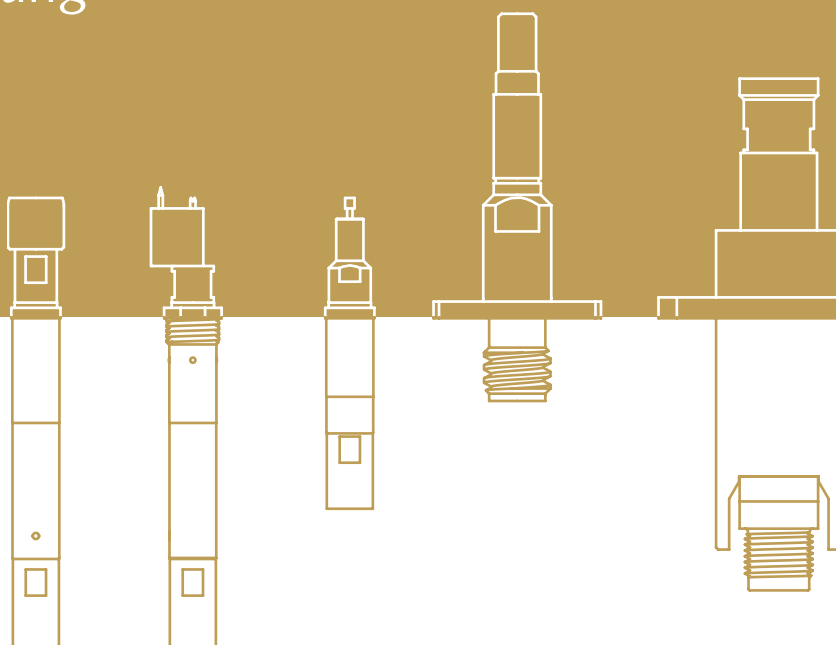
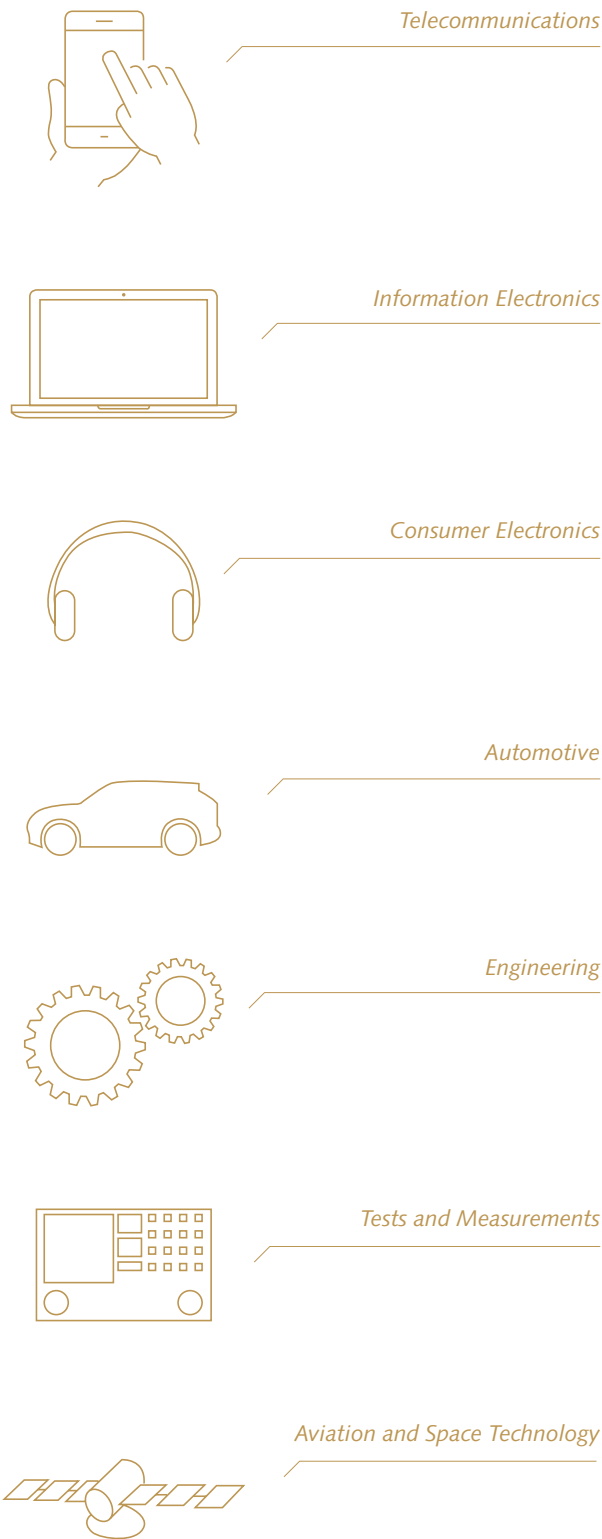


## RF-Probes

Plug Connector, Miniature Switch  
and PCB Contacting



# Competent in your field



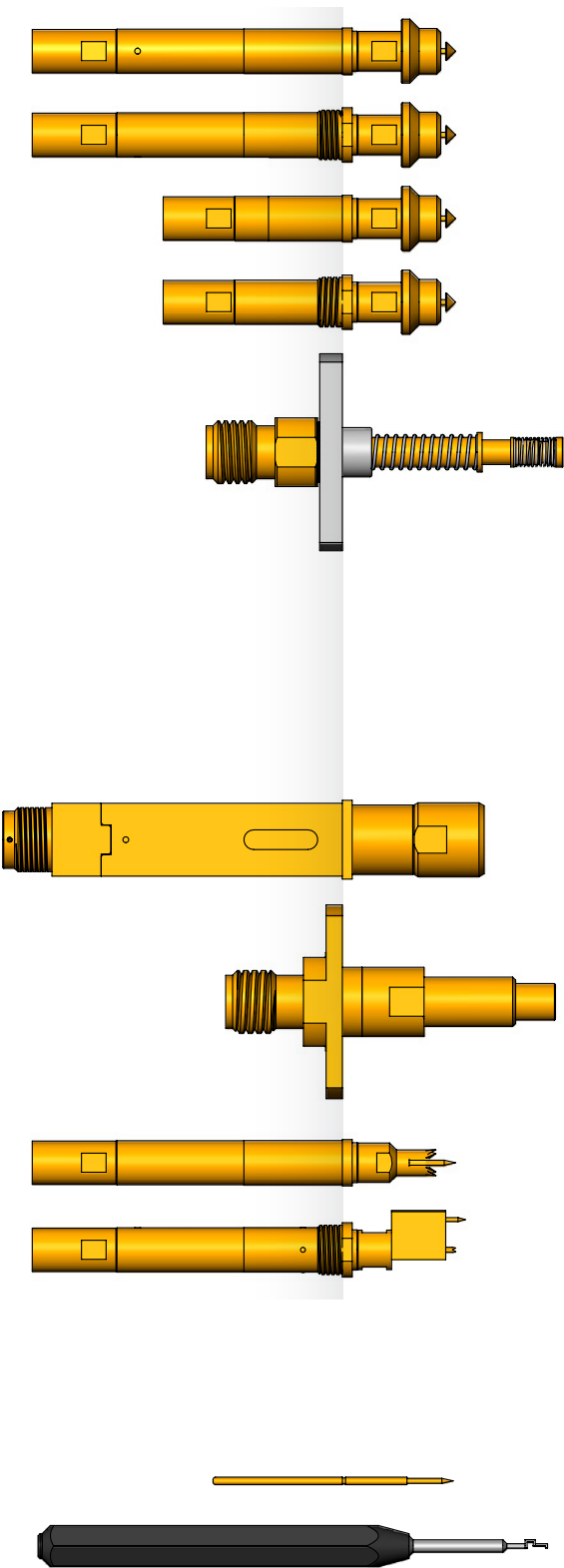
INGUN spring-loaded test probes are used by our customers in various industries, and enable a precise, accurately repeatable test of electronic assemblies to guarantee product quality and customer satisfaction.

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<br>contacting   | Analogue | MMBX / MMCX / MMPX /<br>MBX / MCX                                         |
|                                |          | SMB / SMC                                                                 |
|                                |          | SMP / SMP-L / SSMP /<br>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 /<br>X.FL/ MM5829                                     |
|                                |          | Reverse SMA / TNC                                                         |
|                                |          | IEC / F (75 Ω)                                                            |
|                                |          | FAKRA / GT13 / GT16                                                       |
| Miniature switch<br>contacting | Digital  | HSD / USB Mini /<br>MX-series / USB-series /<br>RJ-series / HDMI /TAE     |
|                                |          | MM8430 / MM8130 /<br>MM8030<br>MS-156 / MS-180 /<br>Pico II, PN 1551372-1 |
| PCB contacting                 |          | PCB test point                                                            |
|                                |          | PCB test point lateral                                                    |
|                                |          | Coaxial dipole probe                                                      |
| Accessories                    |          | Receptacles (KS) / Cable<br>plug assembly / Tools /<br>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                                                                                                                                                                                                                                                                   | 1976                                                                                                             | 1979                                                                                                                                                                | 1995                                                                                                                                                                             | 2005                                                                                                                                                                                                   | 2007                                                                                                                                                       | 2018                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>– “INGenieur UNion” (INGUN) – in English engineer union – founded in Konstanz by Werner H. Heilmann as a trading company for electronic components</li> <li>– Wolfgang Karl joins the company</li> <li>– 7 employees</li> </ul> | <ul style="list-style-type: none"> <li>– INGUN launches their first radio frequency probe in May 1976</li> </ul> | <ul style="list-style-type: none"> <li>– Introduction of the first vacuum test fixture manufactured in Germany at the Productronica trade fair in Munich</li> </ul> | <ul style="list-style-type: none"> <li>– Fully automatic assembly of test probes</li> <li>– Certification in accordance with DIN EN ISO 9001</li> <li>– 108 employees</li> </ul> | <ul style="list-style-type: none"> <li>– Introduction of counterfeit protection for spring-loaded test probes</li> <li>– Now represented worldwide in 28 countries</li> <li>– 145 employees</li> </ul> | <ul style="list-style-type: none"> <li>– Wolfgang Karl is appointed to board of directors</li> <li>– His son, Armin Karl, takes over management</li> </ul> | <ul style="list-style-type: none"> <li>– Over 45 years of INGUN</li> <li>– Represented worldwide on every continent</li> <li>– 11 subsidiaries</li> <li>– 350 employees</li> </ul> |



# 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](http://www.ingun.com/contact)

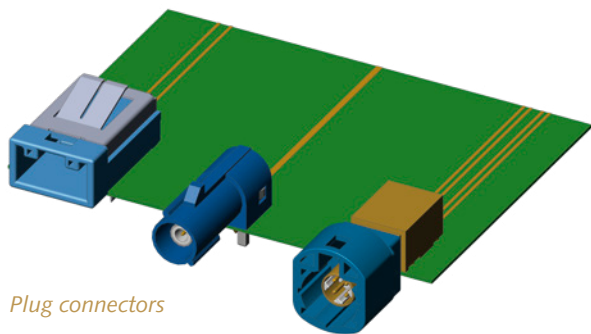


# Solutions for your application



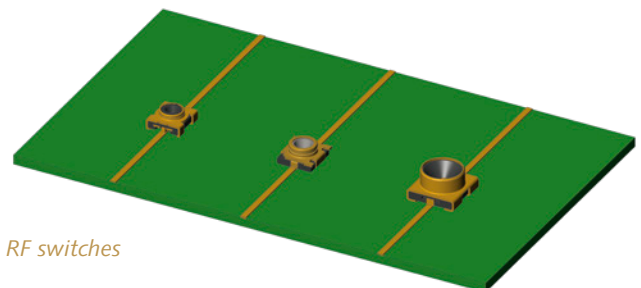
INGUN offers a suitable test solution for each industry and application. This includes plug connectors, RF switches or layouts on the PCB.

**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.



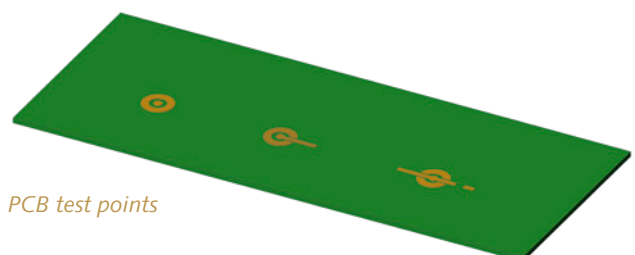
*Plug connectors*

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



*RF switches*

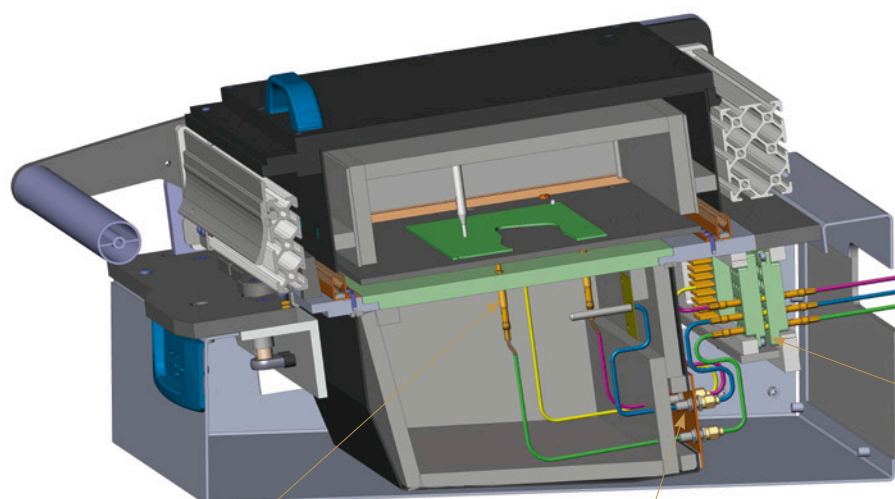
**PCB test points** are structured so that they can be contacted by RF signals directly on the PCB. Depending on the nature of the PCB and application, these are carried out differently.



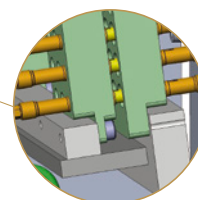
*PCB test points*

# Solutions for your application

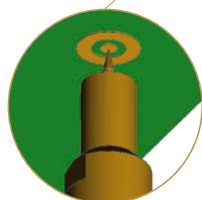
**From test point to measurement system:** INGUN has the compatible, optimally aligned test solution. Additionally, INGUN offers either the complete RF test fixture with RF test probes, interfaces, shielding chamber and completing cabling or as modular solutions.



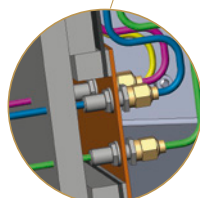
↑ connection to the measurement device



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



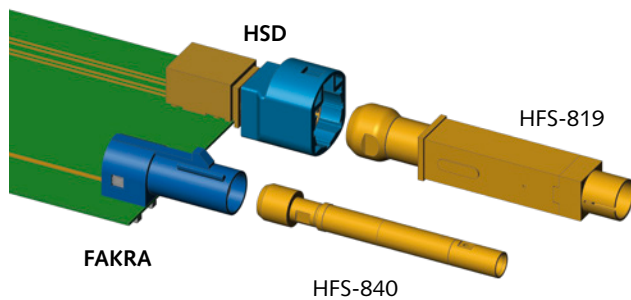
For further information about RF cables and plug connectors, please see page 196



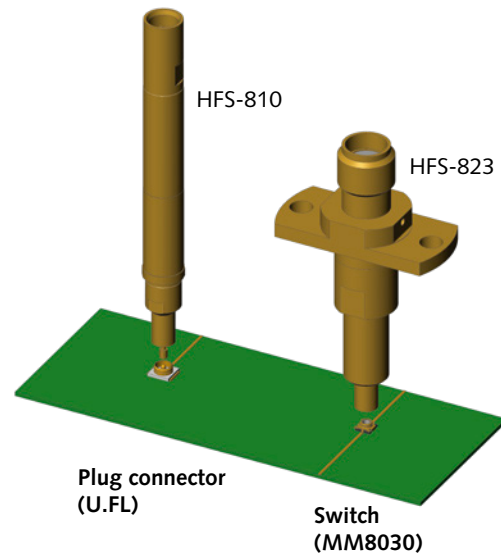
Request our new test fixture catalogue or go to our homepage [www.ingun.com](http://www.ingun.com)

