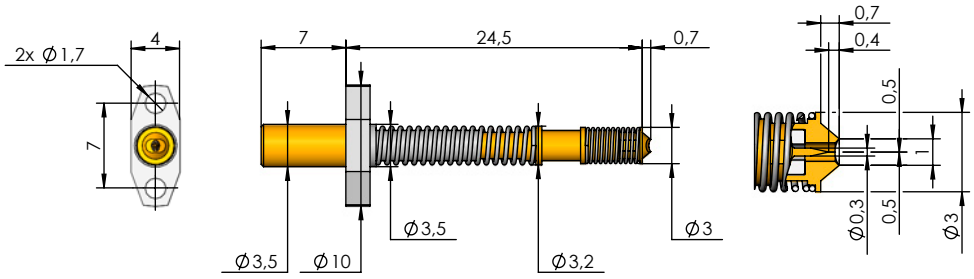
	Outer Cond. (Signal)	Inner Cond. (Ground)
Working Stroke:	4.3 mm	4.3 mm
Maximum Stroke:	6.2 mm	6.2 mm

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 rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-837
Spring Force of Inner Conductor (N) (Signal)	1.0
Spring Force of Outer Conductor (N) (Ground)	3.8
Character for ordering	**48**

Note:
The RF test probes in the HFS-837 series are positioned and fixed with two screws using a flange connection.

For use with high packing density.

Mechanical Data

HFS-837

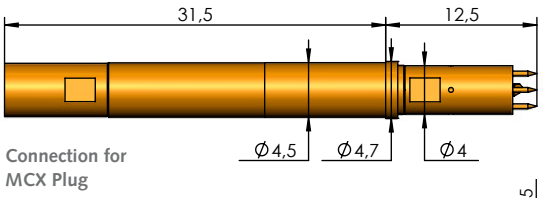
	Outer Cond. (Signal)	Inner Cond. (Ground)
Working Stroke:	4.9 mm	1.0 mm
Maximum Stroke:	5.7 mm	1.5 mm

Series:

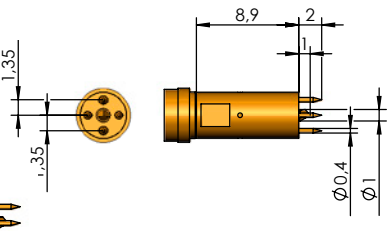
Available Tip Styles:

Ordering Description:

HFS-810 ...



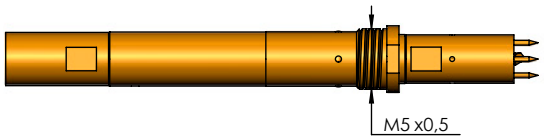
Connection for MCX Plug



HFS-810 307 100 A **xx** 02 V2-36S
HFS-810 307 100 A **xx** 02 V2-36S 4M
HFS-410 307 100 A **xx** 02 V2-36S
HFS-410 307 100 A **xx** 02 V2-36S 4M

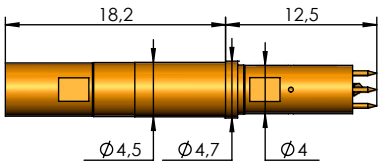
Note: (Version 1 **)
For contacting Ground Pads with different heights. Outer conductor (Ground) with four spring-loaded tips, tip-style 01, working stroke 1.0 mm, spring force 0.8 N.

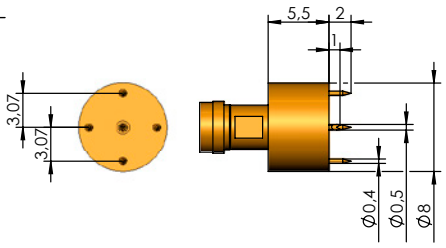
HFS-810 ... 4M (*)



HFS-810 204 051 A **xx** 02 V2-360
HFS-810 204 051 A **xx** 02 V2-360 4M
HFS-410 204 051 A **xx** 02 V2-360
HFS-410 204 051 A **xx** 02 V2-360 4M

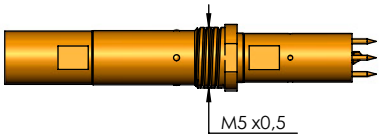
HFS-410 ...





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.

HFS-410 ... 4M (*)



	HFS-810 HFS-810 4M		HFS-410 HFS-410 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	4 x 0.8	4 x 0.8	4 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**92**	**11**	**72**

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-810 and HFS-810 4M

	Outer cond. Body	Outer cond. Point (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	

Mechanical Data
HFS-410 and HFS-410 4M

	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

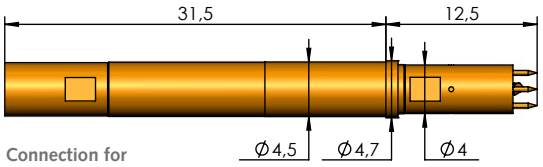
PCB-GGSGG

up to 4 GHz (50 Ω)

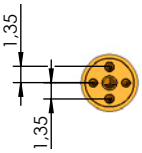
HFS-840 / HFS-840 4M
HFS-440 / HFS-440 4M

Series:

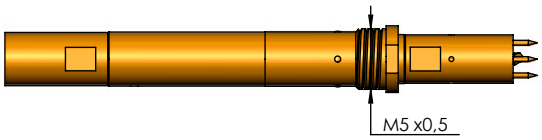
HFS-840 ...



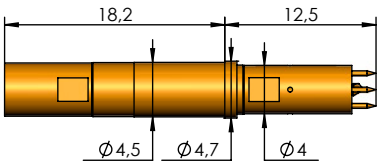
Connection for MCX Plug

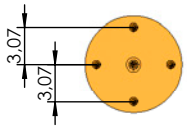


HFS-840 ... 4M (*)

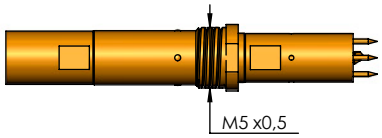


HFS-440 ...

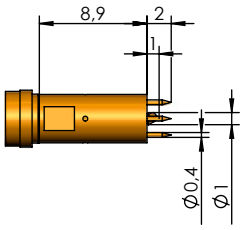


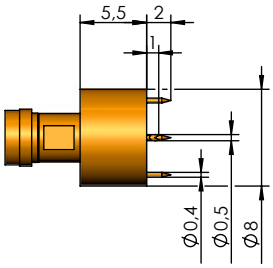


HFS-440 ... 4M (*)



Available Tip Styles:





Ordering Description:

HFS-840 307 100 A **xx** 02 V2-36S
HFS-840 307 100 A **xx** 02 V2-36S 4M
HFS-440 307 100 A **xx** 02 V2-36S
HFS-440 307 100 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-840 204 051 A **xx** 02 V2-360
HFS-840 204 051 A **xx** 02 V2-360 4M
HFS-440 204 051 A **xx** 02 V2-360
HFS-440 204 051 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.

	HFS-840 HFS-840 4M		HFS-440 HFS-440 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	4 x 0.8	4 x 0.8	4 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**92**	**11**	**72**

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data
HFS-840 and HFS-840 4M

	Outer cond. Body	Outer cond. Point (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	

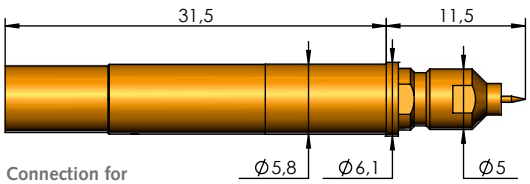
Mechanical Data
HFS-440 and HFS-440 4M

	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	1.0 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.5 mm	

PCB-coax ⊙- closed (75 Ω)

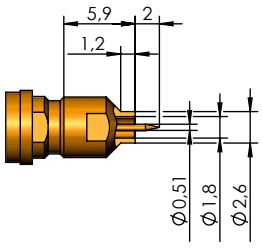
Series:

HFS-858 ...



Connection for
MCX Plug (SE-858 ...)

Available
Tip Styles:



Ordering Description:

HFS-858 201 051 A **xx** 02

Note: For contacting closed Ground Rings with signal guiding inwards. The Outer conductor tip-style 02 (flat) is only used for contacting clean PC-Boards.

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-858
Spring Force of Inner Conductor (N)	1.3
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**53**

Mechanical Data

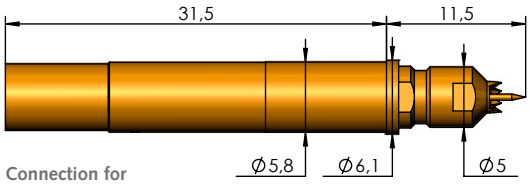
HFS-858

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

PCB test point

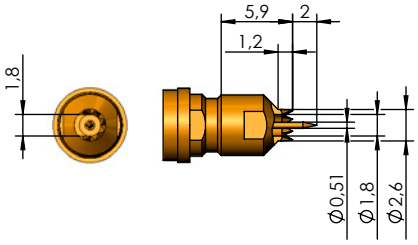
Series:

HFS-858 ...



Connection for
MCX Plug (SE-858 ...)

Available
Tip Styles:



Ordering Description:

HFS-858 201 051 A **xx** 06 S

Note: For contacting open Ground Rings with signal guiding inwards. The slit tip-style 06 S (slit serrated) of the Outer conductor is used for contacting contaminated PC-Boards.

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

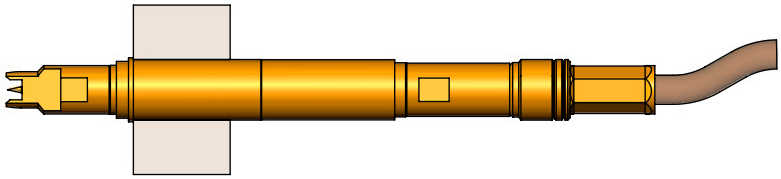
	HFS-858
Spring Force of Inner Conductor (N)	1.3
Spring Force of Outer Conductor (N)	4.0
Character for ordering	**53**

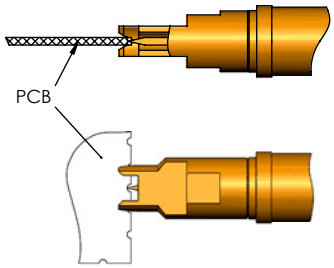
Mechanical Data

HFS-858

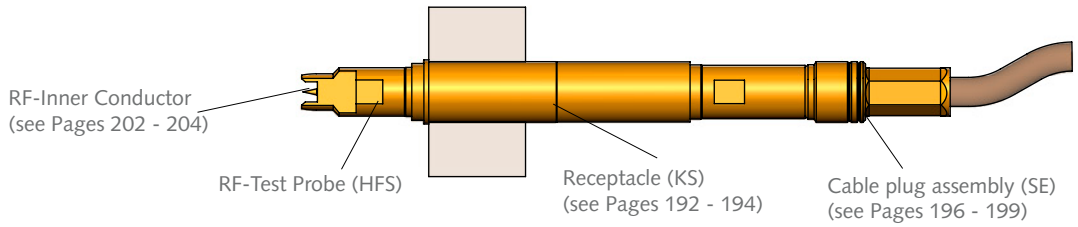
	Outer Cond.	Inner Cond
Working Stroke:	4.0 mm	2.0 mm
Maximum Stroke:	5.0 mm	3.7 mm