# 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*



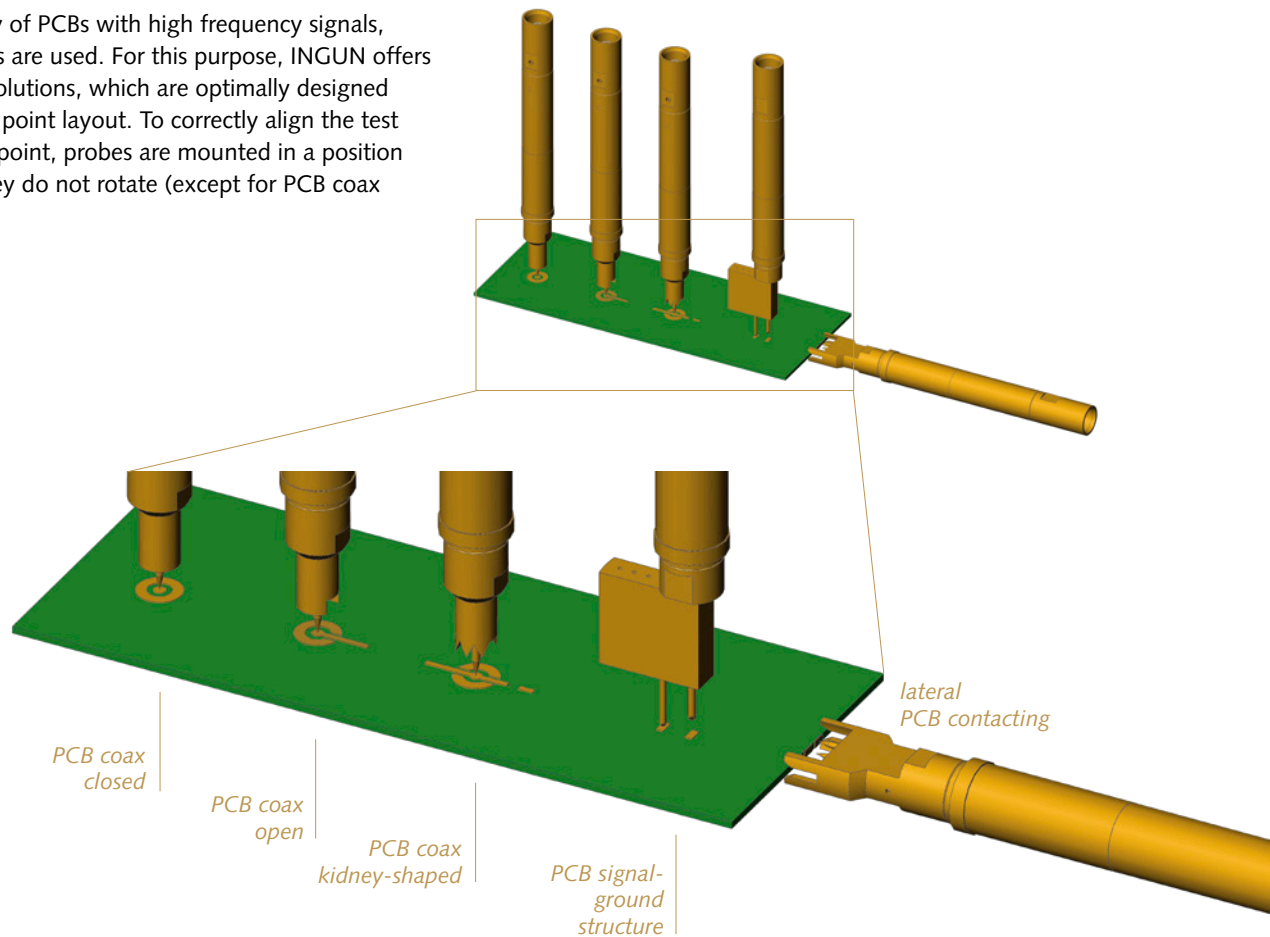
*Example of plug connectors from communication and consumer electronics*

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:

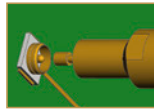
|  |                                                                                                     |
|--|-----------------------------------------------------------------------------------------------------|
|  | PCB: PCB Layout with different levels                                                               |
|  | 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

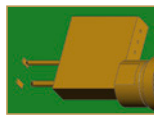
For optimum fulfilment of the test requirements, various versions of RF test probes are available. Selection criteria include the test point to be contacted, frequency and/or data rate, installation area (space available), as well as ambient conditions.



*E.g. U.FL*

## Coaxial test points

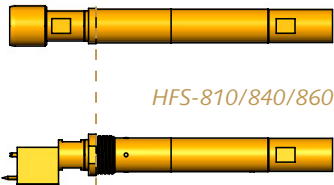
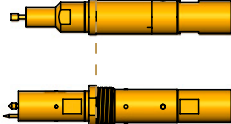
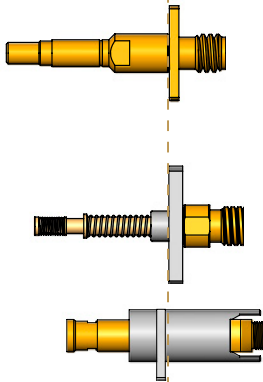
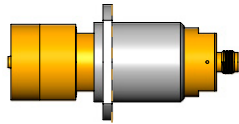
Rotation-symmetrical RF test probes are used with coaxial test points (E.g., SMA, U.FL, miniature switches) and the contact tip is optimally designed based on the connector.



*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 |  <p><i>HFS-810/840/860/865</i></p>                                 | <p>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™).</p> |
| Short HFS    |  <p><i>HFS-410/440</i></p>                                         | <p>Short RF probes are designed for applications, which, due to limited available space, do not allow standard RF probes to be used.</p>                                                                                                                                                                                                                                                                                                                                                           |
| Flange HFS   |  <p><i>HFS-822</i></p> <p><i>HFS-856</i></p> <p><i>HFS-819</i></p> | <p>RF test probes with fixed flanges are designed to enable a contacting process without cable movement. Thus, optimal signal transmission is ensured.</p> <p>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.</p>                      |
| Diverse HFS  |  <p><i>HFS-864</i></p>                                             | <p>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.</p>                                                                                                                                                                                                                                                      |

# Assembly and Connection

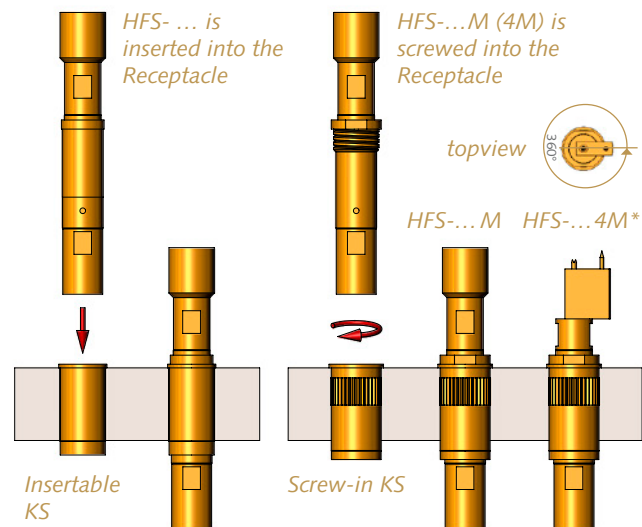
## Assembly

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



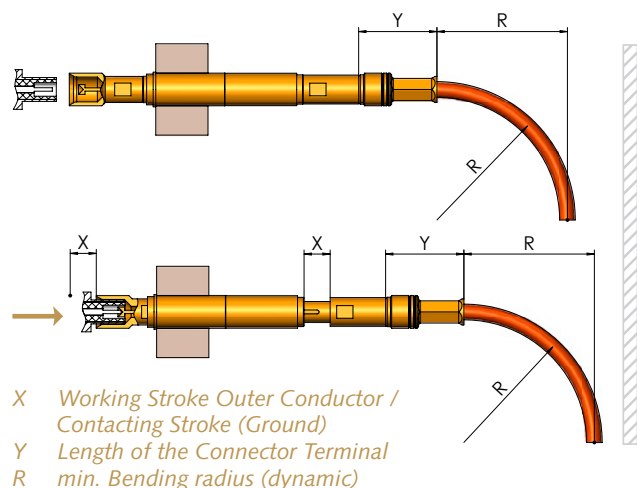
For a complete overview of available RF cable plug assemblies, see page 196 - 199

## 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.



# 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** What kind of unit is to be tested?

- Plug connector
- Miniature switch
- PCB test point

**2** What is the name of the connector, or what is the geometry of the test point?

**3** What is the max. frequency to be transmitted at which return loss?

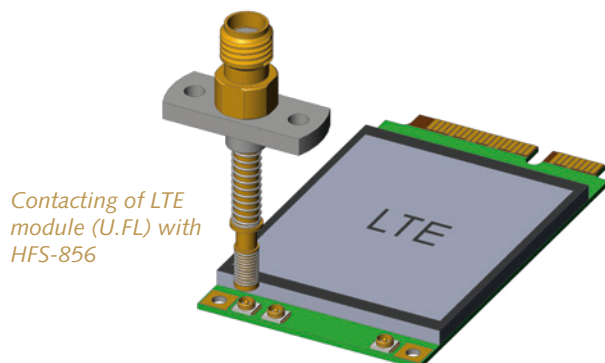
**4** Which choice of RF probe version does the installation area (available space) allow for?

**5** 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<br>pressed in / screwed in |         |         |         | Short RF test<br>probes<br>pressed in /<br>screwed in |         | Flange RF test probes<br>Fixed flange / floating flange |         |         |         |         |         | RF test<br>probes<br>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                                                       |         |         |         |         |         | HFS-409                                    | 124  |
|                           | IEC                                                |         |         |         |                                                       |         |                                                         |         |         |         |         |         |                                            | 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<br>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<br>measurement      |         |         |         |                                                       |         |                                                         |         |         |         |         |         | HFS-010,<br>HFS-110<br>DPS-215,<br>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-GSGGG                                | 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

### Type of product

**HFS** Radio frequency test probe

### Series

|                |               |         |
|----------------|---------------|---------|
| <b>DPS-215</b> | Dipole probe  | ----    |
| <b>DPS-465</b> | Dipole probe  | ----    |
| <b>HFS-010</b> | Dipole probe  | ----    |
| <b>HFS-110</b> | Dipole probe  | ----    |
| <b>HFS-409</b> | F / IEC       | 1,5 GHz |
| <b>HFS-410</b> | Short version | 2 GHz   |
| <b>HFS-440</b> | Short version | 4 GHz   |
| <b>HFS-810</b> | Standard      | 2 GHz   |
| <b>HFS-819</b> | Digital       | Gbit/s  |
| <b>HFS-821</b> | Digital       | Gbit/s  |
| <b>HFS-822</b> | Flange        | 6 GHz   |
| <b>HFS-823</b> | Flange        | 6 GHz   |
| <b>HFS-836</b> | Flange        | 4 GHz   |
| <b>HFS-837</b> | Flange        | 12 GHz  |
| <b>HFS-840</b> | Standard      | 4 GHz   |
| <b>HFS-852</b> | Flange        | 6 GHz   |
| <b>HFS-856</b> | Flange        | 6 GHz   |
| <b>HFS-858</b> | PCB 75Ω       | 1 GHz   |
| <b>HFS-860</b> | Standard      | 6 GHz   |
| <b>HFS-864</b> | 7/16          | 7,5 GHz |
| <b>HFS-865</b> | Standard      | 12 GHz  |

### Material of inner conductor contacting tip

**2** steel                      **3** beryllium copper

### Inner conductor tip style

|           |                           |           |                              |
|-----------|---------------------------|-----------|------------------------------|
| <b>01</b> | spear point               | <b>08</b> | conical tip                  |
| <b>03</b> | inverse cone              | <b>13</b> | 30° tip with bullet-nose     |
| <b>04</b> | crown                     | <b>53</b> | inverse cone: special length |
| <b>05</b> | bullet-nosed              | <b>55</b> | bullet-nosed: special length |
| <b>06</b> | serrated                  | <b>58</b> | cone: special length         |
| <b>07</b> | 90° tri-hedral or pyramid |           |                              |

### Inner conductor tip diameter (1/100 mm)

Example:

**180** 1,8 mm (tip-ø inner conductor)

### Surface

**A** INGUN hard gold

### Spring Force (dN)

Sum of spring force of inner and outer conductor  
Example:

**53** 1.3 N inner conductor + 4,0 N outer conductor

### 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

### Special indexes

### Type

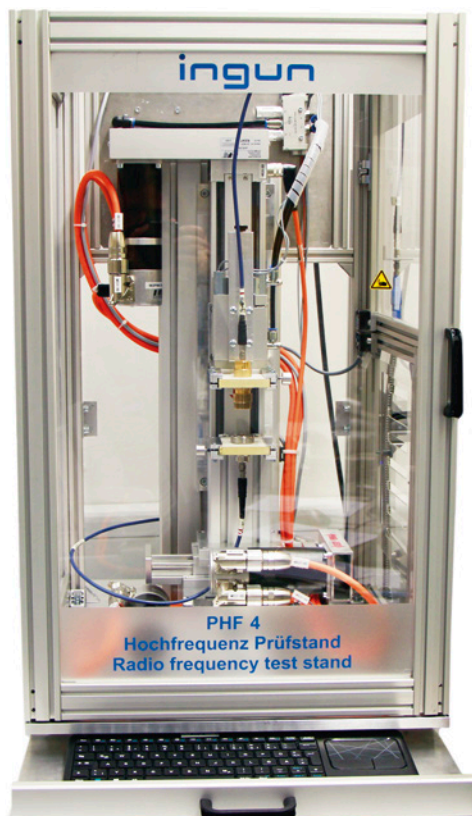
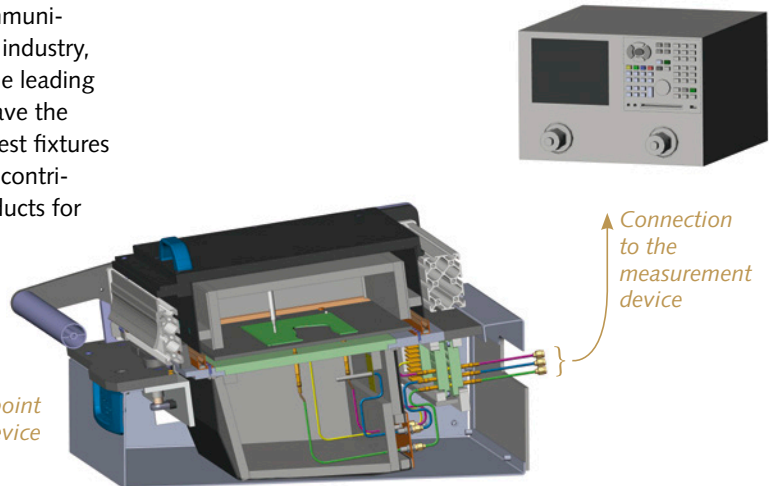
– press-in version  
**M** screw-in version  
**4M** screw-in version adjustable



# 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.

*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!

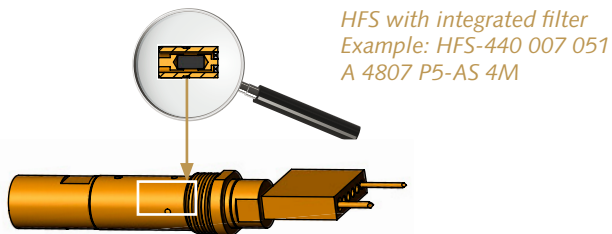


Quality "Made in Germany".  
INGUN has been DIN EN ISO 9001 certified since 1995

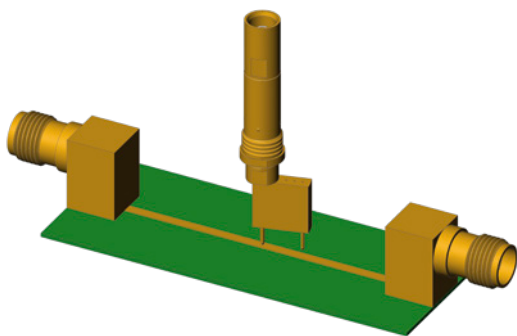
# Integrated Technologies

## High impedance tip – RF test probes with integrated filter

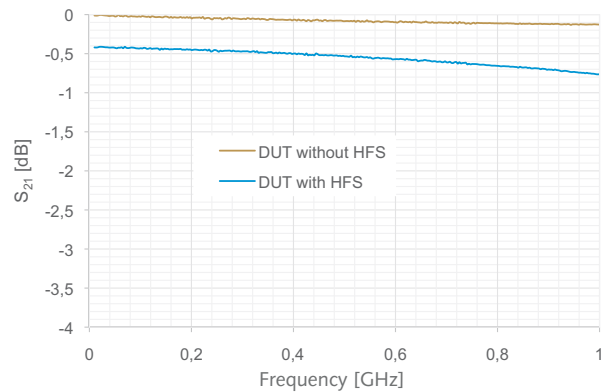
Measurement by RF test probes normally takes place in series with the device under test (DUT). The test solution is therefore a part of the signal path. To ensure minimal return loss the test solution must have the same impedance as the device under test (e.g. 50  $\Omega$ ). If the measurement, however, 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.



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.

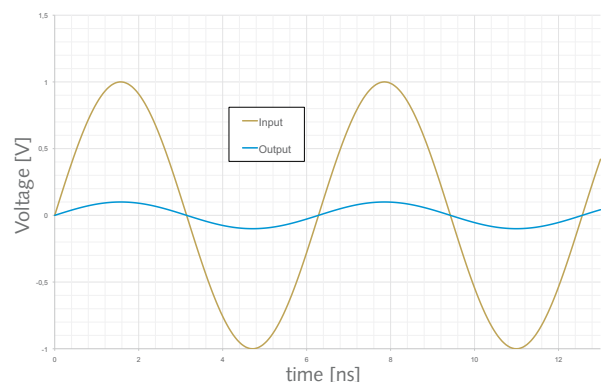


Example of test set-up with three-port measurement



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.



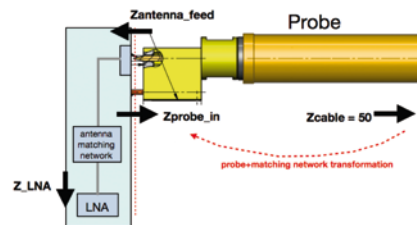
1/10 scaling factor of RF test probe is clear as shown in time domain

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

## RF test probes with narrow band matching network

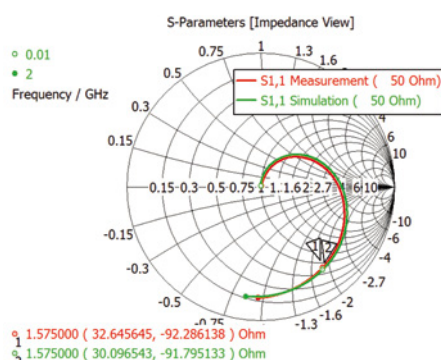
There are applications where the RF test points have complex resistances ( $Z$ ) made up of a real part ( $R$ ) and an imaginary part ( $X$ ) ( $Z = R + jX$ ). In order to be able to connect the test system, a transformation of the complex resistance should occur to achieve an impedance of  $50\ \Omega$  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  $Z_{\text{ant}} = 30\ \Omega + j90\ \Omega$  for the centre frequency of the frequency range 1.575 GHz to 1.6 GHz.