Contacting of PCB‘s from the side



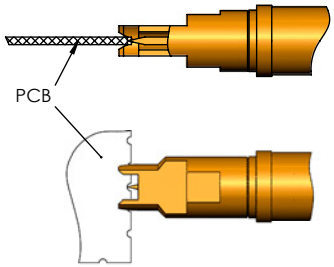


PCB-side

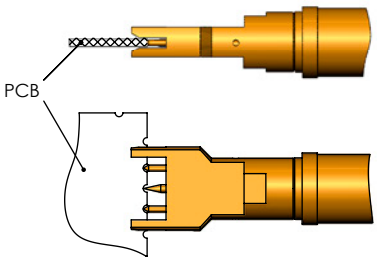


Contacting Example PCB-side:

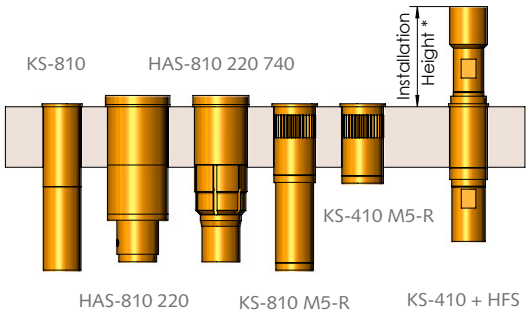
Contacting of PCB's from the side
HFS-810 201 051 A 5314 VZ



Contacting of PCB's from the side
HFS-810 201 051 A 7629-V2-VZ



Customizing 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)
Variant		Installation Height HFS in KS	
PCB-side	... VZ / ... VZ 4M	10.5 mm	11.6 mm
PCB-side	... V2-VZ / ... V2-VZ 4 M	12.7 mm	13.8 mm

Electrical Data
HFS-810 / 810 4M **HFS-840 / 840 4M**
HFS-410 / 410 4M **HFS-440 / 440 4M**

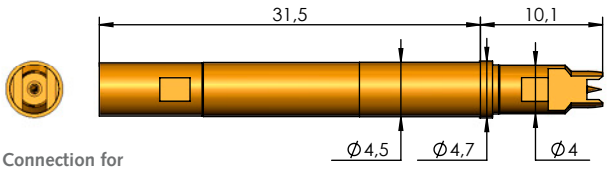
Frequency Range with HFS-810/410:	up to 2 GHz
Frequency Range with HFS-840/440:	up to 4 GHz
Current Rating Outer Conductor:	8–10 A
Current Rating Inner Conductor:	2–3 A
R_i typical Inner Conductor:	$\leq$ 10 mΩ
Impedance Test Probe:	50 Ω
Impedance Cable:	50 Ω

Operating Temperature Range
–40 up to +80° C

Note:
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

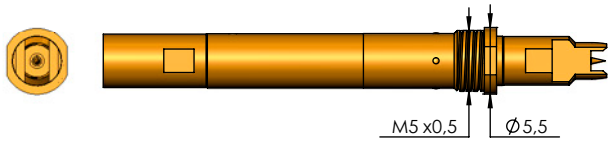
Series:

HFS-810 ... / HFS-840 ...

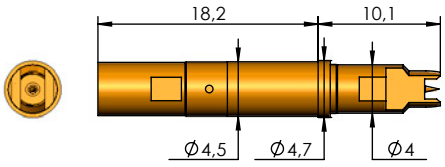


Connection for MCX Plug

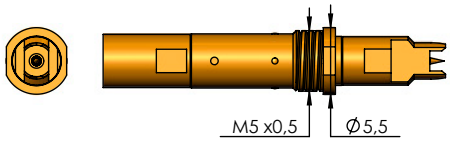
HFS-810 ... 4M / HFS-840 ... 4M (*)



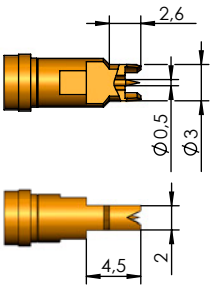
HFS-410 ... / HFS-440 ...



HFS-410 ... 4M / HFS-440 ... 4M (*)



Available Tip Styles:



Ordering Description:

2 GHz

HFS-810 201 051 A **xx** 14 VZ
HFS-810 201 051 A **xx** 14 VZ 4M
HFS-410 201 051 A **xx** 14 VZ
HFS-410 201 051 A **xx** 14 VZ 4M

4 GHz

HFS-840 201 051 A **xx** 14 VZ
HFS-840 201 051 A **xx** 14 VZ 4M
HFS-440 201 051 A **xx** 14 VZ
HFS-440 201 051 A **xx** 14 VZ 4M

Note: Version with spring-loaded Inner Conductor (Signal). The pre-centering of the PC-Board is achieved via the geometry of the Outer Conductor.
Recommended PCB thickness: 0.5 mm.

Further versions for contacting PC-Boards from the side (when their thickness varies) on request.

Spring force rating

The spring-loaded Inner and Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

	HFS-810/840 HFS-810 4M/840 4M			HFS-410/440 HFS-410 4M/440 4M
Spring Force of Inner Conductor Signal (N)	1.3	1.3	1.3	1.0
Spring Force of Outer Conductor Body (N)	4.0	6.0	8.0	4.0
Character for ordering	**53**	**73**	**93**	**50**

Mechanical Data
HFS-810/840 and HFS-810 4M/840 4M

	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	0.5 mm
Maximum Stroke:	5.0 mm	2.2 mm

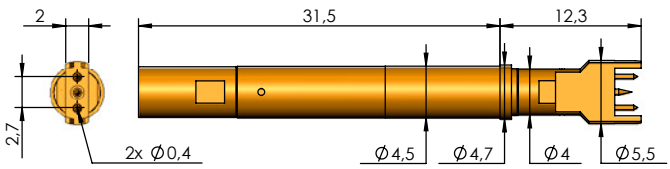
Mechanical Data
HFS-410/440 and HFS-410 4M/440 4M

	Outer Cond.	Inner Cond.
Working Stroke:	2.0 mm	0.5 mm
Maximum Stroke:	3.0 mm	1.5 mm

PCB test point side

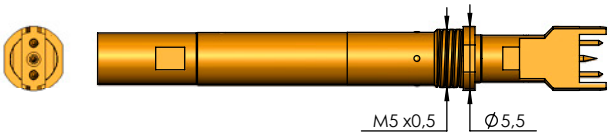
Series:

HFS-810 ... / HFS-840 ...

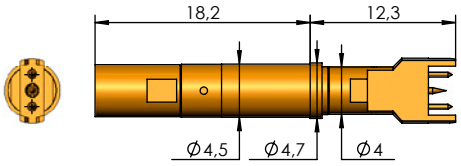


Connection for MCX Plug

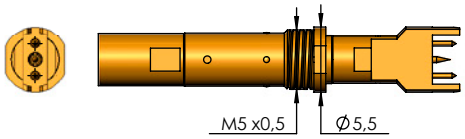
HFS-810 ... 4M / HFS-840 ... 4M (*)



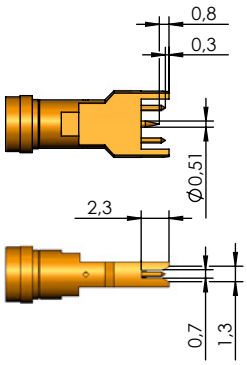
HFS-410 ... / HFS-440 ...



HFS-410 ... 4M / HFS-440 ... 4M (*)



Available Tip Styles:



Ordering Description:

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

Note: Version with spring-loaded Inner Conductor (Signal) and two spring-loaded Ground Contacts. The pre-centering of the PC-Board is achieved via the geometry of the Outer Conductor. Recommended PCB thickness: 0.6 mm.

Further versions for contacting PC-Boards from the side when their thickness and the pitch of the contacting pads vary on request.

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-810/840 HFS-810 4M/840 4M		HFS-410/440 HFS-410 4M/440 4M
Spring Force of Inner Conductor (N) (Signal)	Inner conductor not spring-loaded		
Spring Force at working stroke Spring loaded point (Ground) on Outer Conductor Body (N)	2 x 0.8	2 x 0.8	2 x 0.8
Spring Force of Outer Conductor Body (N)	6.0	8.0	4.0
Character for ordering	**76**	**96**	**56**

Note: (*)
For usage in the case of vibration, shaking, snapping or assembly upside down.

The "4M" variant has additional securing crimps that prevent rotation of the pre-determined position of the Test Probe. For applications with Asymmetric Plungers respectively Outer conductors, that must be assembled in a pre-determined position.

Mechanical Data

HFS-810 and HFS-810 4M **HFS-840 and HFS-840 4M**

	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	4.0 mm	0.5 mm	not spring-loded
Maximum Stroke:	5.0 mm	1.0 mm	

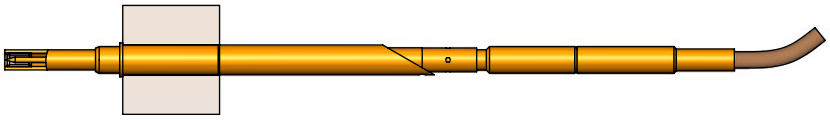
Mechanische Daten

HFS-410 and HFS-410 4M **HFS-440 and HFS-440 4M**

	Outer cond. Body	Outer cond. Point (Ground)	Inner cond. (Signal)
Working Stroke:	2.0 mm	0.5 mm	not spring-loaded
Maximum Stroke:	3.0 mm	1.0 mm	

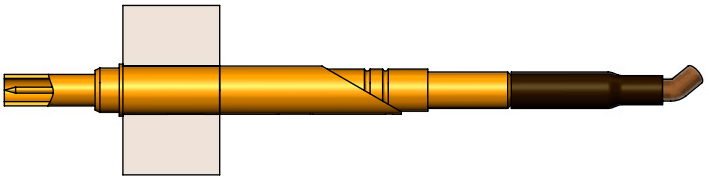
Contacting of PCB's with coaxial di-pole Probe

Series coaxial di-pole Probe HFS-010



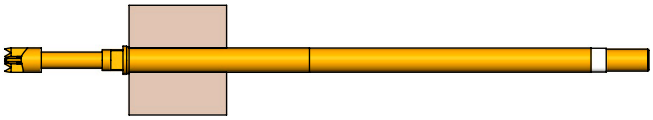
Contacting of PCB's with coaxial di-pole Probe

Series coaxial di-pole Probe HFS-110



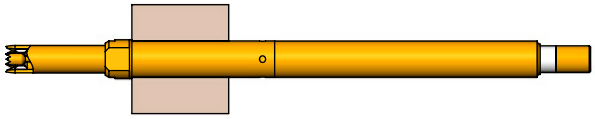
Contacting of PCB's with coaxial di-pole Probe