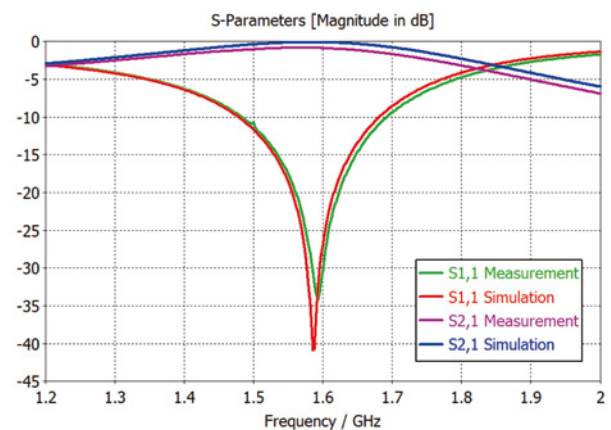
*Example for the use of a RF test probe with narrow band matching network*

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  $50\ \Omega$ . This, however, is only valid for a very narrow frequency range.



*Comparison 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.



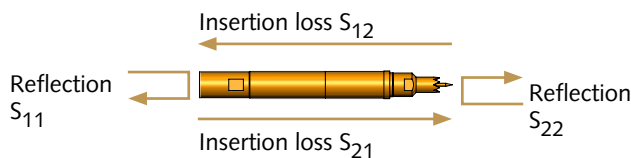
*RF test probe with narrow band matching network*

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 and I directly. Instead, the wave characteristics on the ports of the DUT are determined in order to determine those properties. These are the so-called scattering parameters, or S-parameters for short.

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

A further part of the wave feeds 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.

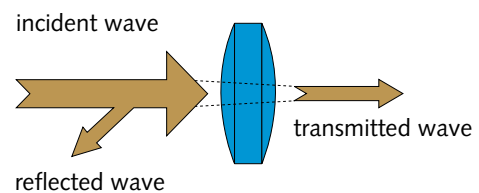
To fully describe the properties of a 2-port RF network, there are a total of four S-parameters, each of which are determined according to magnitude and phase:  $S_{xy,value}$  and  $S_{xy,phase}$  (with  $x,y = 1...2$ ). The reciprocity principle, however, applies to linear passive components in good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

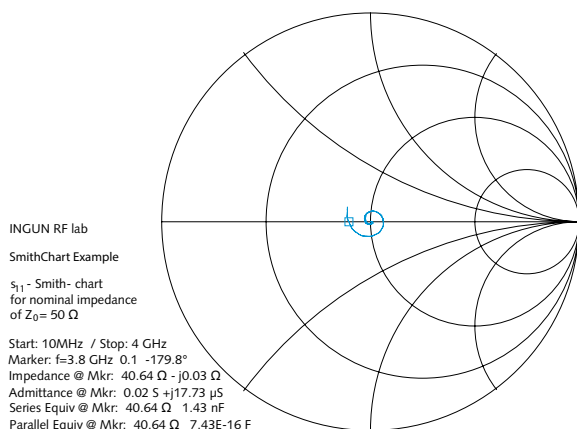
$$VSWR = \frac{1 + 10^{\frac{-RL'}{20}}}{1 - 10^{\frac{-RL'}{20}}} \quad (2)$$

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

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

### 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.)



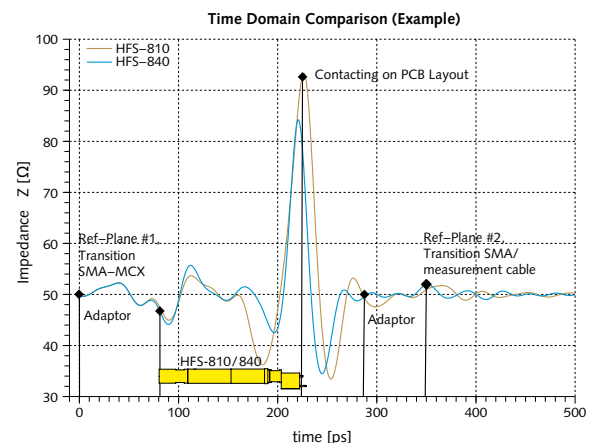
### Time domain reflectometry (TDR)

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.

$$Z_L = Z_0 \cdot \frac{(1 + \rho)}{(1 - \rho)}$$

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.

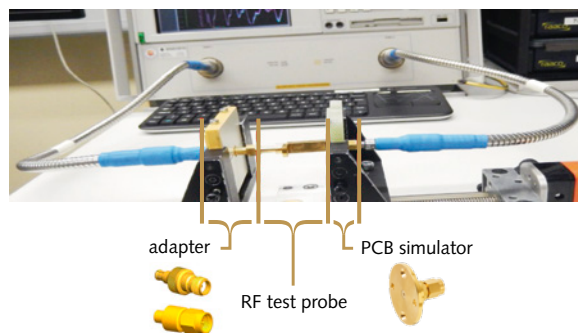


# RF products from INGUN

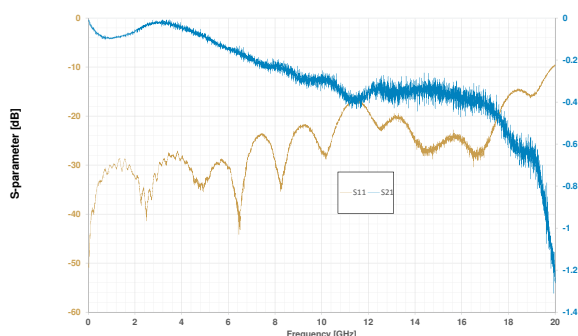
## Specification of coaxial (analogue) RF test probes

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.

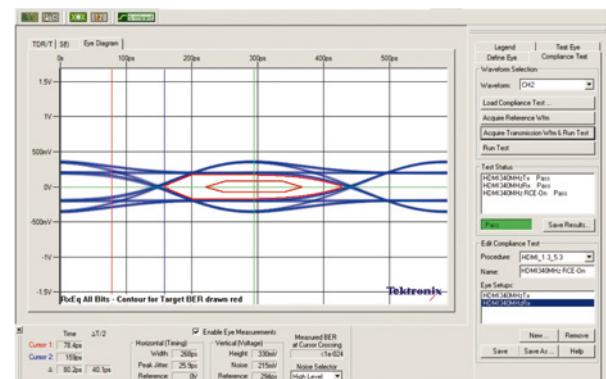


Return and insertion loss of a RF test probe

## 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.

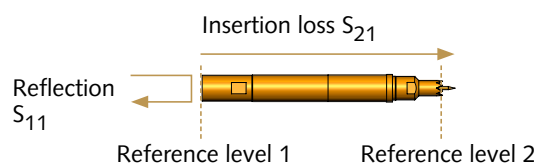


The INGUN laboratory has the capacity (the appropriate measurement equipment and software) to perform specification of digital test probes. Using time domain analyses, measurements to determine the differential impedance can also be performed.



# 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.

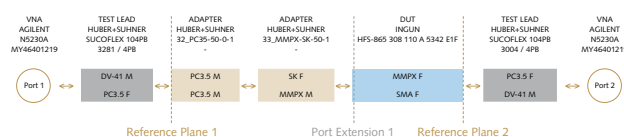


INGUN provides accompanying charts, also as digital s2p files in Touchstone format. These refer to the typical characteristics of transmission of the corresponding RF test probe. Please contact us if you require support with the characterisation of your signal path.



Connection for  
MMPX™-plug

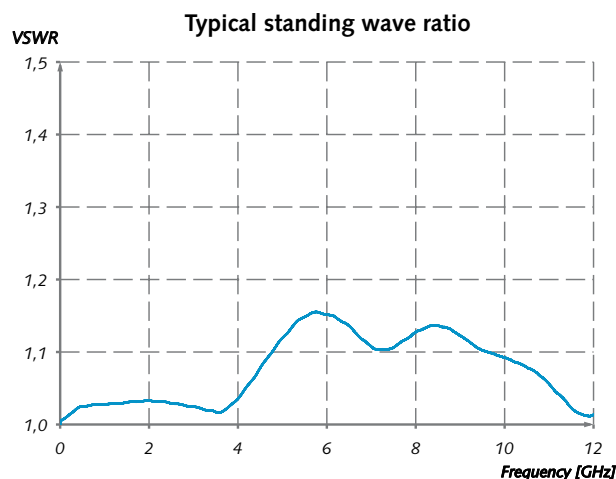
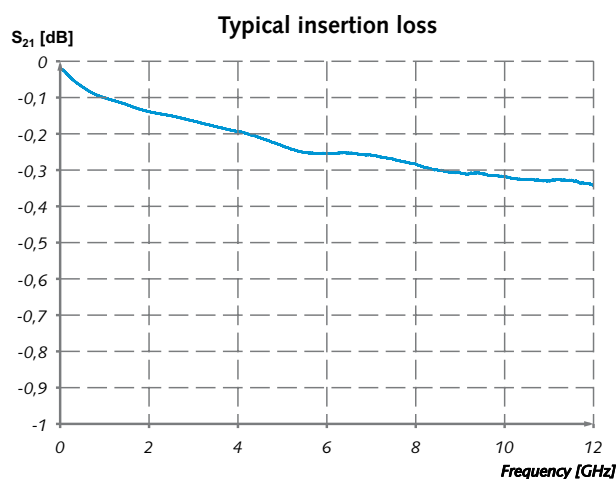
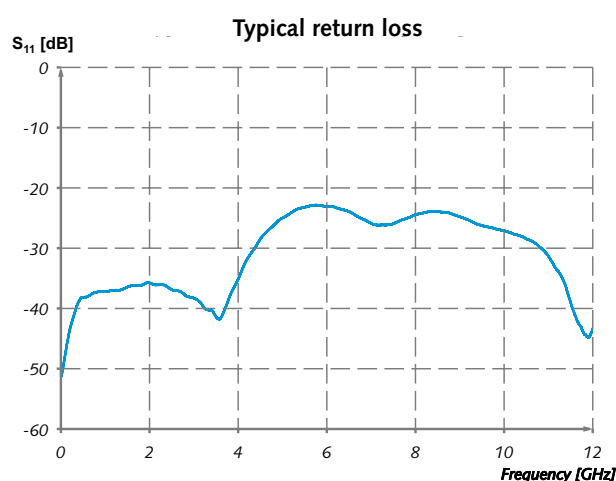
## INGUN test set-up



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

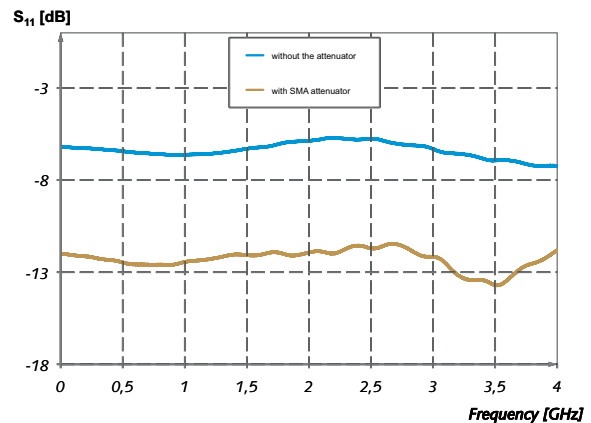
## In-line for RF contact probes

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.

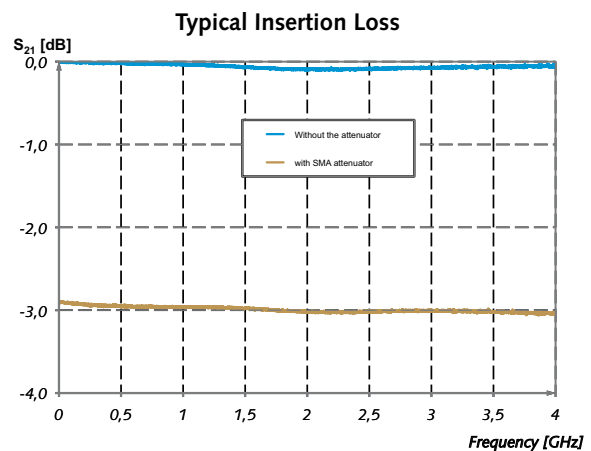
INGUN offers standard 50  $\Omega$  attenuators with 3 dB and 2 Watt load capacity, as well as optional MCX or SMA connection interfaces. Further attenuation values available upon request.



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 values 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](http://www.ingun.com/company)

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

# Applied Radio Frequency Technology



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

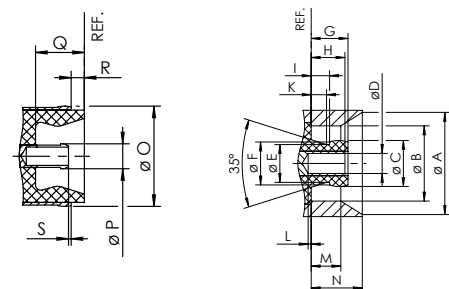
# Contacting of MMBX Connectors

## Series MMBX

### Connection Dimensions

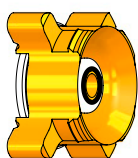
#### Signal Conductor Plug

#### Signal Conductor Jack



Example of manufacturer Huber+Suhner:

MMBX 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 |

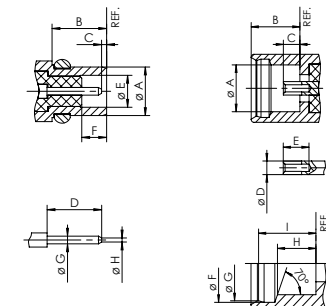
# Contacting of MMCX Connectors

## Series MMCX

### Connection Dimensions

#### Signal Conductor Plug

#### Signal Conductor Jack



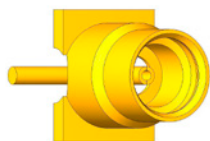
|    | Signal Conductor Plug |             | Signal Conductor Jack |             |
|----|-----------------------|-------------|-----------------------|-------------|
|    | min.                  | max.        | min.                  | max.        |
| A  | -                     | 2.40 / .094 | 2.41 / .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

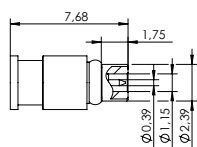


# Contacting of MMPX Connectors

## Series MMPX

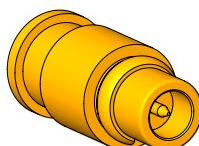
### Connection Dimensions

#### Signal Conductor Jack



Example of manufacturer Huber+Suhner:

MMPX Conductor Jack



## Contents

# MMBX

## Signal Conductor Jack

2 GHz 28  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 29  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

12 GHz 30  
HFS-865

# MMCX

## Signal Conductor Jack

2 GHz 31  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 32  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

# MMPX

## Signal Conductor Jack

12 GHz 33  
HFS-865

MBX s. Page 34 - 37

MCX s. Page 38 - 40

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/Signal Conductor 202 - 204

# MBX

## Signal Conductor Plug

6 GHz 34  
HFS-822

## Signal Conductor Jack

2 GHz 35  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 36  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

6 GHz 37  
HFS-822

# MCX

## Signal Conductor Jack

2 GHz 38  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 39  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

6 GHz 40  
HFS-860, HFS-860 M

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

Tools 200 - 201

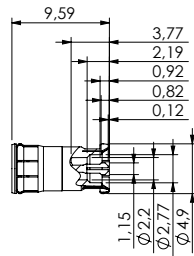
Inner Conductor/ Signal Conductor 202 - 204

# Contacting of MBX Connectors

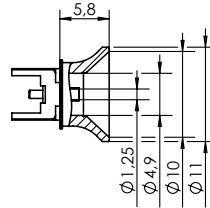
## Series MBX

### Connection Dimensions

#### Signal Conductor Plug



#### Signal Conductor Jack

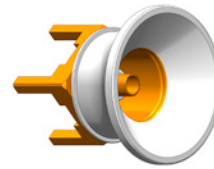


Example of manufacturer Huber+Suhner:

MBX Signal Conductor Plug



MBX Signal Conductor Jack

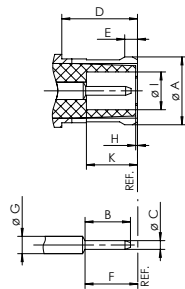


# Contacting of MCX Connectors

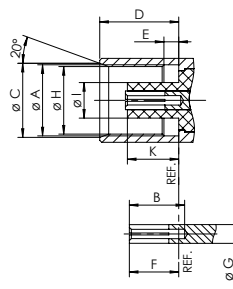
## Series MCX

### Connection Dimensions

#### Signal Conductor Plug



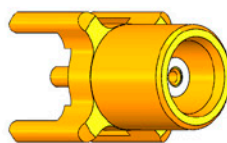
#### Signal Conductor Jack



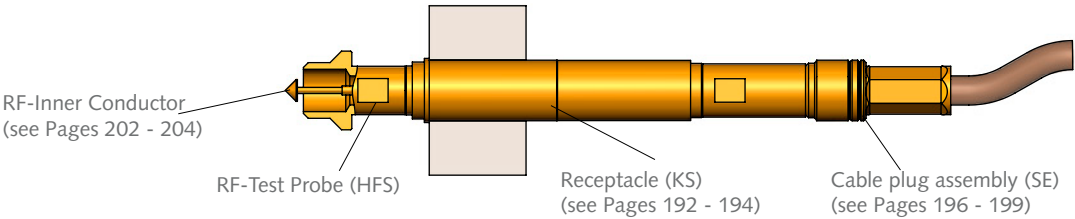
|   | Signal Conductor Plug |              | Signal Conductor Jack |             |
|---|-----------------------|--------------|-----------------------|-------------|
|   | min.                  | max.         | min.                  | max.        |
| A | 3.72 / .146*          | 3.80 / .150* | 3.60 / .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

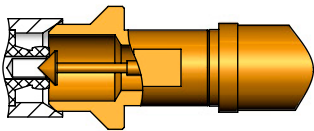




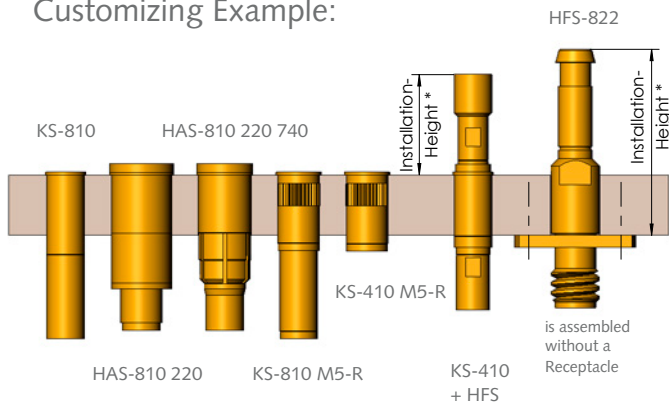


Contacting Example MMBX:

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



Customizing Example:



| 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 <sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) | without 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                                                        | 13.15 mm                               | ---        |
| MCX Signal Conductor Jack         | ... X / ... X M             | 12.9 mm                                                        | 14.0 mm                                | ---        |
|                                   | (HFS-860)<br>... X / ... XM | 11.9 mm                                                        | 13.0 mm                                | ---        |
|                                   | ...X4/...X4M                | 11.8 mm                                                        | 12.9 mm                                | ---        |

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)

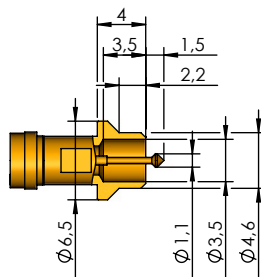
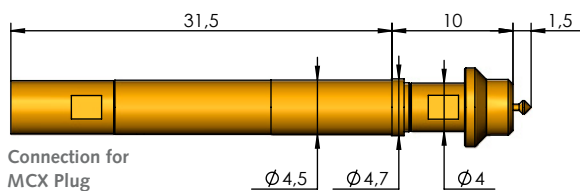
HFS-810 / HFS-810 M  
HFS-410 / HFS-410 M

Series:

Available  
Tip Styles:

Ordering Description:

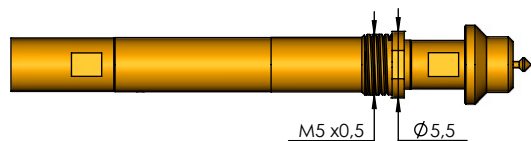
HFS-810 ...



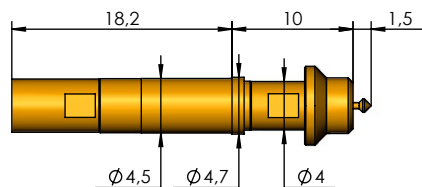
HFS-810 308 110 A **xx** 42 BX  
HFS-810 308 110 A **xx** 42 BX M  
HFS-410 308 110 A **xx** 42 BX  
HFS-410 308 110 A **xx** 42 BX M

**Note:**  
Centering range: ± 0.5 mm

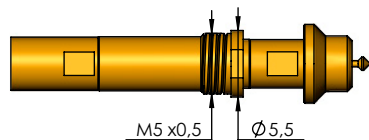
HFS-810 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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

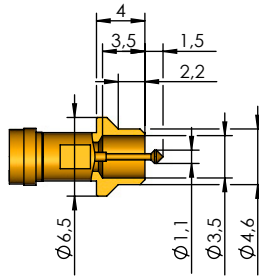
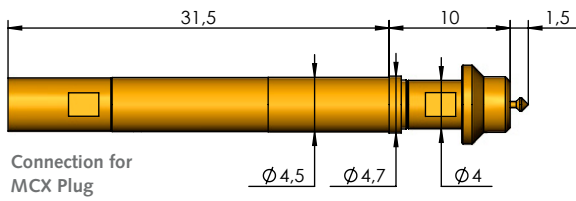
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

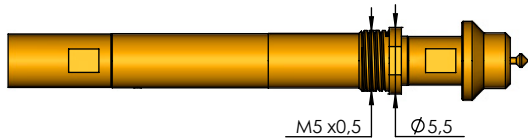
### HFS-840 ...



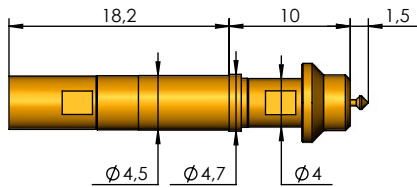
HFS-840 308 110 A **xx** 42 BX  
HFS-840 308 110 A **xx** 42 BX M  
HFS-440 308 110 A **xx** 42 BX  
HFS-440 308 110 A **xx** 42 BX M

**Note:**  
Centering range: ± 0.5 mm

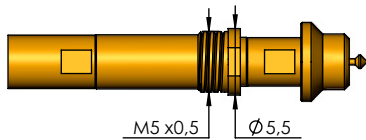
### HFS-840 ... M (\*)



### HFS-440 ...



### HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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)

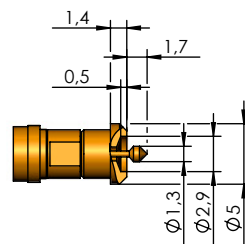
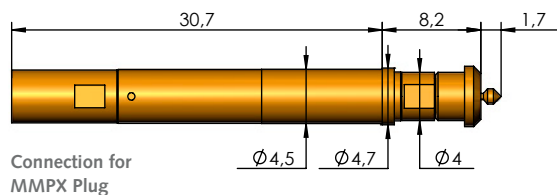
HFS-865

Series:

Available  
Tip Styles:

Ordering Description:

HFS-865 ...



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              | <b>53</b> | <b>73</b> | <b>93</b> |

### Mechanical Data

#### HFS-865

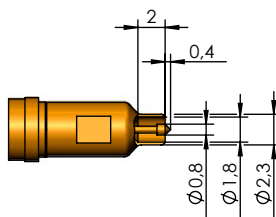
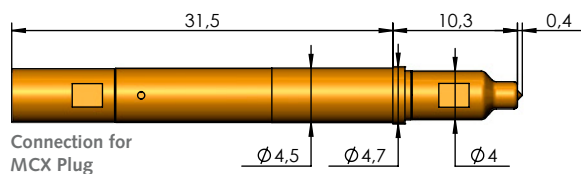
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 1.0 mm      |
| Maximum Stroke: | 5.0 mm      | 1.5 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

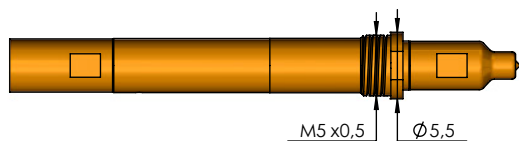
HFS-810 ...



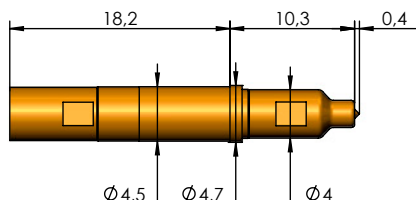
HFS-810 358 080 A **xx** 42 Z  
HFS-810 358 080 A **xx** 42 Z M  
HFS-410 358 080 A **xx** 42 Z  
HFS-410 358 080 A **xx** 42 Z M

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

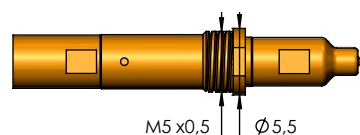
HFS-810 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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)

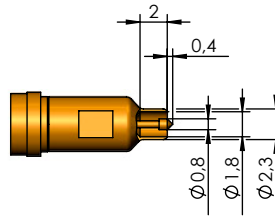
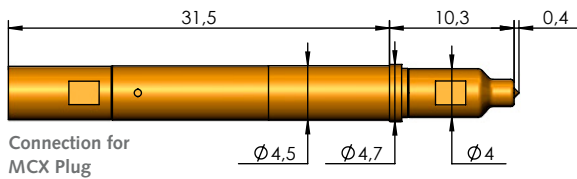
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

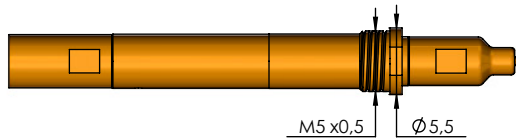
HFS-840 ...



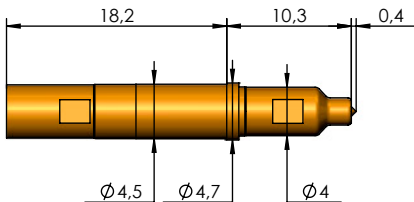
HFS-840 358 080 A **xx** 42 Z  
HFS-840 358 080 A **xx** 42 Z M  
HFS-440 358 080 A **xx** 42 Z  
HFS-440 358 080 A **xx** 42 Z M

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

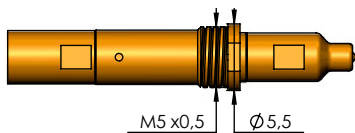
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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      |

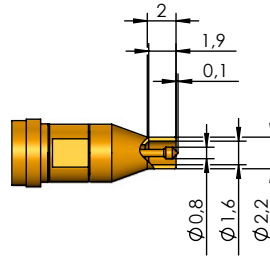
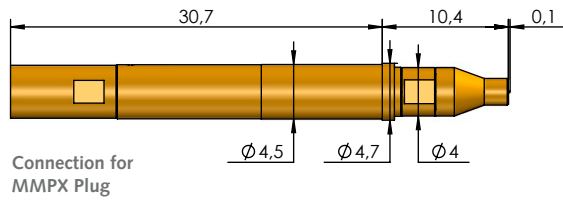


## Series:

Available  
Tip Styles:

## Ordering Description:

## HFS-865 ...

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

**Note:** Version with pre-centering on the inner side of the Connector Outer Contact. Centering range:  $\pm 0.3$  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              | <b>53</b> | <b>73</b> | <b>93</b> |

**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)

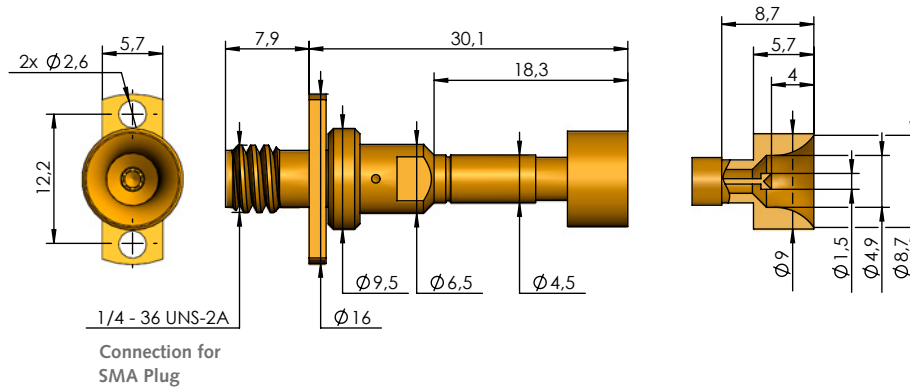
HFS-822

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

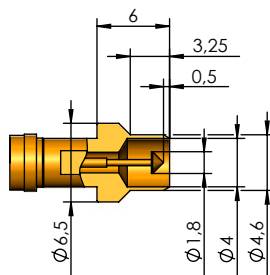
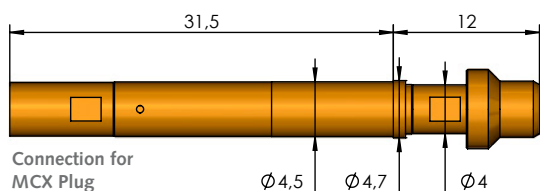
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

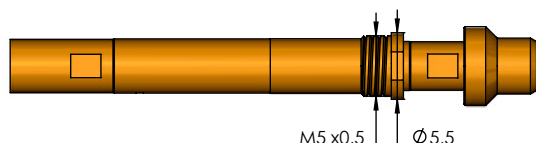
### HFS-810 ...



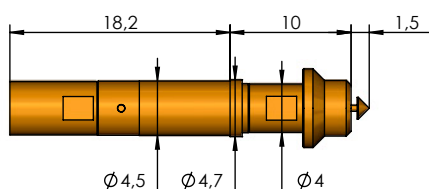
HFS-810 308 180 A **xx** 42 MBX  
HFS-810 308 180 A **xx** 42 MBX M  
HFS-410 308 180 A **xx** 42 MBX  
HFS-410 308 180 A **xx** 42 MBX M

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

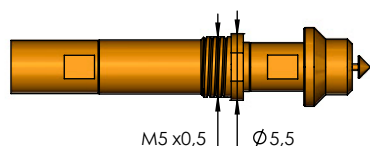
### HFS-810 ... M (\*)



### 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

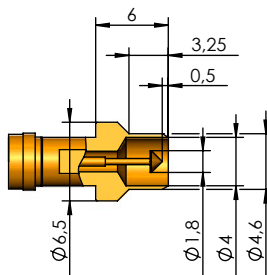
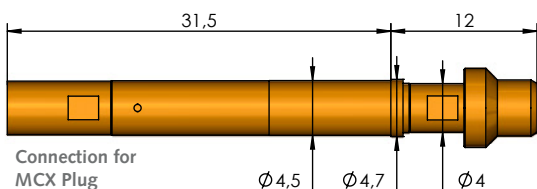
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

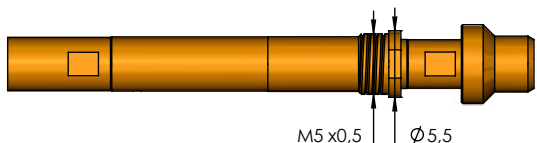
HFS-840 ...



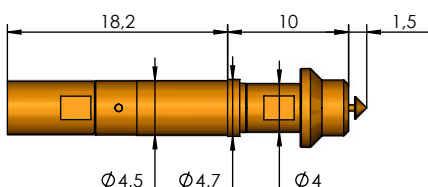
HFS-840 308 180 A **xx** 42 MBX  
HFS-840 308 180 A **xx** 42 MBX M  
HFS-440 308 180 A **xx** 42 MBX  
HFS-440 308 180 A **xx** 42 MBX M

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

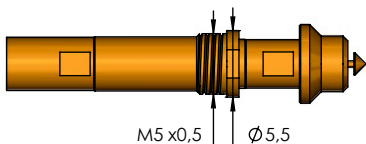
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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

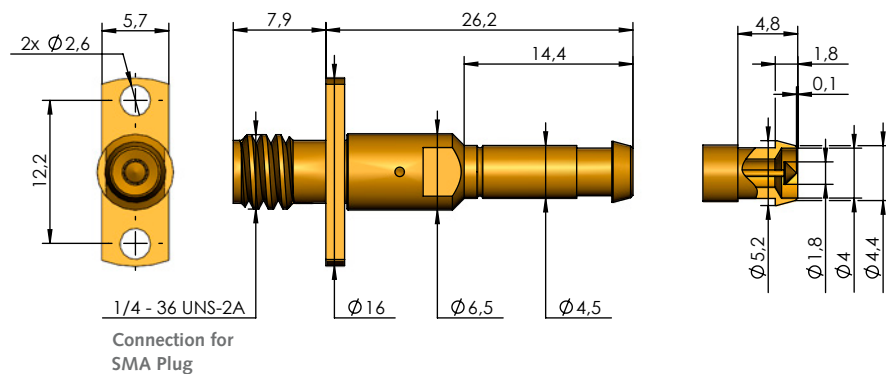
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

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:  $\pm 0.4$  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              | <b>50</b> |

**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)

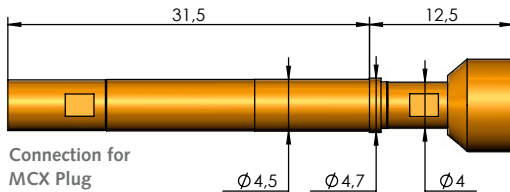
HFS-810 / HFS-810 M  
HFS-410 / HFS-410 M

Series:

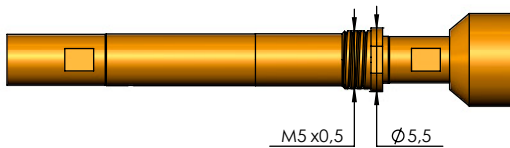
Available  
Tip Styles:

Ordering Description:

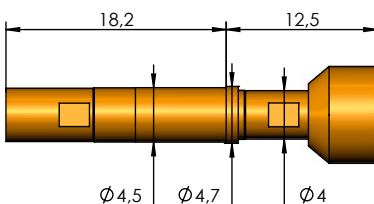
HFS-810 ...



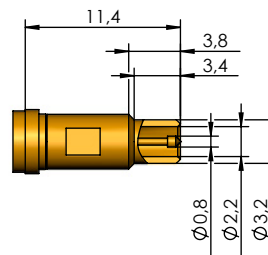
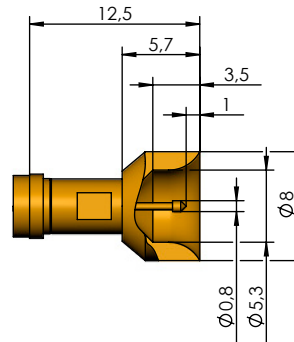
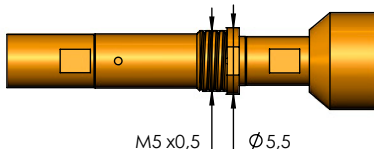
HFS-810 ... M (\*)



HFS-410 ...



HFS-410 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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      |

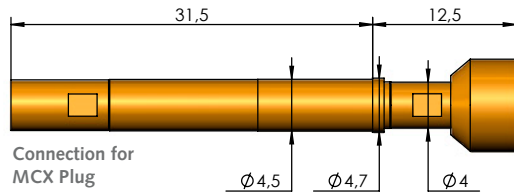


## Series:

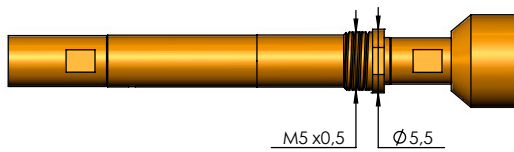
## Available Tip Styles:

## Ordering Description:

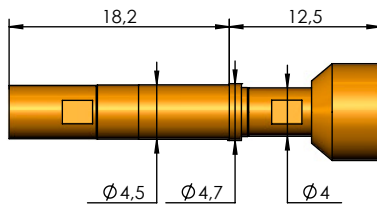
### HFS-840 ...