Series coaxial di-pole Probe DPS-215 M



Contacting of PCB's with coaxial di-pole Probe

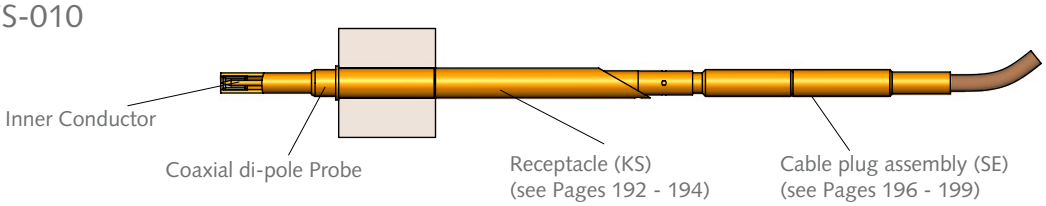
Series coaxial di-pole Probe DPS-465 M



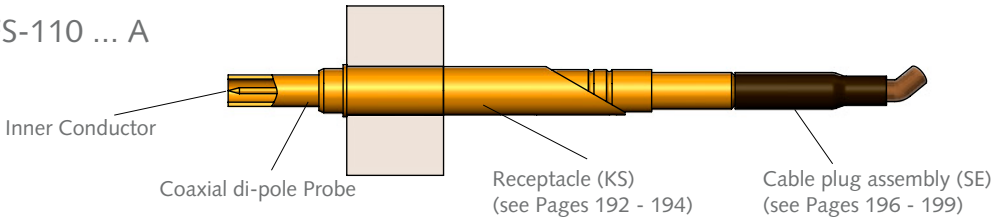
Contents

HFS-010, HFS-110, DPS-215 M, DPS-465 M
Coaxial di-pole Probes

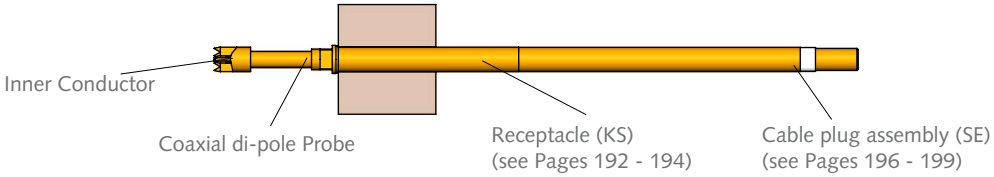
HFS-010



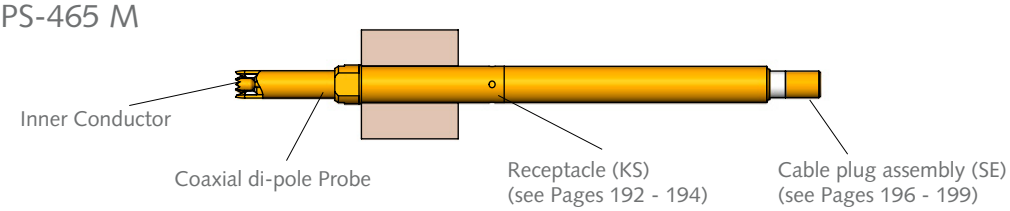
HFS-110 ... A



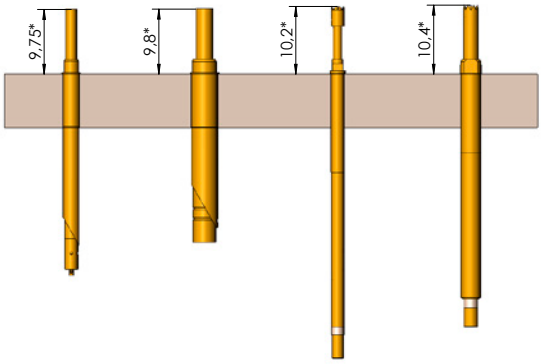
DPS-215 M



DPS-465 M



Customizing 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
Variant		*Installation Height 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
Variant		*Installation Height 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
R_i typical		≤ 20 mΩ	≤ 20 mΩ	≤ 20 mΩ	≤ 20 mΩ

Operating Temperature Range

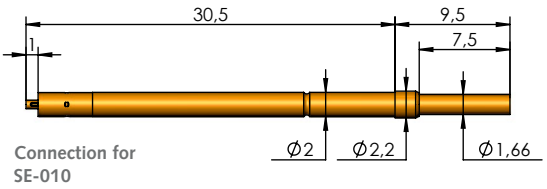
–40 up to +80° C

Grid: ≥ 2.54 mm (*)
≥ 100 Mil

HFS-010
Coaxial di-pole Probe

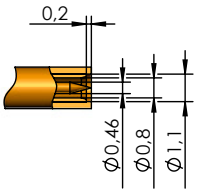
Series:

HFS-010 ...



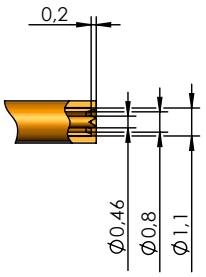
Available Tip Styles:

Ordering Description:



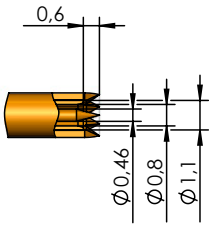
HFS-010 351 050 A **xx** 02 A

Note: Version with Outer conductor tip-style 02 (flat) and Inner Conductor tip-style 51 (crown).



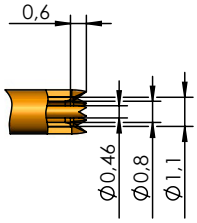
HFS-010 354 050 A **xx** 02 A

Note: Version with Outer conductor tip-style 02 (flat) and Inner Conductor tip-style 54 (extended crown).



HFS-010 351 050 A **xx** 06 A

Note: Version with Outer conductor tip-style 06 (serrated) and Inner Conductor tip-style 51 (extended spear-point) 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 (extended crown) for contacting contaminated surfaces.

	HFS-010
Spring Force of Inner Conductor (N)	0.8
Spring Force of Outer Conductor (N)	1.2
Character for ordering	**20**

Note: (*)
By larger grids than 120 mil (3.00 mm) the Receptacle KS-010 23 can be used (see accessories).

Note:
The Inner conductor is secured in place and cannot be replaced.

The spring-loaded Outer conductor of 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:	7.5 mm	7.5 mm

Assembly Hole in CEM1 and FR4
HFS-010

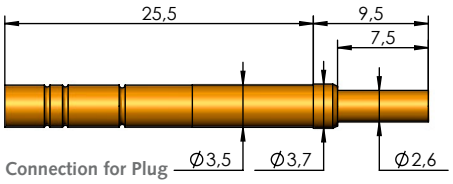
with Receptacle:	Ø 2.48 - 2.49 mm
without Receptacle:	Ø 2.00 mm

HFS-110
Coaxial di-pole Probe

Grid: ≥ 4.50 mm (*)
≥ 180 Mil

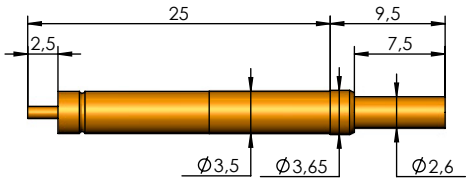
Series:

HFS-110 ... A

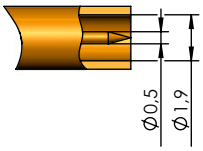


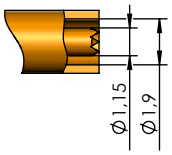
Connection for Plug SE-110

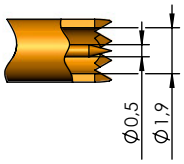
HFS-110 ... B

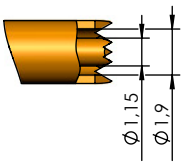


Available Tip Styles:









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 (spear-point).

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 (spear-point) 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 rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	HFS-110
Spring Force of Inner Conductor (N)	1.5
Spring Force of Outer Conductor (N)	3.0
Character for ordering	**30**

Note: (*)
By larger grids than 180 mil (4.5 mm) the Receptacle KS-110 23 can be used (see accessories).

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

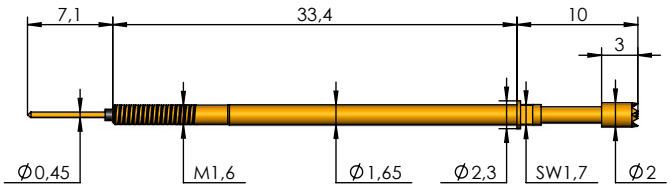
Assembly Hole in CEM1 and FR4
HFS-110

with Receptacle:	Ø 3.98 - 3.99 mm
without Receptacle:	Ø 3.50 mm

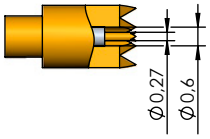
DPS-215 M
Coaxial di-pole Probe

Series:

DPS-215 ... M



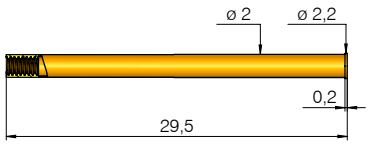
Available Tip Styles:



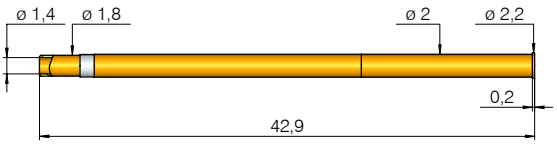
Ordering Description:

DPS-215 304 027 A **xx** 06 M

Note: Version with Outer conductor tip-style 06 (serrated) and Inner Conductor tip-style 04 (extended crown).



KS-215 M1,6



KS-215 M1,6 -F

KS-215 M1,6-F-R (mit Rändel)

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	DPS-215
Spring Force of Inner Conductor (N)	0.4
Spring Force of Outer Conductor (N)	1.6
Character for ordering	**20**

Note: (*)
By larger grids than 100 mil (2,54 mm) the receptacle KS-215 M1,6 (/-F/-R) can be used (see accessories).

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

Assembly Hole in CEM1 and FR4
DPS-215 M

with Receptacle: Ø 1.98 - 1.99 mm

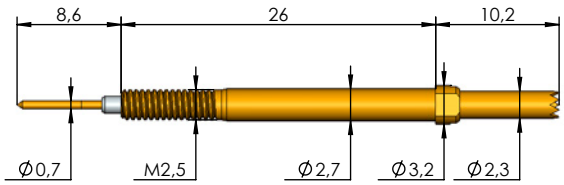
DPS-465
Coaxial di-pole Probe

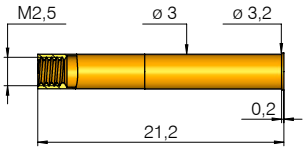
Grid: ≥ 3.50 mm (*)
≥ 140 Mil

DPS-465 M

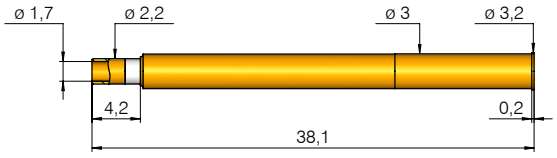
Series:

DPS-465 ... M





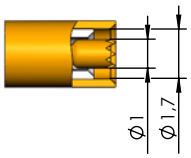
KS-465 M2,5

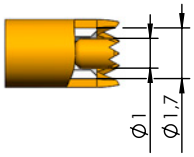


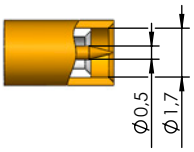
KS-465 M2,5-F

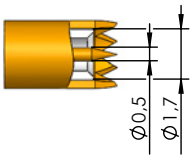
KS-465 M2,5-F-R
(mit Rändel)

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 (spear-point).