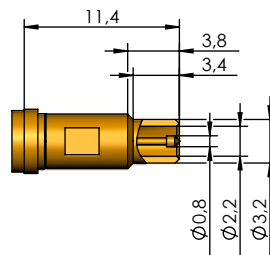
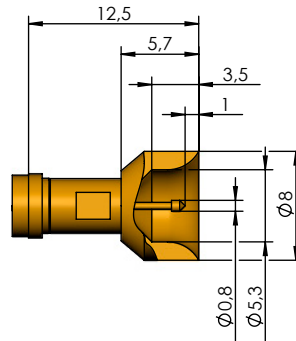
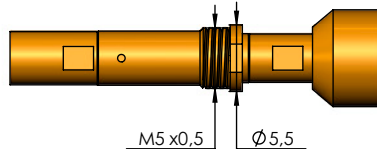
### HFS-840 ... M (\*)



### HFS-440 ...



### HFS-440 ... M (\*)



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<br>HFS-840 M |     |     |     | HFS-440<br>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)

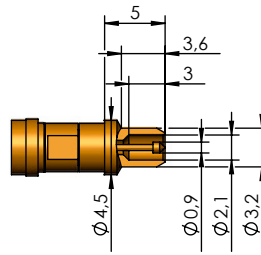
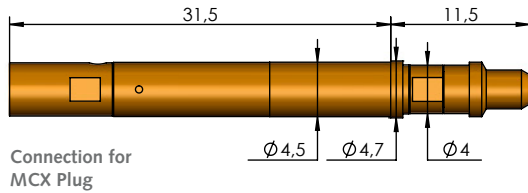
HFS-860 / HFS-860 M

Series:

Available  
Tip Styles:

Ordering Description:

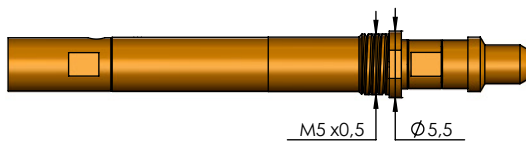
HFS-860 ...



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

HFS-860 ... 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-860<br>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  |

### 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      |

### Note: (\*)

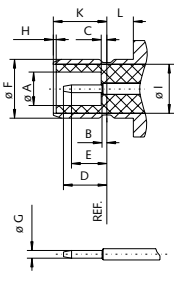
For usage in the case of vibration, shaking, snapping or assembly upside down.

# Contacting of SMB Connectors

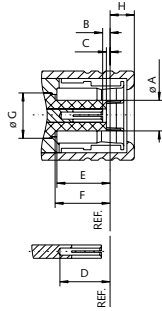
## Series SMB

### Connection Dimensions

#### Signal Conductor Plug



#### Signal Conductor Jack



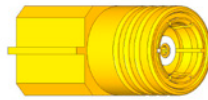
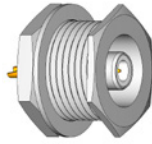
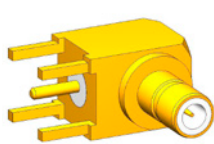
|   | Signal Conductor Plug |             | Signal Conductor Jack |             |
|---|-----------------------|-------------|-----------------------|-------------|
|   | min.                  | max.        | min.                  | max.        |
| A | 2.08 / .082           | -           |                       | 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

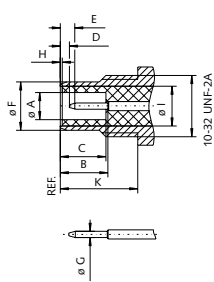


# Contacting of SMC Connectors

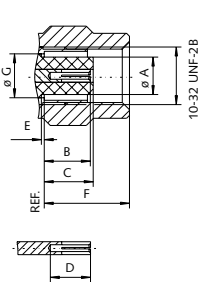
## Series SMC

### Connection Dimensions

#### Signal Conductor Plug



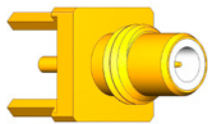
#### Signal Conductor Jack



|   | 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

### Signal Conductor Plug

2 GHz 43  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 44  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

### Signal Conductor Jack

2 GHz 45  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 46  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

## SMC

### Signal Conductor Plug

2 GHz 47  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 48  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

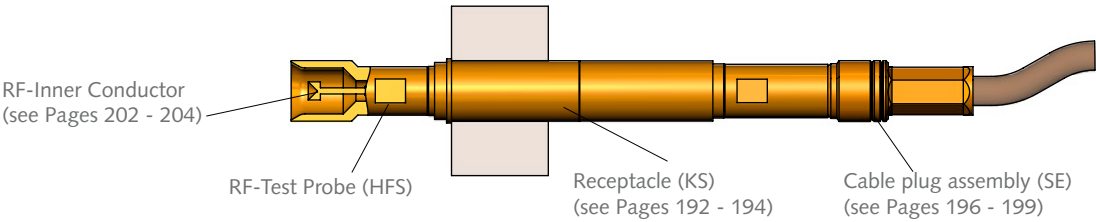
Cable plug assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/ Signal Conductor 202 - 204

# SMB Connectors

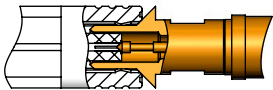
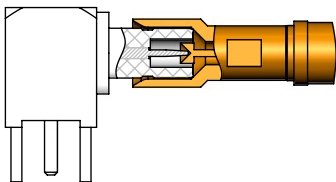
## SMC Connectors



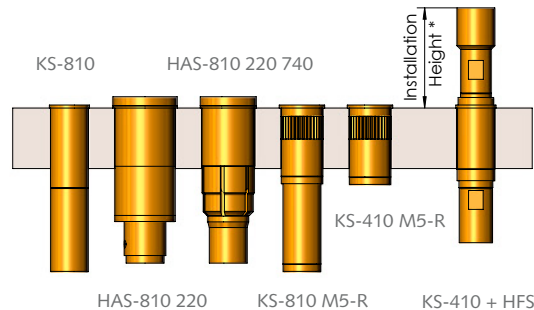
### Contacting Example SMB:

**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:



#### 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<sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) |
|------------------------------------|-------------------------|----------------------------------------------------------------|----------------------------------------|
| Variant                            |                         | *Installation Height HFS in KS                                 |                                        |
| SMB<br>Signal<br>Conductor<br>Plug | ...Y / ... YM           | 13.3 mm                                                        | 14.4 mm                                |
|                                    | ... Y2 / ... Y2 M       |                                                                |                                        |
|                                    | ... F-Y14 / ... F-Y14 M |                                                                |                                        |
|                                    | ... Y3 / ... Y3 M       |                                                                |                                        |
| SMB<br>Signal<br>Conductor<br>Jack | ... ZE / ... ZE M       | 11.8 mm                                                        | 12.9 mm                                |
| SMC<br>Signal<br>Conductor<br>Plug | ... Y5 / ... Y5         | 12.0 mm                                                        | 13.1 mm                                |

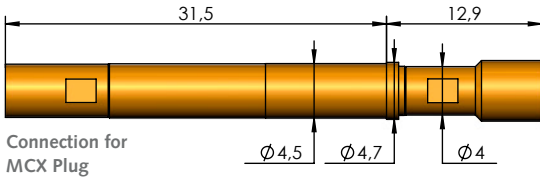
**Note:**  
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

Series:

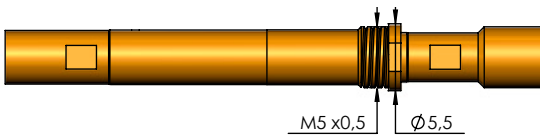
Available  
Tip Styles:

Ordering Description:

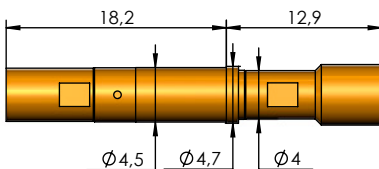
HFS-810 ...



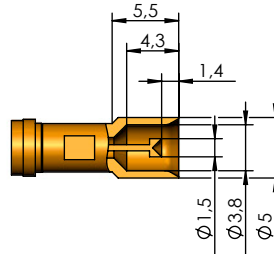
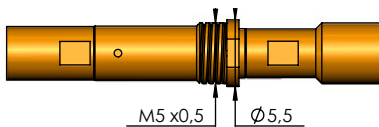
HFS-810 ... M (\*)



HFS-410 ...

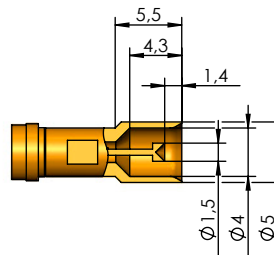


HFS-410 ... M (\*)



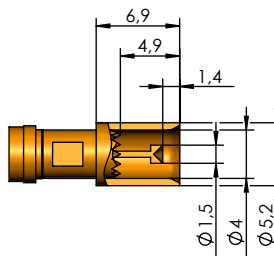
HFS-810 303 150 A **xx** 43 Y  
HFS-810 303 150 A **xx** 43 Y M  
HFS-410 303 150 A **xx** 43 Y  
HFS-410 303 150 A **xx** 43 Y M

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



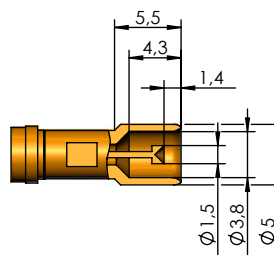
HFS-810 303 150 A **xx** 43 Y2  
HFS-810 303 150 A **xx** 43 Y2 M  
HFS-410 303 150 A **xx** 43 Y2  
HFS-410 303 150 A **xx** 43 Y2 M

**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<br>HFS-810 M |     |     |     | HFS-410<br>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)

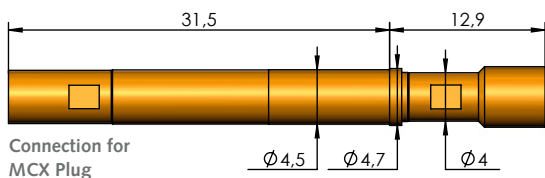
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

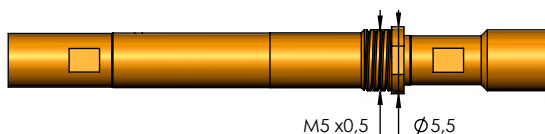
Available  
Tip Styles:

Ordering Description:

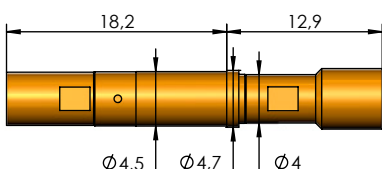
HFS-840 ...



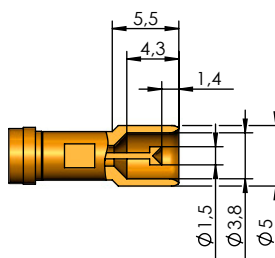
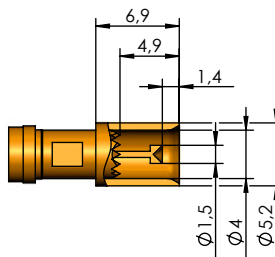
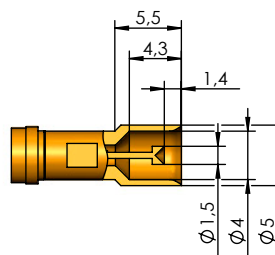
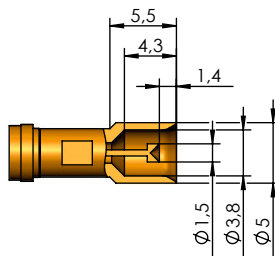
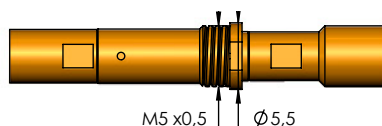
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... M (\*)



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:  $\pm 0.6$  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:  $\pm 0.7$  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:  $\pm 0.7$  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:  $\pm 0.6$  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<br>HFS-840 M |     |     |     | HFS-440<br>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

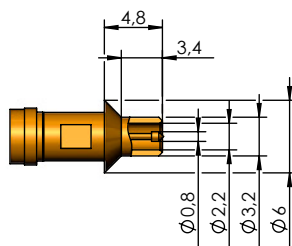
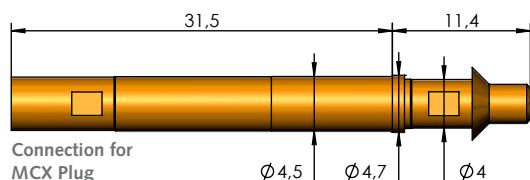
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

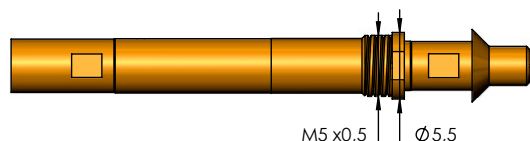
## HFS-810 ...



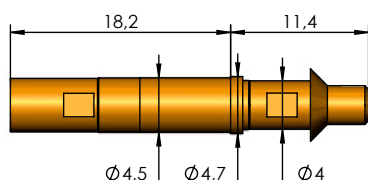
HFS-810 308 080 A **xx** 42 ZE  
HFS-810 308 080 A **xx** 42 ZE M  
HFS-410 308 080 A **xx** 42 ZE  
HFS-410 308 080 A **xx** 42 ZE M

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

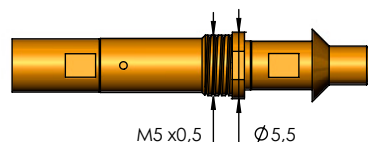
## HFS-810 ... M (\*)



## 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

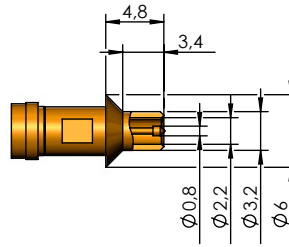
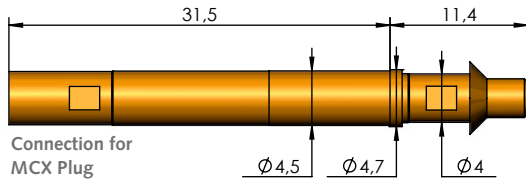
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

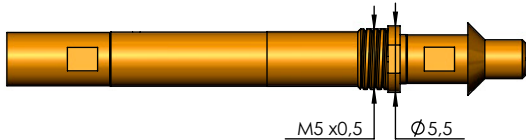
HFS-840 ...



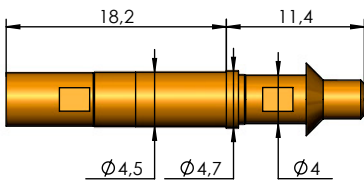
HFS-840 308 080 A **xx** 42 ZE  
HFS-840 308 080 A **xx** 42 ZE M  
HFS-440 308 080 A **xx** 42 ZE  
HFS-440 308 080 A **xx** 42 ZE M

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

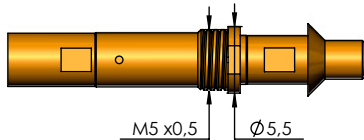
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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      |

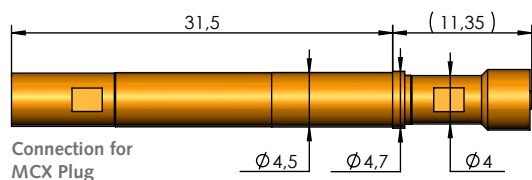
### Mechanical Data

HFS-440 and HFS-440 M

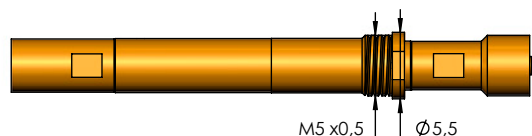
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

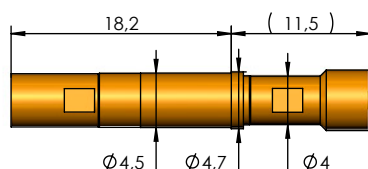
### HFS-810 ...



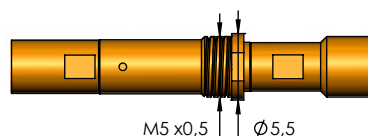
### HFS-810 ... M (\*)



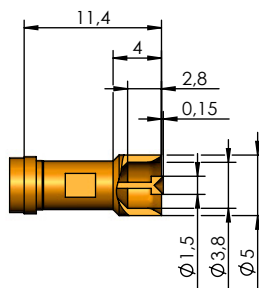
### HFS-410 ...



### 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:  $\pm 0.6$  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<br>HFS-810 M |     |     |     | HFS-410<br>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)

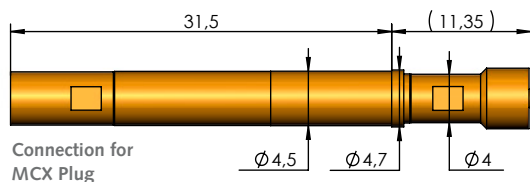
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

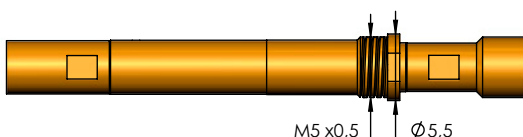
Available  
Tip Styles:

Ordering Description:

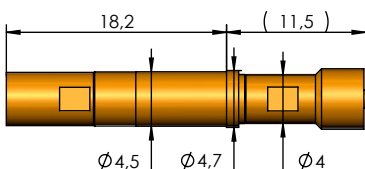
HFS-840 ...



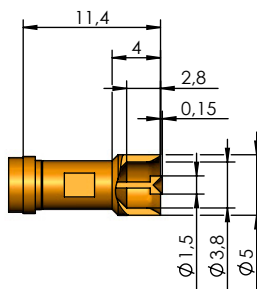
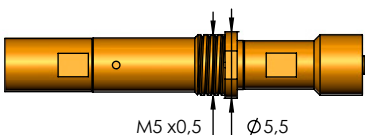
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... M (\*)



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<br>HFS-840 M |           |           |           | HFS-440<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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

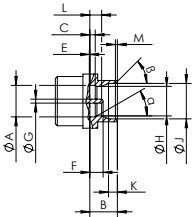
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

# Contacting of SMP Conductors

## Series SMP

Connection Dimensions

Signal Conductor Plug



Example of manufacturer Huber+Suhner:

SMP Conductor Plug



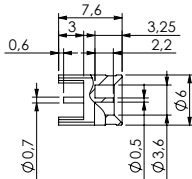
|   | Signal Conductor Plug |              |
|---|-----------------------|--------------|
|   | min.                  | max.         |
| A | 3.15 / .124           | 3.20 / .126  |
| B | 2.74 / .108           | 2.84 / .112  |
| C | 0.52 / .0205          | 0.60 / .0235 |
| E | 0.00 / 0              | -            |
| 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      |

# Contacting of SMP-L Conductors

## Series SMP-L

Connection Dimensions

Signal Conductor Plug



Example of manufacturer Huber+Suhner:

SMP-L Conductor Plug

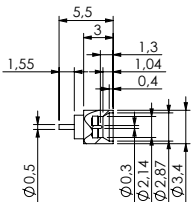


# Contacting of SSMP Conductors

## Series SSMP

Connection Dimensions

Signal Conductor Plug



Example of manufacturer Huber+Suhner:

SSMP Conductor Plug



## Contents

# SMP

Signal Conductor Plug

2 GHz 52  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 53  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

6 GHz 54  
HFS-856

# SMP-L

Signal Conductor Plug

6 GHz 55  
HFS-822

# SSMP

Signal Conductor Plug

6 GHz 56  
HFS-860

# SMP-Max

s. page 57 - 58

# P-SMP

s. page 59

# SMPX

s. page 60

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/Signal Conductor 202 - 204

SMP (X/MAX)  
SMP-L SSMP /  
P-SMP

# SMP-MAX

## Signal Conductor Plug

6 GHz  
HFS-822 57

## Signal Conductor Jack

6 GHz  
HFS-822 58

# P-SMP

## Signal Conductor Plug

6 GHz  
HFS-822 59

# SMPX

## Signal Conductor Plug

12 GHz  
HFS-865 60

Receptacles  
(KS) 192 - 194

Spacer of  
Receptacles (DS) 195

Cable plug  
assembly (SE) 196 - 199

Tools 200 - 201

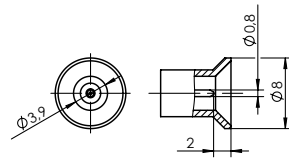
Inner Conductor/  
Signal Conductor 202 - 204

# Contacting of SMP-MAX Connectors

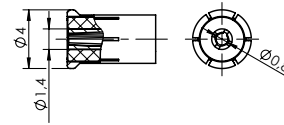
## Series SMP-MAX

### Connection Dimensions

#### Signal Conductor Plug



#### Signal Conductor Jack



Example of manufacturer Huber+Suhner:

SMP-MAX-Signal Conductor Plug

SMP-MAX Signal Conductor Jack

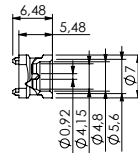


# Contacting of P-SMP Connectors

## Series P-SMP

### Connection Dimensions

#### Signal Conductor Plug



Example of manufacturer Huber+Suhner:

P-SMP Signal Conductor Plug

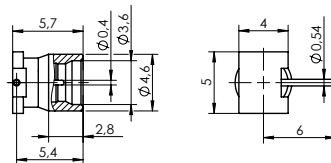


# Contacting of SMPX Connectors

## Series SMPX

### Connection Dimensions

#### Signal Conductor Plug

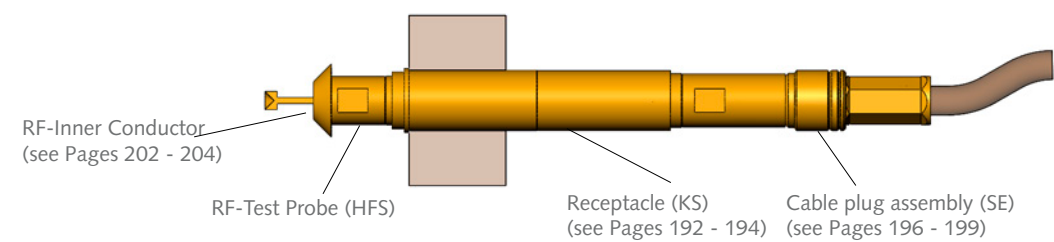


Example of manufacturer Huber+Suhner:

SMPX Signal Conductor Plug



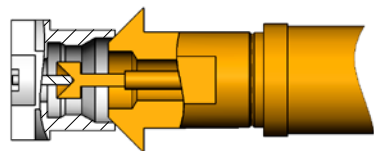
# SMP / SMP-L / SSMP / SMP-MAX / P-SMP / SMPX Connector



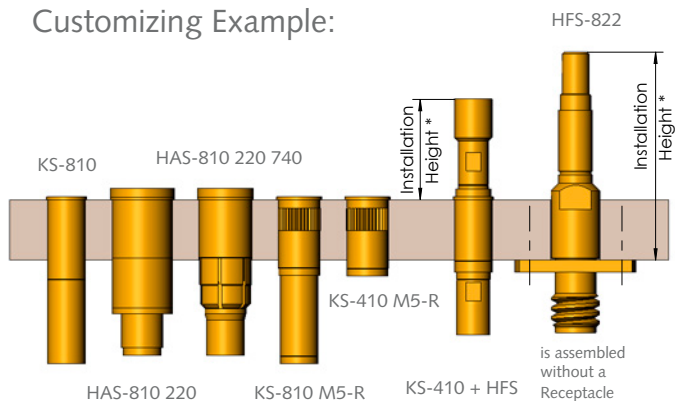
SMP (X/MAX)  
SMP-L SSMP /  
P-SMP

## Contacting Example SMP:

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



## Customizing Example:



| 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 <sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>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                                | ---        |

**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)

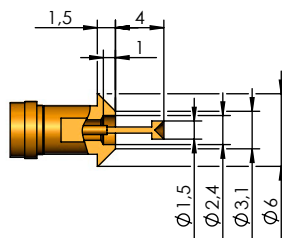
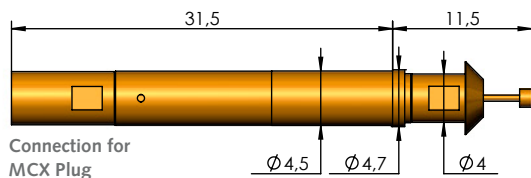
HFS-810 / HFS-810 M  
HFS-410 / HFS-410 M

Series:

Available  
Tip Styles:

Ordering Description:

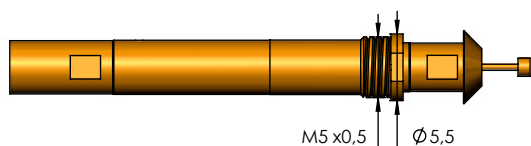
HFS-810 ...



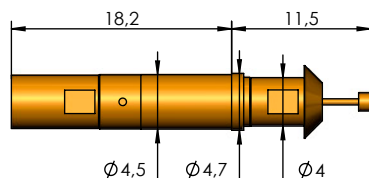
HFS-810 303 150 A **xx** 42 E  
HFS-810 303 150 A **xx** 42 E M  
HFS-410 303 150 A **xx** 42 E  
HFS-410 303 150 A **xx** 42 E M

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

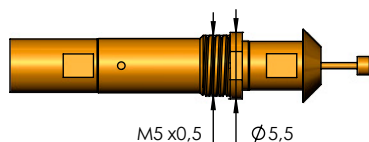
HFS-810 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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      |

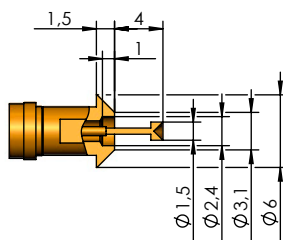
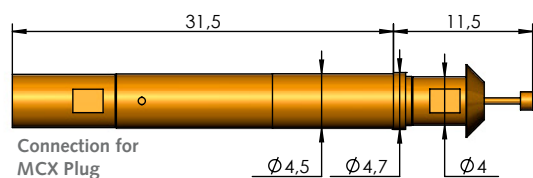


## Series:

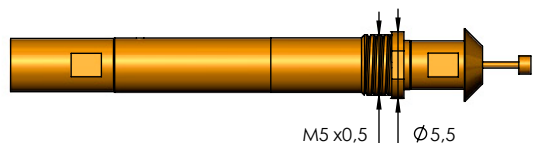
## Available Tip Styles:

## Ordering Description:

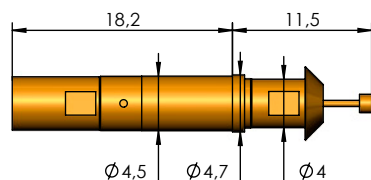
### HFS-840 ...



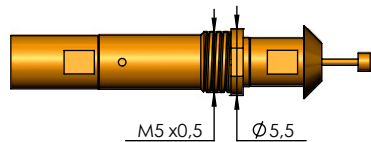
### HFS-840 ... M (\*)



### HFS-440 ...



### HFS-440 ... M (\*)



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:  $\pm 0.4$  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<br>HFS-840 M |     |     |     | HFS-440<br>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:

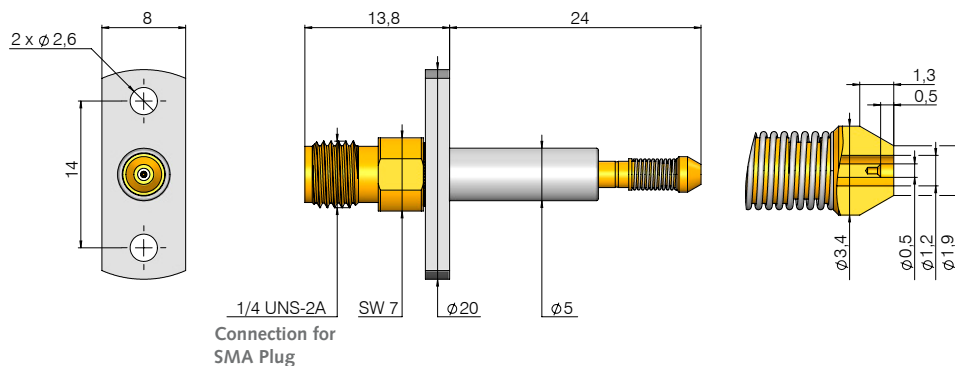


Available  
Tip Styles:

Ordering Description:

HFS-856 ...

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  $\pm 3,0^\circ$ . Centering range:  $\pm 0.7$  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

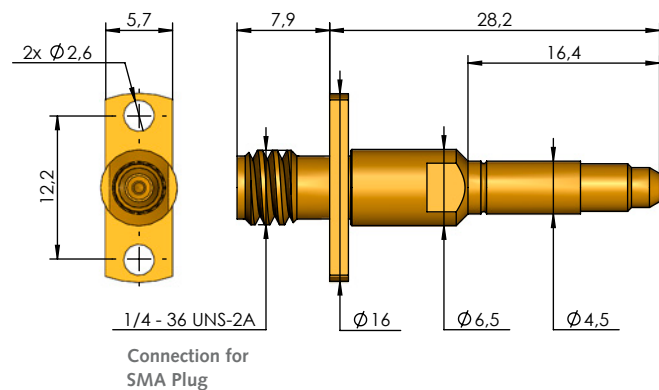
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.2 mm      | 1.0 mm      |
| Maximum Stroke: | 5.2 mm      | 1.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-822 ...

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

**Note:** Version with flange connection. No movement of the connection during stroke movement. Centering range:  $\pm 0.6$  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              | <b>50</b> |

**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)

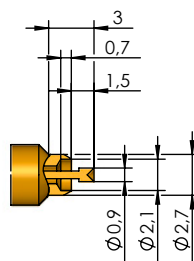
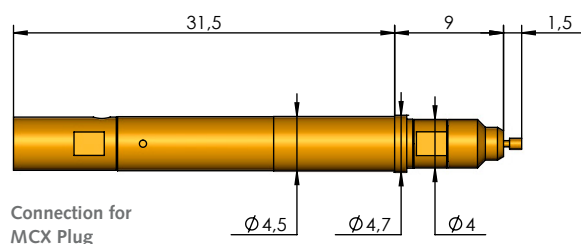
HFS-860 / HFS-860 M

Series:

Available  
Tip Styles:

Ordering Description:

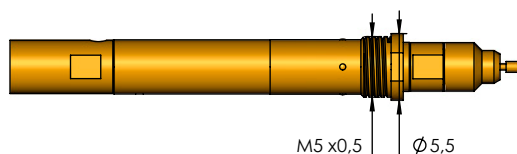
HFS-860 ...



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:  $\pm 0.3$  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<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> |

## 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.

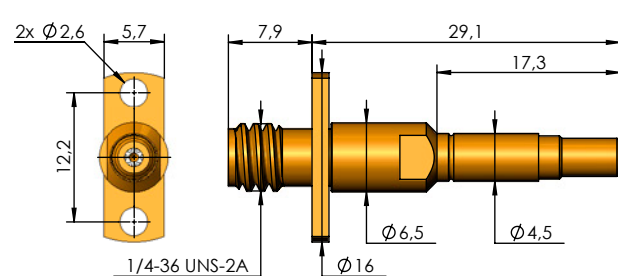
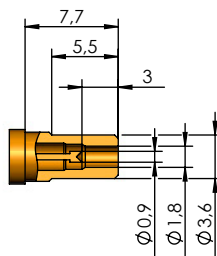
Working Stroke: 4.0 mm 1.0 mm  
Maximum Stroke: 5.0 mm 2.7 mm

Series:

Available  
Tip Styles:

Ordering Description:

HFS-822 ...

Connection for  
SMA PlugHFS-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:  $\pm 1,0$  mm

SMP (X/MAX)  
SMP-L SSMP /  
P-SMP**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:**

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              | <b>50</b> |

**Mechanical Data****HFS-822**

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

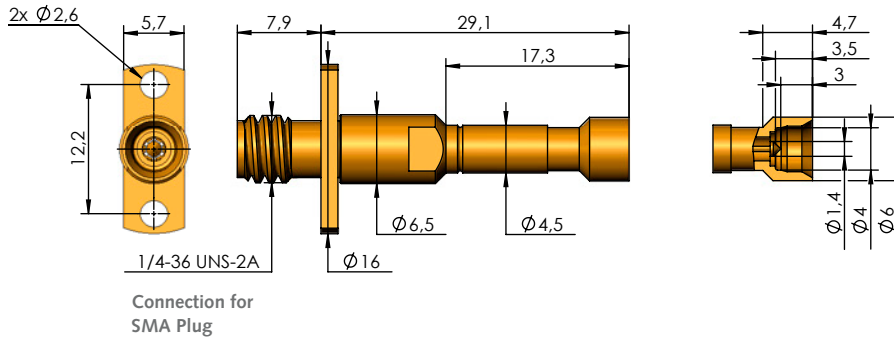
Series:

Available  
Tip Styles:

Ordering Description:

HFS-822 ...

HFS-822 308 140 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.

### 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

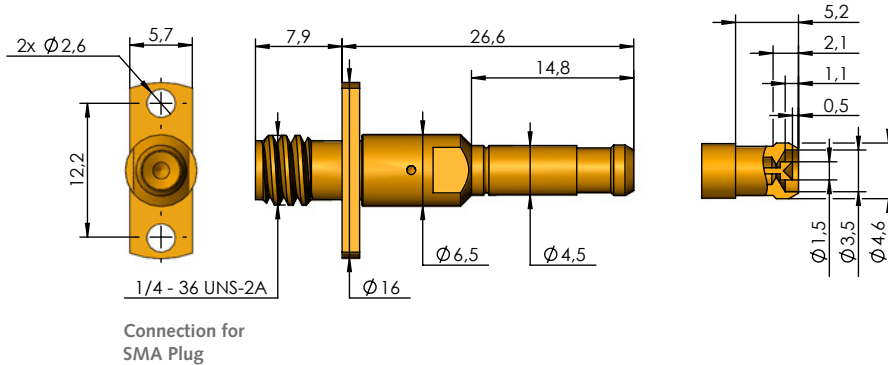
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-822 ...

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

**Note:** Version with flange connection. No movement of the connection during stroke movement.  
Centering range:  $\pm 0.6$  mm

SMP (X/MAX)  
SMP-L SSMP /  
P-SMP**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              | <b>50</b> |

**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)

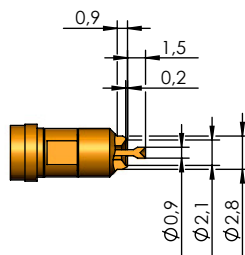
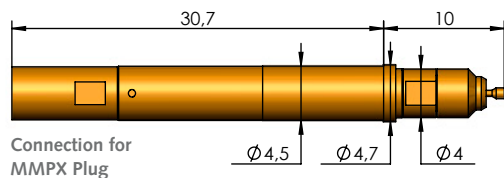
HFS-865

Series:

Available  
Tip Styles:

Ordering Description:

HFS-865 ...