DPS-465 351 050 A **xx** 06 M

Note: Version with Outer conductor tip-style 06 (serrated) and Inner Conductor 51 (spear-point).

Spring force rating

The spring-loaded Outer Conductor are available with different spring forces. The ordering description is derived by adding up the individual values.

	DPS-465
Spring Force of Inner Conductor (N)	1.0
Spring Force of Outer Conductor (N)	3.0
Character for ordering	**40**

Note: (*)
By larger grids than 140 mil (3,50 mm) the receptacle KS-465 M2,5 (/-F/-R) can be used (see accessories).

Note:
The Inner conductor is secured in place and cannot be replaced.

Mechanical Data
DPS-465 M

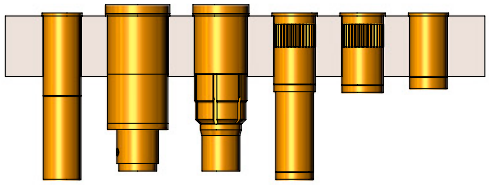
	Outer Cond.	Inner Cond.
Working Stroke:	4.0 mm	4.0 mm
Maximum Stroke:	5.0 mm	5.0 mm

Assembly Hole in CEM1 and FR4
DPS-465 M

with Receptacle: Ø 2.98 - 2.99 mm

Accessories

Receptacles (KS)



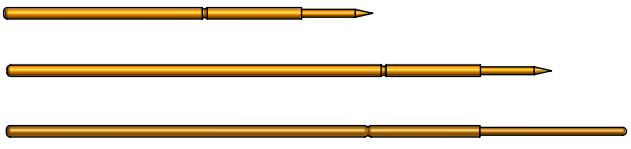
Spacer of Receptacles (DS)

Cable Connector Assembly (SE)

Adapter

Tools

Inner Conductor / Signal Conductor



Contents

Accessories

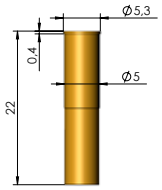
Receptacles

KS-810 Receptacle with securing crimps
KS-810 R Receptacle with securing crimps and knurl
KS-810 F Flange Receptacle with securing crimps

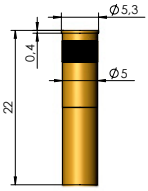
for all HFS … of **series HFS-810/840/860/865 without thread.**

KS-810 M5-R Receptacle with inner thread and knurl
KS-810 M5-F Flange Receptacle with inner thread

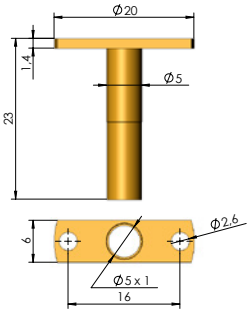
for all HFS ... M (4M) of **series HFS-810/840/860 with thread.**



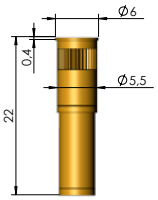
KS-810



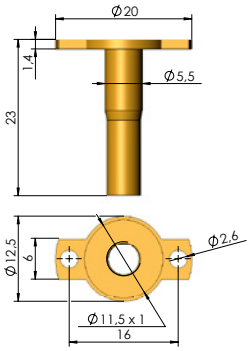
KS-810 R



KS-810 F



KS-810 M5-R



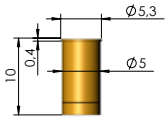
KS-810 M5-F

KS-410 Receptacle with securing crimps
KS-410 F Flange Receptacle with securing crimps

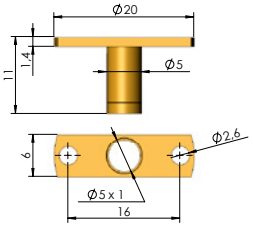
for all HFS … of **series HFS-410/440 without thread.**

KS-410 KM5-R Receptacle with inner thread and knurl
KS-410 KM5-F Flange Receptacle with inner thread

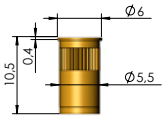
for all HFS ... M (4M) of **series HFS-410/440 with thread.**



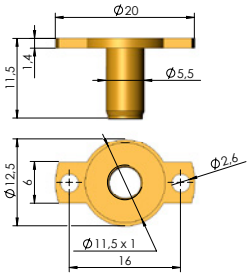
KS-410



KS-410 F



KS-410 KM5-R



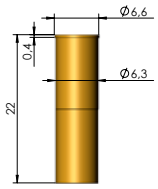
KS-410 KM5-F

Assembly Bore 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 securing crimps

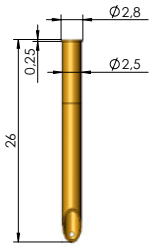
for all HFS of **series HFS-858 without thread**



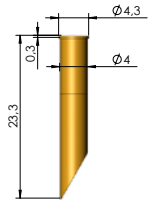
KS-858

KS-010 23 Receptacle with securing crimps
KS-110 23 Receptacle with securing crimps

for all HFS of **series HFS-010 respectively HFS-110.**



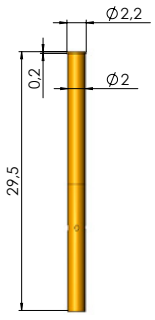
KS-010 23



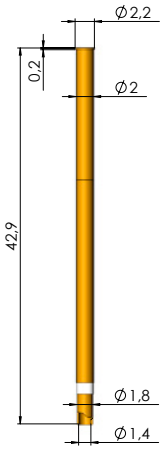
KS-110 23

KS-215 M1,6 Receptacle with securing crimps
KS-215 M1,6-F Receptacle with securing crimps (quick exchange system)
KS-215 M1,6-F-R Receptacle with securing crimps and knurl (quick exchange system)

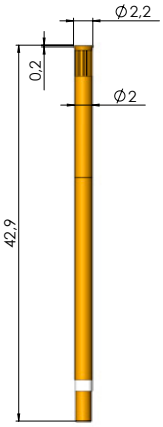
for all DPS of **series DPS-215 M.**



KS-215 M1,6



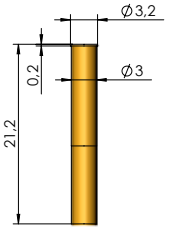
KS-215 M1,6-F



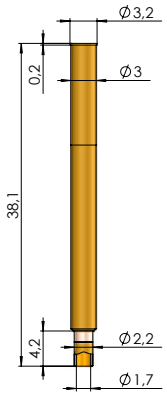
KS-215 M1,6-F-R

KS-465 M2,5 Receptacle with securing crimps
KS-465 M2,5-F Receptacle with securing crimps (quick exchange system)
KS-465 M2,5-F-R Receptacle with securing crimps and knurl (quick exchange system)

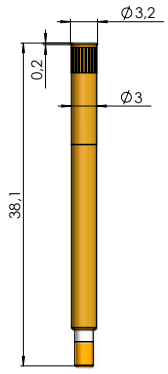
for all DPS of **series DPS-465 M.**



KS-465 M2,5



KS-465 M2,5-F



KS-465 M2,5-F-R

Assembly Bore 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

For all HFS of **series HFS-810/840/860/865 without thread.**

Due to its special design, the flexible Receptacle can absorb side-loads and positioning inaccuracies better, which can occur due to misalignment of the PC-Board/RF Plug Connector.

HAS-810 220	flexible Receptacle (± 3,5° Angular alignment, Grid ≥ 9,0 mm)
HAS-810 220 F	flexible Flange Receptacle (± 3,5° Angular alignment)

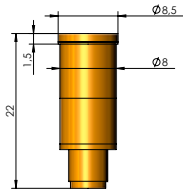
Operating Temperature Range -40° up to +80° C

For all HFS of **series HFS-810/840/860/865 without thread.**

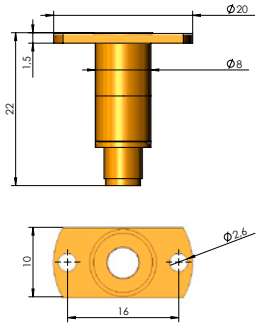
Due to its special design, the flexible Receptacle can absorb side-loads and positioning inaccuracies better, which can occur due to misalignment of the PC-Board/RF Plug Connector.

HAS-810 220 740	flexible Receptacle (± 2,5° Angular alignment, Grid ≥ 8,0 mm)
HAS-810 220 740 F	flexible Flange Receptacle (± 2,5° Angular alignment)

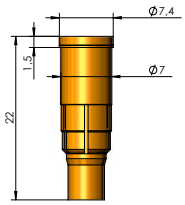
Operating Temperature Range -40° up to +80° C



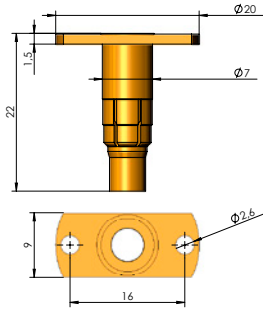
HAS-810 220



HAS-810 220 F



HAS-810 220 740



HAS-810 220 740 F

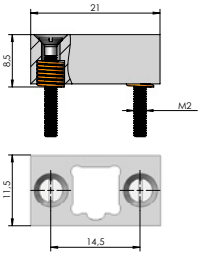
HAS-819 flexible Mounting for all RF Probes of **series HFS-819** with the **spring force index 127.**

HAS-819 160 flexible Mounting with increased spring-force for all RF Probes of **series HFS-819** with the **spring force index 207.**

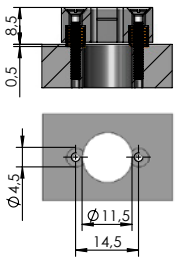
Operating Temperature Range max. +40° C

HAS-819 D8-160 flexible Mounting for the **HFS-819 ... RV7-Z** version for contacting the **„Double 8 mm"** plug connector.

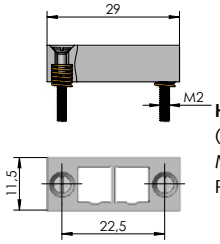
Operating Temperature Range max. +40° C



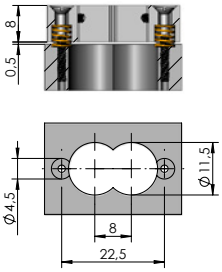
HAS-819/ HAS-819 160
(Consisting of Contact Mounting, Threaded Pins, Springs and Screws)



Customizing recommendation for Mounting Plate



HAS-819 D8-160
(Consisting of Contact Mounting, Threaded Pins, Springs and Screws)



Customizing recommendation for Mounting Plate

Assembly bore 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 Mounting HAS-819/HAS-819 160:	see customizing recommendation
with flexible Mounting HAS-819 D8-160:	see customizing recommendation

Spacer of Receptacles

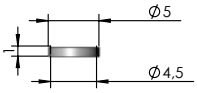
DS-810 0x 50 N Spacers for Barrel of RF Probe

To increase the installation height by 1, 2 or 4 mm the spacers **DS-810 0x 50 N** can be placed over the barrel respectively under the collar of the RF probe before it is pressed in.
For all **HFS of series HFS-410/440/810/840/860/865 without thread.**

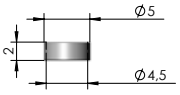
DS-810 0x N Spacers for the Receptacles KS-810 + KS-410

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 assembly hole.