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

**Note:** Version with centering via Inner Conductor Probe. Centering range:  $\pm 0.2$  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              | <b>53</b> | <b>73</b> | <b>93</b> |

## Mechanical Data

### HFS-865

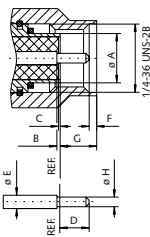
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 1.0 mm      |
| Maximum Stroke: | 5.0 mm      | 1.5 mm      |

# Contacting of SMA Connectors

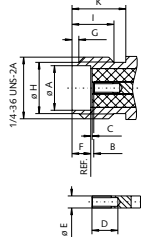
## Series SMA

### Connection Dimensions

#### Signal Conductor Plug



#### Signal Conductor Jack



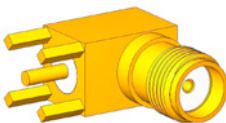
|   | Signal Conductor Plug |             | Signal Conductor Jack |             |
|---|-----------------------|-------------|-----------------------|-------------|
|   | min.                  | max.        | min.                  | max.        |
| A | -                     | 4.59 / .181 | 4.59 / .181           | -           |
| 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

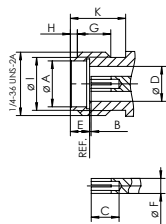


# Contacting of PC 3.5 Connectors

## Series PC 3.5

### Connection Dimensions

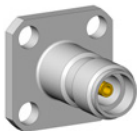
#### Signal Conductor Jack



|   | 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

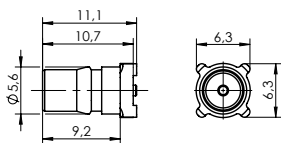


# Contacting of QMA Connectors

## Series QMA

### Connection Dimensions

#### Signal Conductor Jack



Example of manufacturer Huber+Suhner:

#### QMA Signal Conductor Jack



## Contents

# SMA

## Signal Conductor Plug

2 GHz 63  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 64  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

## Signal Conductor Jack

2 GHz 65  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 66  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

6 GHz 67  
HFS-860, HFS-860 M

12 GHz 68  
HFS-865

# PC 3.5

## Signal Conductor Jack

12 GHz 69  
HFS-865

# QMA

## Signal Conductor Jack

6 GHz 70  
HFS-860, HFS-860 M

Receptacles (KS) 192 - 194

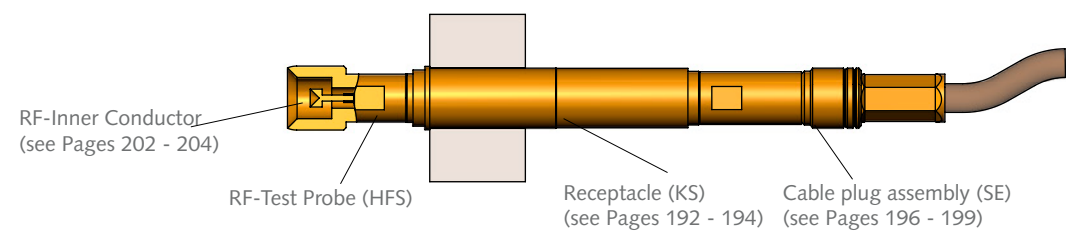
Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/Signal Conductor 202 - 204

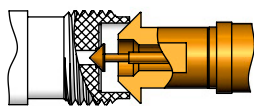
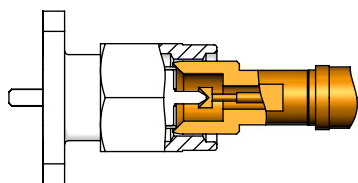
# SMA / PC 3.5 / QMA Connectors



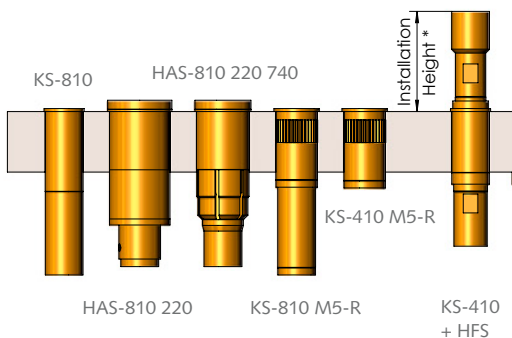
## Contacting Example SMA:

**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<sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) |
|---------------------------------------|--------------------------|----------------------------------------------------------------|----------------------------------------|
| Variant                               |                          | *Installation Height HFS in KS                                 |                                        |
| SMA<br>Signal<br>Conductor<br>Plug    | ... E3 / ...E3 M         | 11.9 mm                                                        | 13.0 mm                                |
|                                       | ...E3 / ...E3 M          | 11.9 mm                                                        | 13.0 mm                                |
| SMA<br>Signal<br>Conductor<br>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                                |
| PC 3.5<br>Signal<br>Conductor<br>Jack | ... E1F / ... E1F M      | 12.2 mm                                                        | 13.3 mm                                |
|                                       | ... E2F                  | 12.2 mm                                                        | 13.3 mm                                |
| QMA<br>Signal<br>Conductor<br>Jack    | ... QMA / ... QMA M      | 18.3 mm                                                        | 19.4 mm                                |
|                                       | ... QMA / ... QMA M      | 18.3 mm                                                        | 19.4 mm                                |

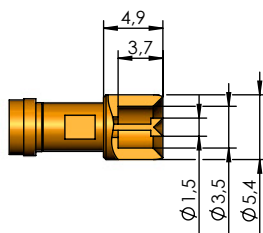
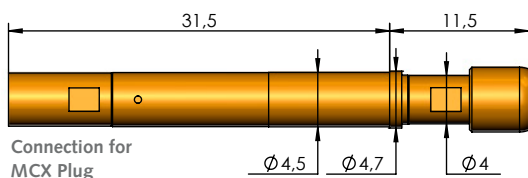
**Note:**  
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

Series:

Available  
Tip Styles:

Ordering Description:

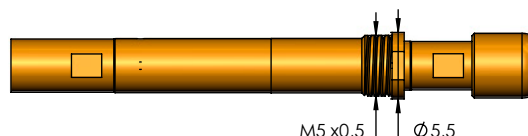
## HFS-810 ...



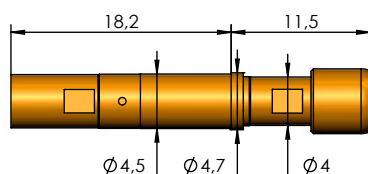
HFS-810 303 150 A **xx** 43 E3  
HFS-810 303 150 A **xx** 43 E3 M  
HFS-410 303 150 A **xx** 43 E3  
HFS-410 303 150 A **xx** 43 E3 M

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

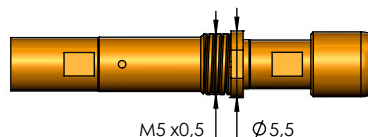
## HFS-810 ... M (\*)



## 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

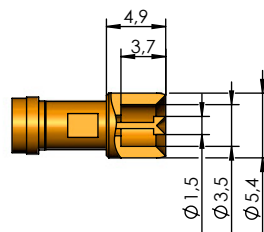
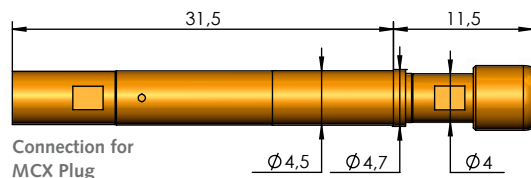
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

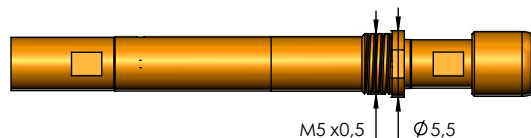
HFS-840 ...



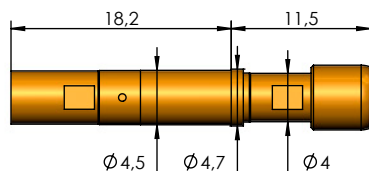
HFS-840 303 150 A **xx** 43 E3  
HFS-840 303 150 A **xx** 43 E3 M  
HFS-440 303 150 A **xx** 43 E3  
HFS-440 303 150 A **xx** 43 E3 M

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

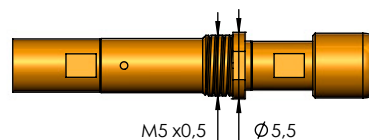
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |           |           |           | HFS-440<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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

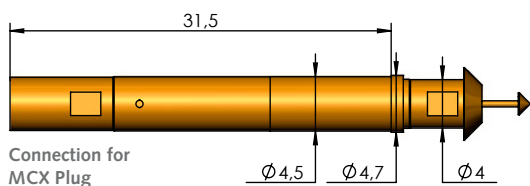
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

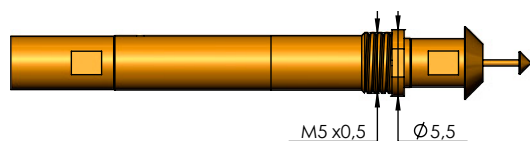
Available  
Tip Styles:

Ordering Description:

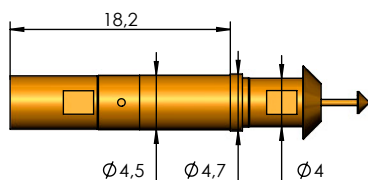
## HFS-810 ...



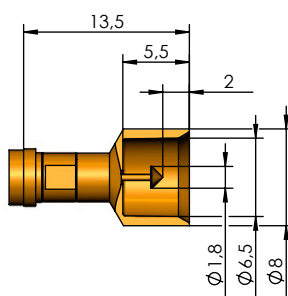
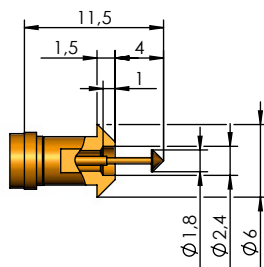
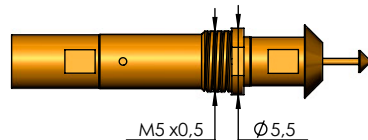
## HFS-810 ... M (\*)



## HFS-410 ...



## HFS-410 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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)

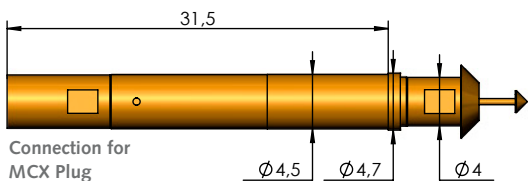
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

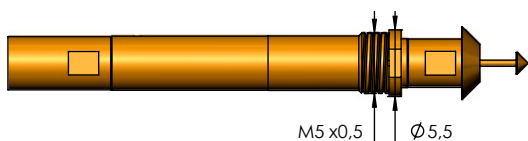
Available  
Tip Styles:

Ordering Description:

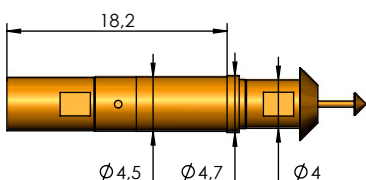
HFS-840 ...



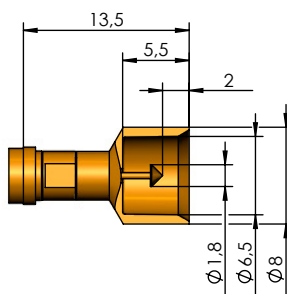
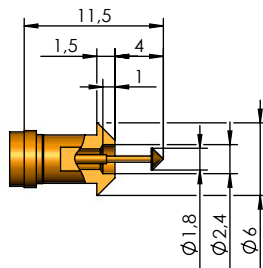
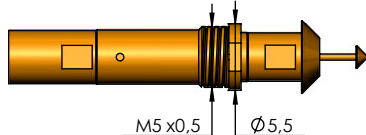
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... M (\*)



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<br>HFS-840 M |     |     |     | HFS-440<br>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      |

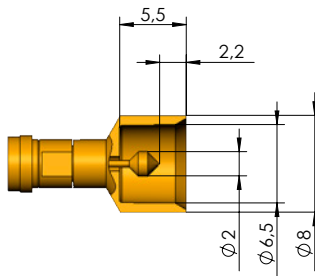
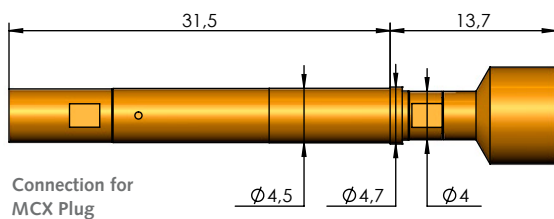


## Series:

Available  
Tip Styles:

## Ordering Description:

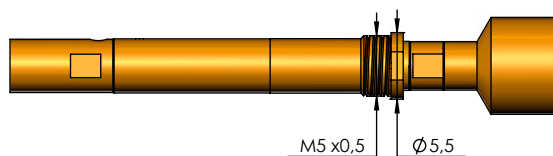
## HFS-860 ...



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:  $\pm 1.0$  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<br>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)

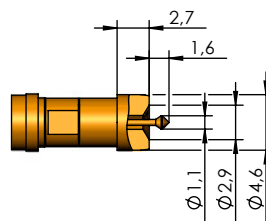
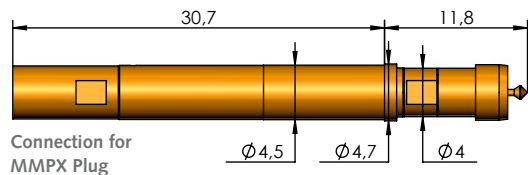
HFS-865

Series:

Available  
Tip Styles:

Ordering Description:

HFS-865 ...



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

**Note:** Version with centering via Inner Conductor Probe.  
Centering range:  $\pm 0.05$  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              | <b>53</b> | <b>73</b> | <b>93</b> |

## Mechanical Data

### HFS-865

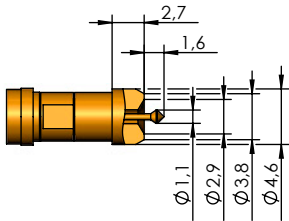
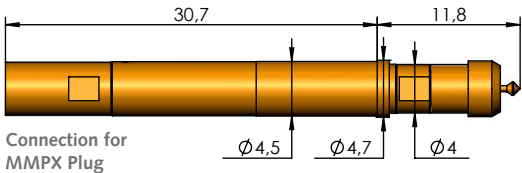
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 1.0 mm      |
| Maximum Stroke: | 5.0 mm      | 1.5 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-865 ...



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

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

SMA / PC3.5  
QMA

**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

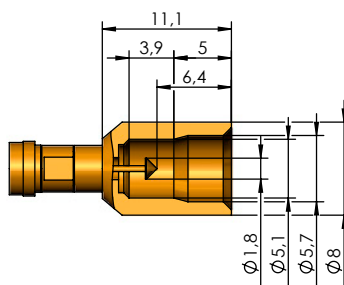
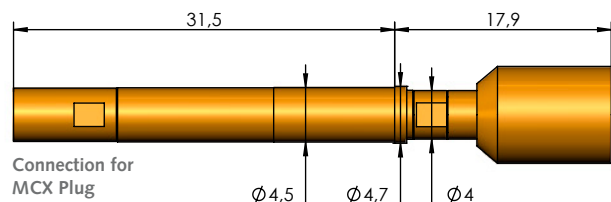
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 1.0 mm      |
| Maximum Stroke: | 5.0 mm      | 1.5 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

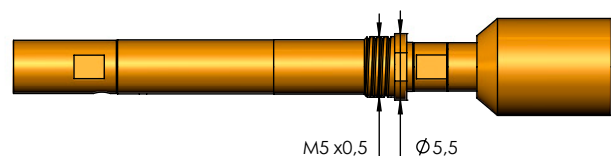
HFS-860 ...



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

**Note:** Version with pre-centering via Outer conductor. 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<br>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

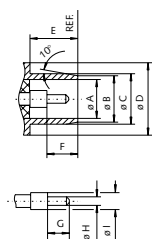
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 2.0 mm      |
| Maximum Stroke: | 5.0 mm      | 3.7 mm      |

# Contacting of BMA Connectors

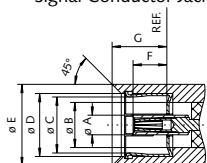
## Series BMA

### 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

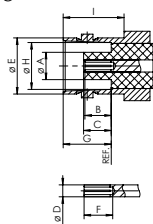


# Contacting of BNC Connectors

## 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

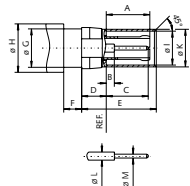


# Contacting of 1.0 / 2.3 Connectors

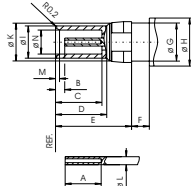
## Series 1.0 / 2.3

### Connection Dimensions

#### Signal Conductor Plug



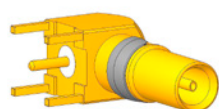
#### Signal Conductor Jack



|   | 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



## Contents

## BMA

### Signal Conductor Plug

2 GHz 73  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 74  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

## BNC

### Signal Conductor Jack

2 GHz 75  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 76  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

## 1.0 / 2.3

### Signal Conductor Jack

2 GHz 77  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 78  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

Receptacles (KS) 192 - 194

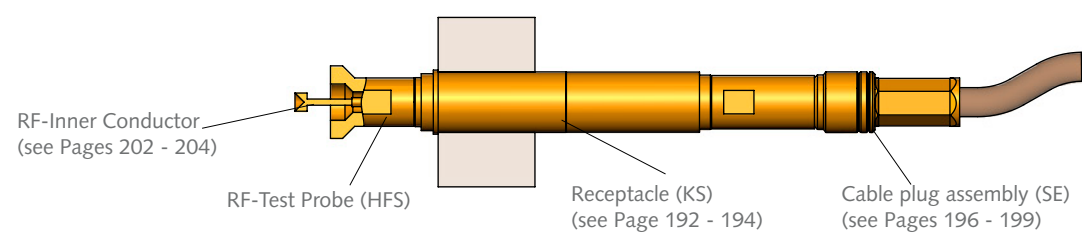
Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

Tools 200 - 201

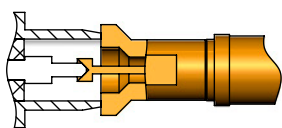
Inner Conductor/Signal Conductor 202 - 204

# BMA / BNC / 1.0/2.3 Connectors

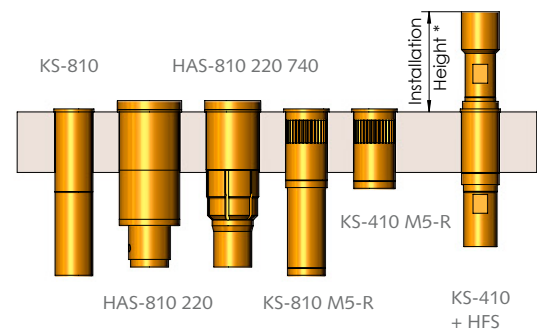


## Contacting Example BMA:

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



## Customizing Example:



| 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 <sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>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                                |

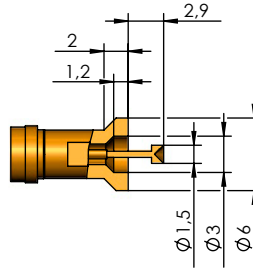
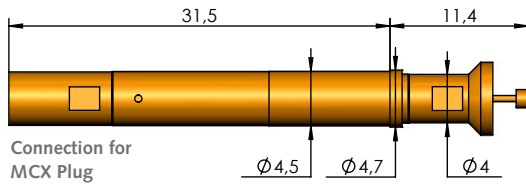
**Note:**  
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

## Series:

## Available Tip Styles:

## Ordering Description:

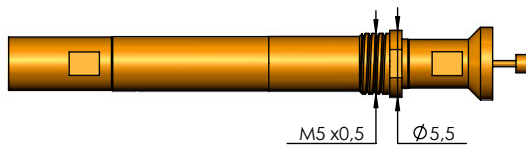
### HFS-810 ...