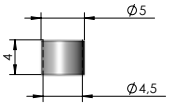
For the **Receptacles KS-810 and KS-410.**



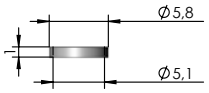
DS-810 01 50 N



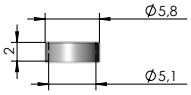
DS-810 02 50 N



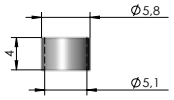
DS-810 04 50 N



DS-810 01 N



DS-810 02 N



DS-810 04 N

Coaxial cables and cable assemblies

Introduction

Apart from the RF Probe itself, the cable-plug assemblies provide the most important link between Test System and UUT. Good signal transmission is an important factor in assuring high quality measurements – hence choosing the right cable type is crucial for guaranteeing low loss transmission along with other properties like good matching and phase stability.

The higher the frequency the higher the requirements are in regard to signal transmission properties of the cable. INGUN offers various pre-wired cable-types for the RF product series.

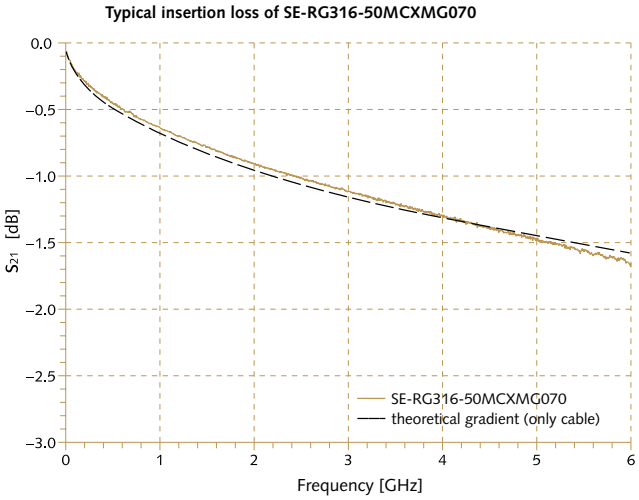
RF cable plug assembly

Loss calculation of the cable (without the plug connector)

The loss can be estimated by using the following equation:

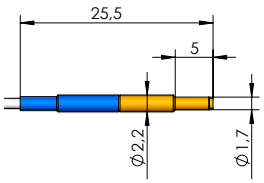
$$\alpha\ [\mathrm{dB}] = (a \cdot \sqrt{f} + b \cdot f) \cdot l \qquad f \text{ in [GHz]}, l \text{ in [m]}$$

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 only the cable, you need to add the loss properties of the MCX connector and the second coaxial interface (if available). For normal usage however these values are mostly neglectable.

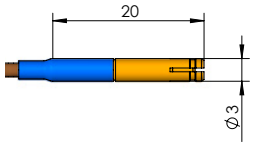


Cable type	K_01152-07	RG178 B/U	ENVIROFLEX_178	RG316 /U	ENVIROFLEX_316_D	MULTIFLEX_86	RTK-FLEX405-SPC-FEP	RG59 B/U	RG179 B/U
Impedance [Ω]	50	50	50	50	50	50	50	75	75
fmax [GHz]	1	1	3	3	6	40	60	1	1
Shielding effectiveness [dB]	> 40 bis 1 GHz	> 40 bis 1 GHz	> 40 bis 3 GHz	> 38 bis 1 GHz	> 80 bis 6 GHz	> 90 bis 18 GHz	> 90 bis 1 GHz	> 40 bis 1 GHz	> 41 bis 1 GHz
Material of the inner conductor	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

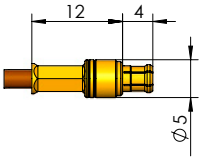
Plug versions: (see page 198 for ordering number)



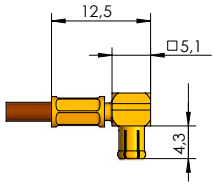
SE-010



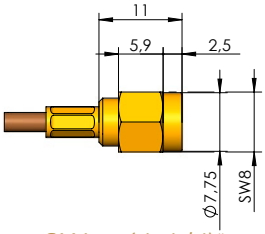
SE-110



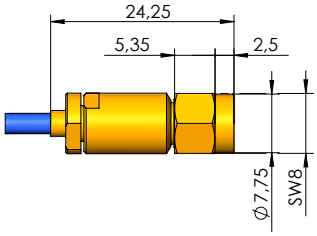
*MCX-plug (straight)**



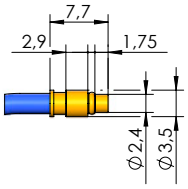
*MCX-m (angular 90°)**



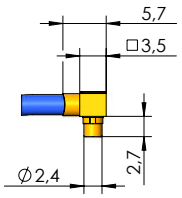
*SMA-m (straight)**



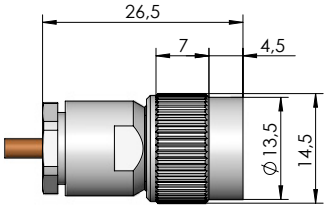
PC3.5-m (straight)



MMPX™-m (straight)



MMPX™-m (angular 90°)



TNC-m (straight)

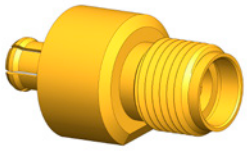
Note: (*)
Plug with bend protection. Finish with shrink hose (20 mm).

Adapter

MCX-m adapter for SMA-f

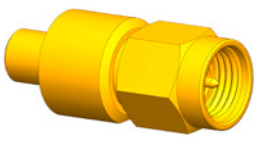
Ordering number
HFS-ADA-MCX-M-SMA-F

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-409/822/823/836/837/858/864

Cable plug assembly up to max. 0.2 GHz for HFS-010					
Part number	**Ordering number**	**Interface 1**	**Cable length and type**	**Interface 2**	**f_{max}**
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					
Part number	**Ordering number**	**Interface 1**	**Cable length and type**	**Interface 2**	**f_{max}**
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					
Part number	**Ordering number**	**Interface 1**	**Cable length and type**	**Interface 2**	**f_{max}**
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 (Winkel 90°)	40 cm, RG316 /U	SMA-m (gerade)	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					
Part number	**Ordering number**	**Interface 1**	**Cable length and type**	**Interface 2**	**f_{max}**
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. 33 GHz for HFS-865					
Part number	**Ordering number**	**Interface 1**	**Cable length and type**	**Interface 2**	**f_{max}**
SE-MF86-50MMPXMG080PC35MG	SE-MF86-0008	MMPXTM-m (straight)	80 cm, MULTIFLEX_86	PC3.5-m (straight)	26,5 GHz
SE-MF86-50MMPXMW080PC35MG	SE-MF86-0009	MMPXTM-m (angular 90°)	80 cm, MULTIFLEX_86	PC3.5-m (straight)	26,5 GHz

Cable plug assembly for special applications						
Part number	**Ordering number**	**Interface 1**	**Cable length and type**	**Interface 2**	**f_{max}**	**Application**
SE-RG316-50MCXMG070S	SE-RG316-0012	MCX-m (straight)	70 cm, RG316/U	open	3 GHz	MCX-plug with additional isolation
SE-RG316-50MCXMG150S	SE-RG316-0017	MCX-m (straight)	150 cm, RG316/U	open	3 GHz	MCX-plug with additional isolation
SE-EF178-50MCXMG080	SE-EF178-0007	MCX-m (straight)	80 cm, ENVIROFLEX_178	open	3 GHz	highly flexible cable for 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 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 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 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	for HFS-837 and HFS-852
SE-RG59-75TNCMG070	SE-RG59-0002	TNC-m (straight)	70 cm, RG59/U	open	1 GHz	for HFS-409
SE-RG179-75MCXMG070	SE-RG179-0001	MCX-m (straight)	70 cm, RG179 B/U	open	1 GHz	for HFS-858

Nomenclature	
f	female = Signal Conductor Jack
m	male = Signal Conductor Plug
f_{max}	max. frequency

Note:
Other configurations and special lengths on request.

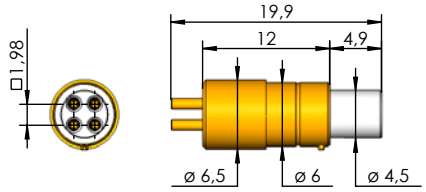
More informationen and data sheets regarding the Cable Assemblies can be downloaded from our homepage www.ingun.com or are available on request.

Cable plug assembly

SE-819 V2 for HFS-819 ... with Plug Connection

The Connector SE-819 V2 is not pre-wired and is supplied as a solder version. To prevent interchanging of the pole designation the Connector has a position detection marking.

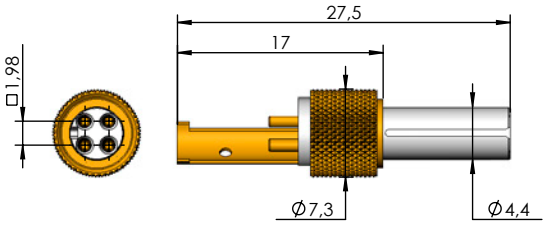
SE-819 V2 for HFS-819



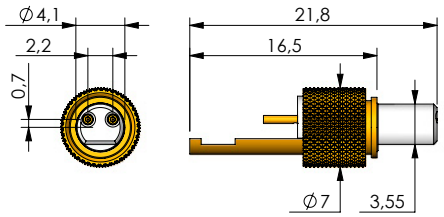
SE-819 V5-Z for HFS-819
SE-821 for HFS-821

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 incorrect tensile loading of the cable, the screw-on plug connectors are equipped with a strain relief on the connectors. To prevent interchanging of the pole designation the connector has a position detection marking.

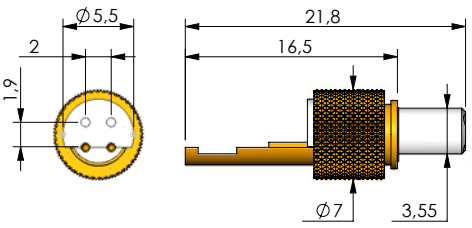
SE-819 V5-Z for HFS-819



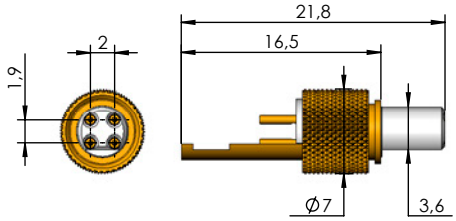
SE-821 MX38 for HFS-821



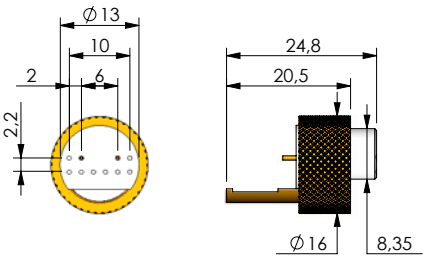
SE-821 MX48 for HFS-821



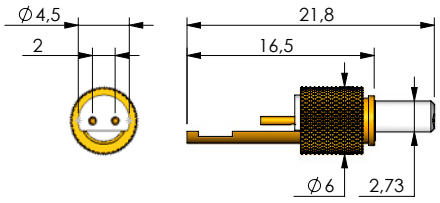
SE-821 MX49 for HFS-821



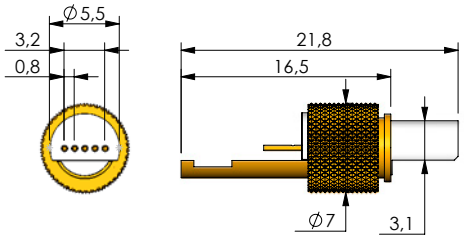
SE-821 MX62 for HFS-821



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

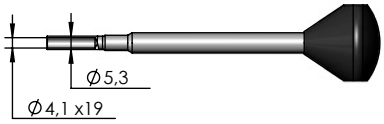
Ordering number SMA-Connection:
HFS-ADA-0002

Tools

SW-GKS (Insertion Tool for KS)
Universal Insertion Tool for Receptacles. The SW-GKS consists of a handle SW-H and a screwed in, flat plastic Insert E-SW GKS with a diameter of 5.8 mm.

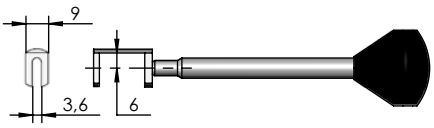
SW-GKS

SW-HFS-810-S (Insertion Tool for HFS)
Insertion Tool for RF Probes series HFS-410/440/810/840/ 860 with an Outer conductor diameter < 4.0 mm. The SW-HFS-810-S consists of a handle SW-H 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 Probes 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 a handle SW-H and a screwed in Insert E-SW-HFS-810.

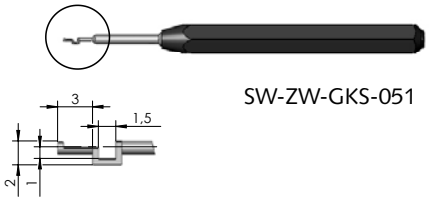


SW-ZW-HFS-810

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 a handle SW-H and a screwed in Insert E-SW-GKS-187-B.

SW-GKS-187-B

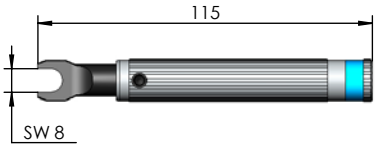
SW-ZW-GKS-051 (Insertion and Extraction Tool for the Inner Conductor Probe GKS-051)
Insertion and Extraction Tool for the RF Inner Conductor Probe series GKS-051 with Inner Conductor tip-diameter > 0.51 mm and the smallest inner diameter of the Outer conductor of > 4.0 mm. The SW-ZW-GKS-051 consists of a **handle SW-G** 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 of HF Connectors.

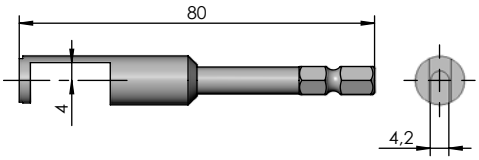


SMA, PC3.5 Torque Wrench

GS-810 SW 3.5 (Wrench for HFS Outer conductors)
GS-810 SW 4.0 (Wrench for HFS Body)
Tools for de-assembly and assembly of RF Probes series HFS-810/840/410/440/860
GS-822 SW 8.0 (Wrench for RF Probe with SMA-/PC3.5 Connection)
Tools for de-assembly and assembly of RF Probes with SMA respectively PC3.5 Connection (SW8).

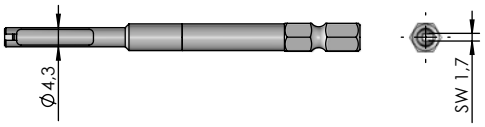
GS-810 SW 3.5 (4.0, 8.0)

BIT-HFS-810 M (Screwing Tool for HFS- ... M/4M)
Bit Tool for screwing in and screwing out 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.
In the case of limited space the Bit Tools can also be used without the Torque Spanner.



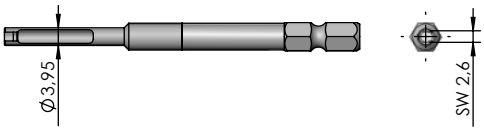
BIT-HFS-810 M

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.
In the case of limited space the Bit Tools can also be used without the Torque Spanner.



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.
In the case of limited space the Bit Tools can also be used without the Torque Spanner.

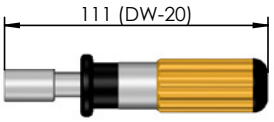


BIT-SKS-465 M

DW-20-120 (Torque Wrench for BIT-... M)
The adjustable torque wrench (20-120 Ncm) is used in combination with the bit tools.

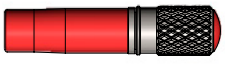
DW-20-120

DW-20 (Torque Wrench for BIT-... M)
The pre-set torque wrench (20 Ncm) is used in combination with the bit tools.



DW-20

DW-5-S (Torque Wrench for BIT-... M)
The pre-set torque wrench (5 Ncm) is used in combination with the bit tools.

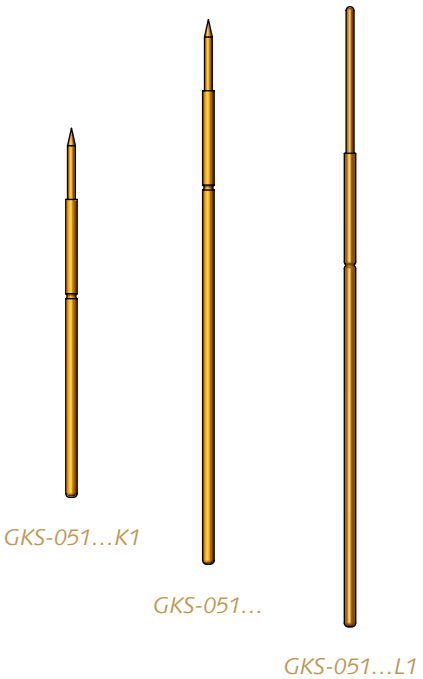


DW-5-S

INGUN RF Probes according to Part No. and Inner Conductor

Part No. RF Probe	Part No. Inner Conductor	Page
DPS-215 304 027 A 2006 M	not interchangeable	189
DPS-465 3xx 050 A 400x M	not interchangeable	190
HFS-010 35x 050 A 200x A	not interchangeable	187
HFS-110 30x 050 A 300x x	not interchangeable	188
HFS-409 305 100 A 8343 MF	HSS-118 306 350 A 3005 M	108
HFS-409 306 350 8342 M	HSS-118 306 350 A 3002 M	107
HFS-409 306 350 8343 M	HSS-118 306 350 A 3002 M	107
HFS-410 358 180 A xx42 Q (M)	GKS-051 358 180 A 1000 K1	81
HFS-4x0 201 051 A xx02 (M)	GKS-051 201 051 A 1000 K1	156/157
HFS-4x0 201 051 A xx02 S (4M)	GKS-051 201 051 A 1000 K1	158/159
HFS-4x0 201 051 A xx06 (M)	GKS-051 201 051 A 1000 K1	156/157
HFS-4x0 201 051 A xx06 P (4M)	GKS-051 201 051 A 1000 K1	161/162
HFS-4x0 201 051 A xx06 S (4M)	GKS-051 201 051 A 1000 K1	158/159
HFS-4x0 201 051 A xx14 VZ (4M)	GKS-051 201 051 A 1000 K1-N15	183
HFS-4x0 201 051 A xx29 V2 (4M)	GKS-051 201 051 A 0000 K1	170/172
HFS-4x0 201 051 A xx29 V2-Sx (4M)	GKS-051 201 051 A 0000 K1	170/172
HFS-4x0 201 051 A xx29 V2-VZ (4M)	GKS-051 201 051 A 0000 K1	184
HFS-4x0 204 051 A xx02 V1-AS3 (4M)	GKS-051 204 051 A 0000 K1	164/165
HFS-4x0 204 051 A xx02 V2-360 (4M)	GKS-051 204 051 A 0000 K1	177/178
HFS-4x0 303 090 A xx40 GT13 (4M)	GKS-051 303 090 A 1000 K1	115/116
HFS-4x0 303 090 A xx43 Y6 (M)	GKS-051 303 090 A 1000 K1	90/91
HFS-4x0 303 090 xx42 GT16 (M)	GKS-051 303 090 A 1000 K1	117/118
HFS-4x0 303 150 A xx02 D (M)	GKS-051 303 150 A 1000 K1	73/74
HFS-4x0 303 150 A xx42 E (M)	GKS-051 303 150 A 1000 K1	52/53
HFS-4x0 303 150 A xx42 F (M)	GKS-051 303 150 A 1000 K1	111/112
HFS-4x0 303 150 A xx42 FS1 (M)	GKS-051 303 150 A 1000 K1	111/112
HFS-4x0 303 150 A xx42 RF3 (M)	GKS-051 303 150 A 1000 K1	111/112
HFS-4x0 303 150 A xx42 W (M)	GKS-051 303 150 A 1000 K1	83/84
HFS-4x0 303 150 A xx43 E3 (M)	GKS-051 303 150 A 1000 K1	63/64
HFS-4x0 303 150 A xx43 F-Y14 (M)	GKS-051 303 150 A 1000 K1	43/44
HFS-4x0 303 150 A xx43 QN (M)	GKS-051 303 150 A 1000 K1	102/103
HFS-4x0 303 150 A xx43 Y (M)	GKS-051 303 150 A 1000 K1	43/44
HFS-4x0 303 150 A xx43 Y2 (M)	GKS-051 303 150 A 1000 K1	43/44
HFS-4x0 303 150 A xx43 Y3 (M)	GKS-051 303 150 A 1000 K1	43/44
HFS-4x0 303 150 A xx43 Y5 (M)	GKS-051 303 150 A 1000 K1	47/48
HFS-4x0 307 100 A xx02 V2-36S (4M)	GKS-051 307 100 A 0000 K1	177/178
HFS-4x0 308 080 A xx42 GT16-F (4M)	GKS-051 308 080 A 1000 K1	119/120
HFS-4x0 308 080 A xx42 X4 (M)	GKS-051 308 080 A 1000 K1	38/39
HFS-4x0 308 080 A xx42 ZE (M)	GKS-051 308 080 A 1000 K1	45/46
HFS-4x0 308 080 A xx42 ZE3 (M)	GKS-051 308 080 A 1000 K1	113/114
HFS-4x0 308 080 A xx43 T (M)	GKS-051 308 080 A 1000 K1	77/78
HFS-4x0 308 080 A xx43 X (M)	GKS-051 308 080 A 1000 K1	38/39
HFS-4x0 308 110 A xx42 BX (M)	GKS-051 308 110 A 1000 E1F K1	28/29
HFS-4x0 308 180 A xx42 E (M)	GKS-051 308 180 A 1000 K1	65/66
HFS-4x0 308 180 A xx42 MBX (M)	GKS-051 308 180 A 1000 K1	35/36
HFS-4x0 308 180 A xx43 E (M)	GKS-051 308 180 A 1000 K1	65/66
HFS-4x0 204 051 A xx02 V2 (4M)	GKS-051 204 051 A 0000 K1	171/174
HFS-4x0 358 051 A xx02 V2-00S (4M)	GKS-051 358 080 A 0000 K1-L	164/165
HFS-4x0 358 080 A xx02 V2-00S (4M)	GKS-051 358 080 A 0000 K4	164/165
HFS-4x0 358 080 A xx02 V2-09S (4M)	GKS-051 358 080 A 0000 K1-L	171/174
HFS-4x0 358 080 A xx42 Z (M)	GKS-051 358 080 A 1000 K1	31/32
HFS-4x0 358 180 A xx42 QS (M)	GKS-051 358 080 A 1000 K1	75/76
HFS-440 007 051 A xx07 Px-AS (4M)	not interchangeable	169
HFS-810 358 180 A xx42 Q (M)	GKS-051 358 180 A xx00	81
HFS-840 007 051 A xx07 Px-AS (4M)	not interchangeable	169
HFS-8x0 201 051 A xx02 (M)	GKS-051 201 051 A xx00	156/157
HFS-8x0 201 051 A xx02 S (4M)	GKS-051 201 051 A xx00	158/159

Nomenclature	
f	female = Signal Conductor Jack
m	male = Signal Conductor Plug
S	Signal
G	Ground
Example: GSG	2 Ground Pins, 1 Signal Pin
x	Part No. available as 410 (440) or 810 (840) (2 respectively 4 GHz)
xx	Spring Force variants
HFS-4(8)10	Part No. available as HFS-410 and HFS-810
HFS-4(8)40	Part No. available as HFS-440 and HFS-840
HFS-…(M)	Part No. also available as screw-in version
HFS-…(4M)	Part No. also available as adjustable screw-in version



GKS-051…K1

GKS-051…

GKS-051…L1

Part No. RF Probe	Part No. Inner Conductor	Page
HFS-8x0 201 051 A xx06 (M)	GKS-051 201 051 A xx00	156/157
HFS-8x0 201 051 A xx06 P (4M)	GKS-051 201 051 A xx00	161/162
HFS-8x0 201 051 A xx06 S (4M)	GKS-051 201 051 A xx00	158/159
HFS-8x0 201 051 A xx14 VZ (4M)	GKS-051 201 051 A 1300 N15	183
HFS-8x0 201 051 A xx29 V2 (4M)	UKS-051 201 051 A	170/172
HFS-8x0 201 051 A xx29 V2-Sx (4M)	UKS-051 201 051 A	170/172
HFS-8x0 201 051 A xx29 V2-VZ (4M)	UKS-051 201 051 A	184
HFS-8x0 204 051 A xx02 V1-AS3 (4M)	UKS-051 201 051 A	164/165
HFS-8x0 358 051 A xx02 V2-00S (4M)	GKS-051 358 080 A 0000 L	164/165
HFS-8x0 204 051 A xx02 V2-360 (4M)	UKS-051 204 051 A	177/178
HFS-8x0 303 090 A xx40 GT13 (4M)	GKS-051 303 090 A xx00	115/116
HFS-8x0 303 090 A xx43 Y6 (M)	GKS-051 303 090 A xx00	90/91
HFS-8x0 303 090 xx42 GT16 (M)	GKS-051 303 090 A xx00	117/118
HFS-8x0 303 150 A xx02 D (M)	GKS-051 303 150 A xx00	73/74
HFS-8x0 303 150 A xx42 E (M)	GKS-051 303 150 A xx00	52/53
HFS-8x0 303 150 A xx42 F (M)	GKS-051 303 150 A xx00	111/112
HFS-8x0 303 150 A xx42 FS1 (M)	GKS-051 303 150 A xx00	111/112
HFS-8x0 303 150 A xx42 RF3 (M)	GKS-051 303 150 A xx00	111/112
HFS-8x0 303 150 A xx42 W (M)	GKS-051 303 150 A xx00	83/84
HFS-8x0 303 150 A xx43 E3 (M)	GKS-051 303 150 A xx00	63/64
HFS-8x0 303 150 A xx43 F-Y14 (M)	GKS-051 303 150 A xx00	43/44
HFS-8x0 303 150 A xx43 QN (M)	GKS-051 303 150 A xx00	102/103
HFS-8x0 303 150 A xx43 Y (M)	GKS-051 303 150 A xx00	43/44
HFS-8x0 303 150 A xx43 Y2 (M)	GKS-051 303 150 A xx00	43/44
HFS-8x0 303 150 A xx43 Y3 (M)	GKS-051 303 150 A xx00	43/44
HFS-8x0 303 150 A xx43 Y5 (M)	GKS-051 303 150 A xx00	47/48
HFS-8x0 307 100 A xx02 V2-36S (4M)	UKS-051 307 100 A 0000	177/178
HFS-8x0 308 080 A xx42 GT16-F (4M)	GKS-051 308 080 A xx00	119/120
HFS-8x0 308 080 A xx42 X4 (M)	GKS-051 308 080 A 1000 K1	38/39
HFS-8x0 308 080 A xx42 ZE (M)	GKS-051 308 080 A xx00	45/46
HFS-8x0 308 080 A xx42 ZE3 (M)	GKS-051 308 080 A xx00	113/114
HFS-8x0 308 080 A xx43 T (M)	GKS-051 308 080 A xx00	77/78
HFS-8x0 308 080 A xx43 X (M)	GKS-051 308 080 A xx00	38/39
HFS-8x0 308 110 A xx42 BX (M)	GKS-051 308 110 A xx00	28/29
HFS-8x0 308 180 A xx42 E (M)	GKS-051 308 180 A xx00	65/66
HFS-8x0 308 180 A xx42 MBX (M)	GKS-051 308 180 A xx00	35/36
HFS-8x0 308 180 A xx43 E (M)	GKS-051 308 180 A xx00	65/66
HFS-8x0 204 051 A xx02 V2 (4M)	UKS-051 204 051 A	171/174
HFS-8x0 358 080 Axx02 V2-00S (4M)	GKS-051 358 080 A 0000 L	164/165
HFS-8x0 358 080 A xx02 V2-09S (4M)	GKS-051 358 080 A 0000 L	171/174
HFS-8x0 358 080 A xx42 Z (M)	GKS-051 358 080 A xx00	31/32
HFS-8x0 358 180 A xx42 QS (M)	GKS-051 358 180 A xx00	75/76
HFS-819 303 090 A xxx43 F2-Z	GKS-051 303 090 A 1300*	125
HFS-819 303 090 A xxx43 RV5	GKS-051 303 090 A 1300*	124
HFS-819 303 090 A xxx43 RV5-Z	GKS-051 303 090 A 1300*	126
HFS-819 303 090 A xxx43 RV7-Z	GKS-051 303 090 A 1300	126
HFS-819 303 090 A xxx43 V2	GKS-051 303 090 A 1300*	124
HFS-819 303 090 A xxx43 V2-Z	GKS-051 303 090 A 1300*	126
HFS-819 319 090 A xxx43 RV5-H3	GKS-051 319 090 A 1300	127
HFS-819 355 051 A xxx42 V8 (-Z)	GKS-051 355 051 A 1300 L1*	128
HFS-821 302 045 A 9905 MX48	not interchangeable	131
HFS-821 302 045 A 9905 MX68	not interchangeable	134
HFS-821 305 080 A 9905 MX38	not interchangeable	130
HFS-821 305 080 A 9905 MX49	not interchangeable	132
HFS-821 305 080 A 9905 MX62	not interchangeable	133
HFS-821 313 050 A 9905 USB Mini	not interchangeable	129
HFS-822 303 051 A 5043 MM5829	GKS-051 303 051 A1000 MM5829	98

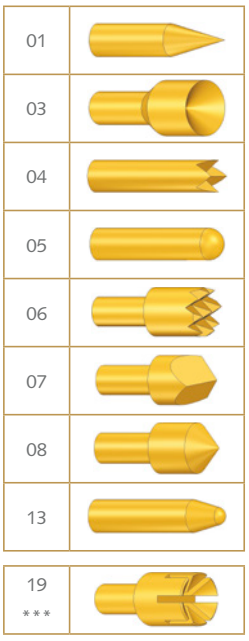
Note: "xx" within the Part No. of the Inner Conductor.

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 catalog 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 Conductor (N): 1.3 N 2.0 N
Character of the Ordering Description of the Inner Conductor: **13** **20**
Example Part No. Inner Conductor with 1.3 N: GKS-051 201 051 A **13** 00
Example Part No. Inner Conductor with 2.0 N: GKS-051 201 051 A **20** 00

Note: To exchange the Inner Conductor the Outer conductor of the RF Probe must be screwed off. See page 152 for tools for assembly and de-assembly.

Tip styles: Inner Conductor



Note: The recommended Inner Conductors are matched up to the RF Probe. Usage of different tip-styles and tip-diameters can negatively influence the high-frequency behavior, respectively the impedance.

INGUN RF Probes according to Part No. and Inner Conductor

Part No. RF Probe	Part No. Inner Conductor	Page
HFS-822 303 051 A xx42 PSMP2	GKS-051 303 150 A 1000 K1	59
HFS-822 303 090 A xx42 SMPL	GKS-051 303 090 A 1000 K1	55
HFS-822 303 090 A xx42 SMPMM	GKS-051 303 090 A 1000 K1	57
HFS-822 303 090 A xx43 UFL	GKS-051 303 090 A 1000 UFL	93
HFS-822 303 150 A xx43 MBXF	GKS-051 303 150 A 1000 K1	34
HFS-822 308 140 A xx43 SMPMF	GKS-051 308 140 A 1000 K1	58
HFS-822 308 180 A xx42 MBX2	GKS-051 308 180 A 1000 K1	37
HFS-823 305 040 A 6043 MM310	GKS-051 305 040 A 2000 K3 MM310	142
HFS-823 305 051 A 6043 MM036	GKS-051 305 051 A 2000 K3 MM036	145
HFS-823 305 051 A 6043 MS03	GKS-051 305 051 A 2000 K3 MS03	147
HFS-823 305 051 A 6043 MS06	GKS-051 305 051 A 2000 K3 MS06	147
HFS-836 288 120 A 4588 A51F50L	GKS-075 288 120 A 2000	173
HFS-836 288 120 A 4588 A31R50L	GKS-075 288 120 A 2000	175
HFS-837 201 030 A 4823 F05	not interchangeable	176
HFS-837 201 030 A 4823 F10	not interchangeable	166
HFS-852 303 051 A 4043 UFL-H	not interchangeable	94
HFS-856 303 051 A 5042 SMP-H	not interchangeable	54
HFS-856 303 051 A 5543 UFL-H	not interchangeable	95
HFS-856 305 030 A 5543 MM8030-H	not interchangeable	143
HFS-856 305 030 A 6343 MS180-H	not interchangeable	150
HFS-856 305 040 A 6343 MS156-H	not interchangeable	148
HFS-856 379 030 A 5543 XFL-H	not interchangeable	97
HFS-858 201 051 A 5302	GKS-051 201 051 A 1300	179
HFS-858 201 051 A 5306 S	GKS-051 201 051 A 1300	180
HFS-860 201 051 A xx06 P (4M)	GKS-051 201 051 A xx00	163
HFS-860 201 051 A xx06 S (4M)	GKS-051 201 051 A xx00	160
HFS-860 303 074 A xx43 Y6 (M)	GKS-051 303 074 A xx00	92
HFS-860 303 090 A xx42 SSMP (M)	GKS-051 303 090 A xx00 N10	56
HFS-860 303 150 A xx43 ER (M)	GKS-051 303 150 A xx00	101
HFS-860 305 051 A xx43 Y80 (M)	GKS-051 305 051 A xx00	149
HFS-860 305 051 A xx43 Y82 (M)	GKS-051 355 051 A xx00 L1	146
HFS-860 308 090 A xx42 X (M)	GKS-051 308 090 A xx00	40
HFS-860 308 200 A xx43 E (M)	GKS-051 308 200 A xx00 P1	67
HFS-860 308 180 A xx43 QMA (M)	GKS-051 308 180 A xx00	70
HFS-860 353 051 A xx43 Y52 (M)	GKS-051 353 051 A xx00	96
HFS-860 358 300 A xx42 Q (M)	GKS-051 358 300 A xx00 Q	82
HFS-864 342 700 A 28643 F716	not interchangeable	85
HFS-865 303 090 A xx42 PX F	not interchangeable	60
HFS-865 308 080 A xx42 MMPF	not interchangeable	33
HFS-865 308 110 A xx42 E1 F	not interchangeable	68
HFS-865 308 110 A xx42 E2 F	not interchangeable	69
HFS-865 308 127 A xx42 BXF	not interchangeable	30
HFS-865 313 050 A xx43 MM1	not interchangeable	144

Accessories	Page
Spacer for receptacle	195
Inner conductor	202
Cable plug assemblies (SE)	196
Receptacles (KS)	192
Tools	200

* HFS-819… requires four of these Inner Conductors

** Inner Conductor incl. Isolation part

*** Tip style “19”:
Alternative tip style to “03”, with 1.50 mm (Width of slit 0.2 mm).
Available for the Inner Conductor GKS-051…/GKS-051…K1
Part No.:
GKS-051 319 150 A xx00 (K1)

INGUN RF Probes according to Type of Contacting/ Interface

Type of Contacting and Interface	Part No. RF Probe	Frequency range	Page
1.0/2.3-f	HFS-4(8)x0 308 080 A xx43 T (M)	2/4 GHz	77/78
7/16-f	HFS-864 342 700 A 28643 F716	7,5 GHz	85
BMA-m	HFS-4(8)x0 303 150 A xx02 D (M)	2/4 GHz	73/74
BNC-f	HFS-4(8)x0 358 180 A xx42 QS (M)	2/4 GHz	75/76
Dipol	HFS-010 35x 050 A 200x A	Dipol	187
Dipol	HFS-110 30x 050 A 300x x	Dipol	188
Dipol	DPS-215 304 027 A 2006 M	Dipol	189
Dipol	DPS-465 3xx 050 A 400x M	Dipol	190
FAKRA-f	HFS-4(8)x0 308 080 A xx42 ZE3 (M)	2/4 GHz	113/114
FAKRA-m	HFS-4(8)x0 303 150 A xx42 F (M)	2/4 GHz	111/112
FAKRA-m	HFS-4(8)x0 303 150 A xx42 FS1 (M)	2/4 GHz	111/112
FAKRA-m	HFS-4(8)x0 303 150 A xx42 RF3 (M)	2/4 GHz	111/112
F-f	HFS-409 305 100 A 8343 MF	1,5 GHz	108
FME-m	HFS-4(8)x0 303 150 A xx42 W (M)	2/4 GHz	83/84
GT13-m	HFS-4(8)x0 303 090 A xx40 GT13 (4M)	2/4 GHz	115/116
GT16-f	HFS-4(8)x0 308 080 A xx42 GT16-F (4M)	2/4 GHz	119/120
GT16-m	HFS-4(8)x0 303 090 xx42 GT16 (M)	2/4 GHz	117/118
HDMI-f NEU	34814 (PS-HDMI)	Gbit/s	136
HSD-f	HFS-819 355 051 A xxx42 V8 (-Z)	Gbit/s	128
HSD-m	HFS-819 303 090 A xxx43 V2	Gbit/s	124
HSD-m	HFS-819 303 090 A xxx43 RV5	Gbit/s	124
HSD-m	HFS-819 303 090 A xxx43 F2-Z	Gbit/s	125
HSD-m	HFS-819 303 090 A xxx43 V2-Z	Gbit/s	126
HSD-m	HFS-819 303 090 A xxx43 RV5-Z	Gbit/s	126
HSD-m	HFS-819 303 090 A xxx43 RV7-Z	Gbit/s	126
HSD-m	HFS-819 319 090 A xxx43 RV5-H3	Gbit/s	127
IEC-f	HFS-409 306 350 8342 M	1,5 GHz	107
IEC-m	HFS-409 306 350 8343 M	1,5 GHz	107
MBX-f	HFS-4(8)x0 308 180 A xx42 MBX (M)	2/4 GHz	35/36
MBX-f	HFS-822 308 180 A xx42 MBX2	6 GHz	37
MBX-m NEU	HFS-822 303 150 A xx43 MBXF	6 GHz	34
MCX-f	HFS-4(8)x0 308 080 A xx42 X4 (M)	2/4 GHz	38/39
MCX-f	HFS-4(8)x0 308 080 A xx43 X (M)	2/4 GHz	38/39
MCX-f	HFS-860 308 090 A xx42 X (M)	6 GHz	40
SSMP-m NEU	HFS-860 303 090 A xx42 SSMP (M)	6 GHz	56
MM5829 NEU	HFS-822 303 051 A 5043 MM5829	6 GHz	98
MM8030	HFS-823 305 040 A 6043 MM310	6 GHz	142
MM8030	HFS-856 305 030 A 5543 MM8030-H	6 GHz	143
MM8030	HFS-865 313 050 A xx43 MM	12 GHz	144
MM8130/8430	HFS-823 305 051 A 6043 MM036	6 GHz	145
MM8130/8430	HFS-860 305 051 A xx43 Y80 (M)	6 GHz	146
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MMBX-f	HFS-865 308 127 A xx42 BXF	12 GHz	30
MMBX-f	HFS-4(8)x0 308 110 A xx42 BX(M)	2/4 GHz	28/29
MMCX-f	HFS-4(8)x0 358 080 A xx42 Z (M)	2/4 GHz	31/32
MMPX-f NEU	HFS-865 308 080 A xx42 MMPF	12 GHz	33
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INGUN RF probes according to Type of Contacting/ Interface

Type of Contacting and Interface	Part No. RF Probe	Frequency range	Page
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MS-156 (HF) / MS-156 C	HFS-860 305 051 A xx43 Y82 (M)	6 GHz	149
MS-180 NEW	HFS-856 305 030 A 6343 MS180-H	6 GHz	150
MX38 NEW	HFS-821 305 080 A 9905 MX38	Gbit/s	130
MX48 NEW	HFS-821 302 045 A 9905 MX48	Gbit/s	131
MX49	HFS-821 305 080 A 9905 MX49	Gbit/s	132
MX62 NEW	HFS-821 305 080 A 9905 MX62	Gbit/s	133
MX68 NEW	HFS-821 302 045 A 9905 MX68	Gbit/s	134
N-f	HFS-4(8)10 358 180 A xx42 Q (M)	2 GHz	81
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PC3.5-f	HFS-865 308 110 A xx42 E2 F	12 GHz	69
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PCB-GGSGG	HFS-4(8)x0 204 051 A xx02 V2-360 (4M)	2/4 GHz	177/178
PCB-GSG	HFS-4(8)x0 201 051 A xx29 V2 (4M)	2/4 GHz	170/172
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PCB-GSG	HFS-836 288 120 A 4588 A51F50L	4 GHz	173
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PCB-koax-kidney-shaped	HFS-4(8)x0 201 051 A xx06 P (4M)	2/4 GHz	161/162
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Pico II, PN 1551372-1 NEW	HFS-823 305 040 A 6043 MM310	6 GHz	151
Power DC-f NEW	35640 (PS-PowerDC)	Gbit/s	136
P-SMP-m NEW	HFS-822 303 090 A xx42 PSMP2	6 GHz	59
QMA-f	HFS-860 308 180 A xx43 QMA (M)	6 GHz	70
RJ-10 NEW	17824 (PS-RJ)	Gbit/s	137
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RJ-45 NEW	17826 (PS-RJ)	Gbit/s	137
RJ-50 NEW	17827 (PS-RJ)	Gbit/s	137
R-SMA-m	HFS-860 303 150 A xx43 ER (M)	6 GHz	101
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SMA-f	HFS-4(8)x0 308 180 A xx43 E (M)	2/4 GHz	65/66
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Type of Contacting and Interface	Part No. RF Probe	Frequency range	Page
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SMB-m	HFS-4(8)x0 303 150 A xx43 F-Y14 (M)	2/4 GHz	43/44
SMB-m	HFS-4(8)x0 303 150 A xx43 Y3 (M)	2/4 GHz	43/44
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SMP-L-m NEW	HFS-822 303 090 A xx42 SMPL	6 GHz	55
SMP-m	HFS-4(8)x0 303 150 A xx42 E (M)	2/4 GHz	52/53
SMP-m NEW	HFS-856 303 051 A 5042 SMP-H	6 GHz	54
SMP-MAX-f	HFS-822 308 140 A xx43 SMPMF	6 GHz	58
SMP-MAX-m	HFS-822 303 090 A xx42 SMPMM	6 GHz	57
SMPX-m	HFS-865 303 090 A xx42 PX F	12 GHz	60
TAE-f NEW	34847 (PS-TAE)	Gbit/s	136
U.FL-m	HFS-4(8)x0 303 090 A xx43 Y6 (M)	2/4 GHz	90/91
U.FL-m	HFS-860 303 074 A xx43 Y6 (M)	6 GHz	92
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USB Micro-f (type B) NEW	34816 (PS-USB)	Gbit/s	136
USB Mini-f NEW	HFS-821 313 050 A 9905 USB Mini	Gbit/s	129
USB Mini-f (type B) NEW	21072 (PS-USB)	Gbit/s	136
USB-f (type A) NEW	21071 (PS-USB)	Gbit/s	136
USB-f (type B) NEW	17829 (PS-USB)	Gbit/s	136
W.FL-m	HFS-860 353 051 A xx43 Y52 (M)	6 GHz	96
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X.FL-m	HFS-860 353 051 A xx43 Y52 (M)	6 GHz	96
X.FL-m	HFS-856 379 030 A 5543 XFL-H	6 GHz	97

Nomenclature	
f	female = Signal Conductor Jack
m	male = Signal Conductor Plug
S	Signal
G	Ground
Example: GSG	2 Ground Pins, 1 Signal Pin
xx / xxx	Spring Force Variants
HFS-4(8)10	Part No. available as HFS-410 and HFS-810 available
HFS-4(8)40	Part No. available as HFS-440 and HFS-840 available
HFS-4(8)x0	Part No. available as 410 (810) or 440 (840) available (2 respectively 4 GHz)
HFS-…(M)	Part No. additionally available as screw-in version
HFS-…(4M)	Part No. additionally available as adjustable screw-in version

INGUN RF-Probes according to Part No.

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