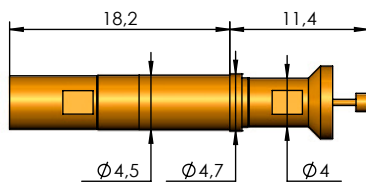
HFS-810 303 150 A **xx** 02 D  
HFS-810 303 150 A **xx** 02 D M  
HFS-410 303 150 A **xx** 02 D  
HFS-410 303 150 A **xx** 02 D M

**Note:** Version with pre-centering via Inner Conductor Probe.  
Centering range:  $\pm 0.2$  mm

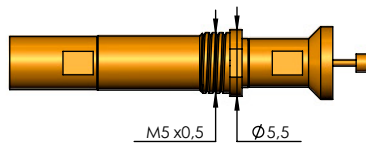
### HFS-810 ... M (\*)



### 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

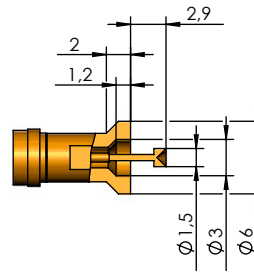
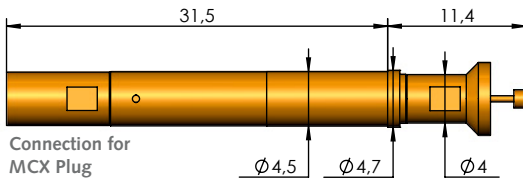
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

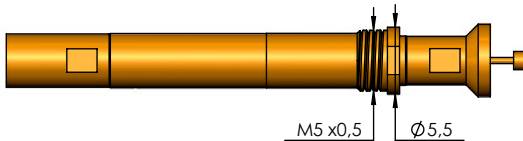
HFS-840 ...



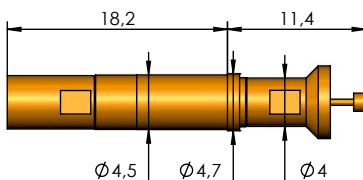
HFS-840 303 150 A **xx** 02 D  
HFS-840 303 150 A **xx** 02 D M  
HFS-440 303 150 A **xx** 02 D  
HFS-440 303 150 A **xx** 02 D M

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

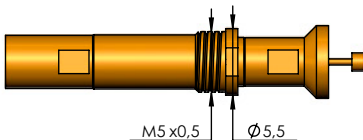
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |           |           |           | HFS-440<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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

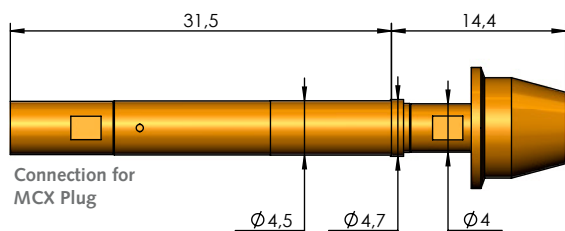
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

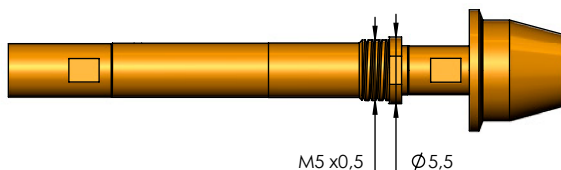
## Available Tip Styles:

## Ordering Description:

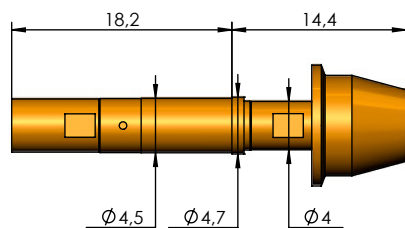
### HFS-810 ...



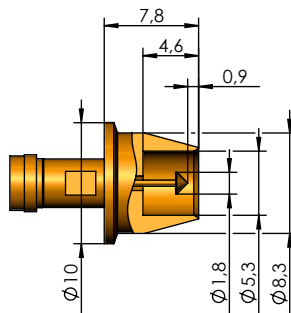
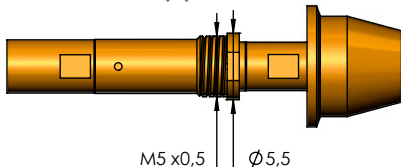
### HFS-810 ... M (\*)



### HFS-410 ...



### HFS-410 ... M (\*)



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

BMA / BNC  
1.0/2.3

## 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<br>HFS-810 M |           |           |           | HFS-410<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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)

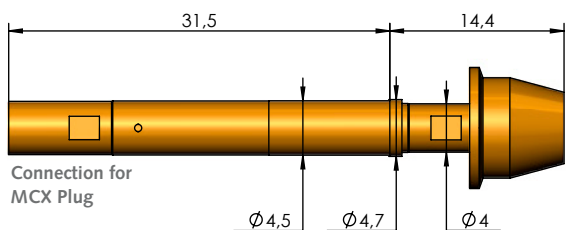
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

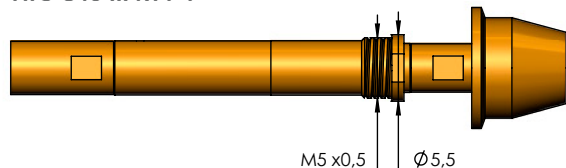
Available  
Tip Styles:

Ordering Description:

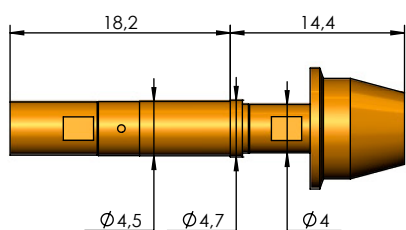
HFS-840 ...



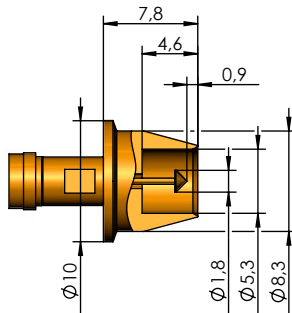
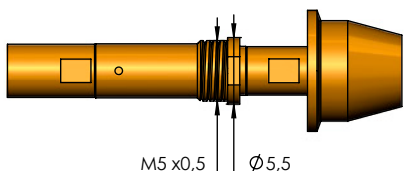
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... M (\*)



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<br>HFS-840 M |           |           |           | HFS-440<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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

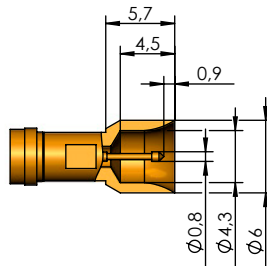
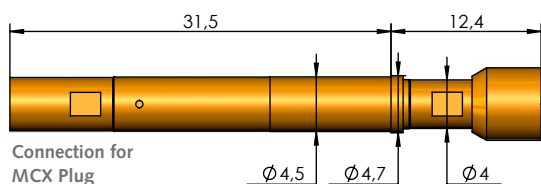
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 2.5 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

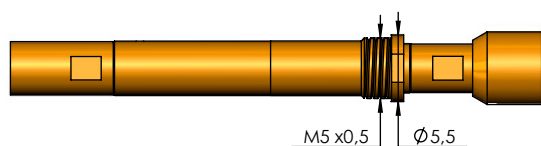
### HFS-810 ...



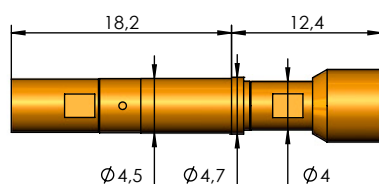
HFS-810 308 080 A **xx** 43 T  
HFS-810 308 080 A **xx** 43 T M  
HFS-410 308 080 A **xx** 43 T  
HFS-410 308 080 A **xx** 43 T M

**Note:**  
Centering range: ± 0.6 mm

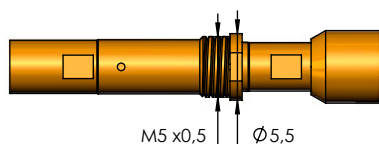
### HFS-810 ... M (\*)



### 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<br>HFS-810 M |           |           |           | HFS-410<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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)

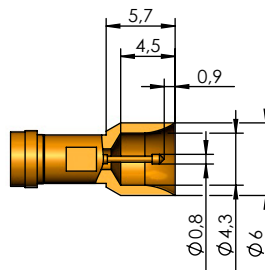
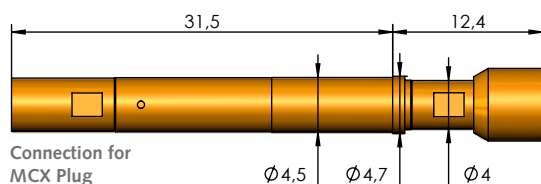
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

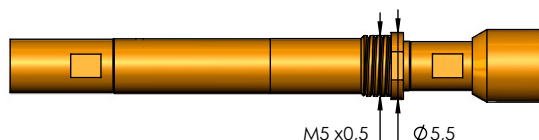
HFS-840 ...



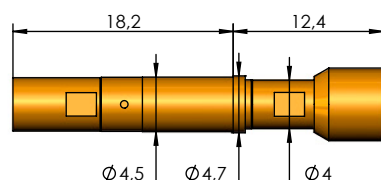
HFS-840 308 080 A **xx** 43 T  
HFS-840 308 080 A **xx** 43 T M  
HFS-440 308 080 A **xx** 43 T  
HFS-440 308 080 A **xx** 43 T M

**Note:**  
Centering range: ± 0.6 mm

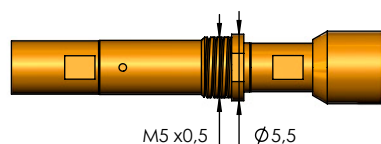
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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

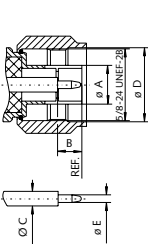
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

# Contacting of N Connectors

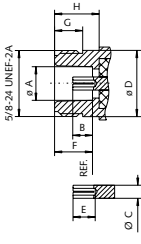
## Series N

### 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

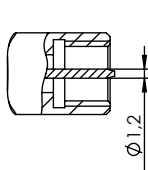


# Contacting of FME Connectors

## Series FME

### Connection Dimensions

#### Signal Conductor Plug



Example:

#### FME Signal Conductor Plug

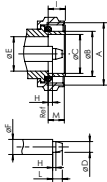


# Contacting of 7/16 Connectors

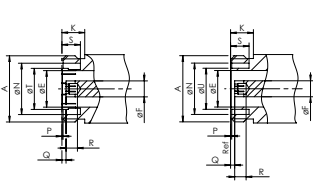
## Series 7/16

### 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



## Contents

## N

### Signal Conductor Jack

2 GHz 81  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

6 GHz 82  
HFS-860, HFS-860 M

## FME

### Signal Conductor Plug

2 GHz 83  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 84  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

## 7/16

### Signal Conductor Jack

7.5 GHz 85  
HFS-864

Receptacles (KS) 192 - 194

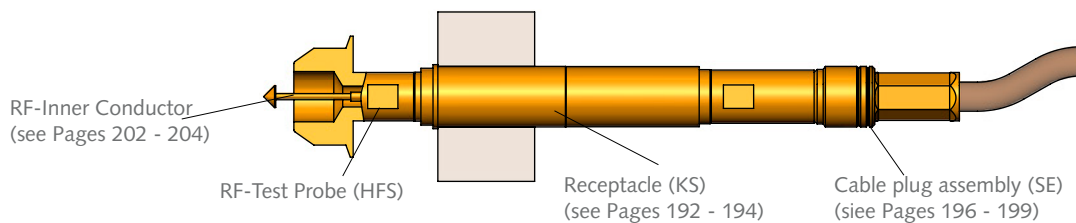
Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/ Signal Conductor 202 - 204

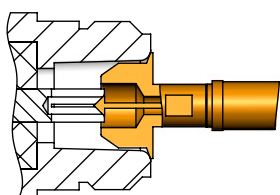
# N / FME / 7/16 Connectors



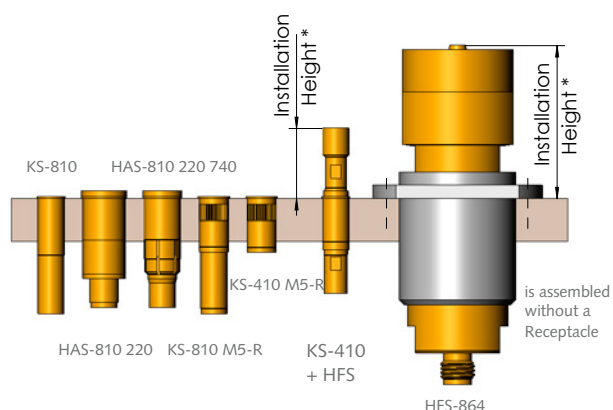
## Contacting Example N:

Contacting of N Signal Conductor Jack

HFS-810 358 180 A 5342 Q



## Customizing Example:



| Installation Height in Receptacle   |                              | KS-810 (F)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) | without KS |
|-------------------------------------|------------------------------|----------------------------------------------------------------|----------------------------------------|------------|
| Variant                             |                              | *Installation Height HFS in KS                                 |                                        |            |
| N<br>Signal<br>Conductor<br>Jack    | ... Q / ... Q M              | 13.9 mm                                                        | 15.0 mm                                | ---        |
|                                     | (HFS-860)<br>... Q / ... Q M | 14.7 mm                                                        | 15.8 mm                                | ---        |
| FME<br>Signal<br>Conductor<br>Plug  | ... W / ... W M              | 13.9 mm                                                        | 15.0 mm                                | ---        |
| 7/16<br>Signal<br>Conductor<br>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<sub>i</sub> typical Inner Conductor: ≤ 10 mΩ

Impedance Test Probe: 50 Ω

Impedance Cable: 50 Ω

### Operating Temperature Range

–40 up to +80° C

### Note:

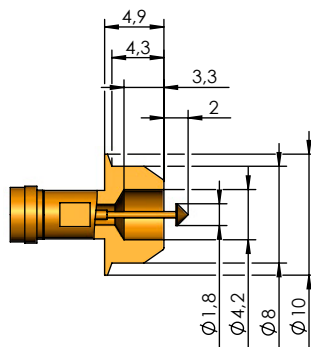
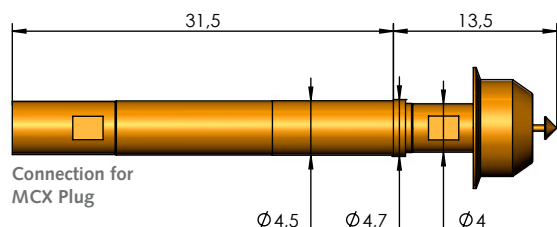
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

## Series:

## Available Tip Styles:

## Ordering Description:

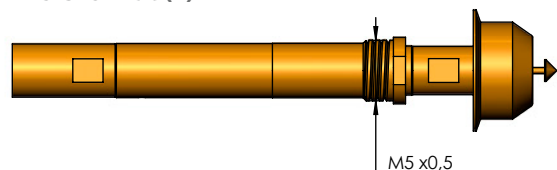
### HFS-810 ...



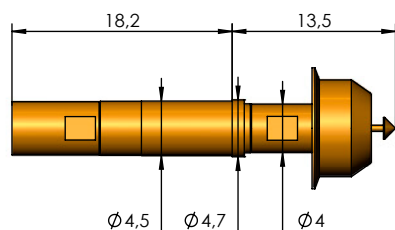
HFS-810 358 180 A **xx** 42 Q  
HFS-810 358 180 A **xx** 42 Q M  
HFS-410 358 180 A **xx** 42 Q  
HFS-410 358 180 A **xx** 42 Q M

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

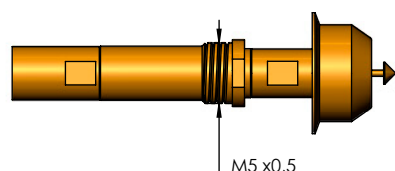
### HFS-810 ... M (\*)



### 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

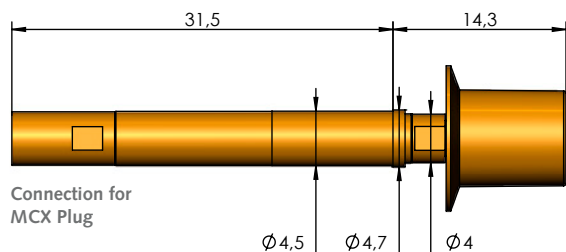
HFS-860 / HFS-860 M

Series:

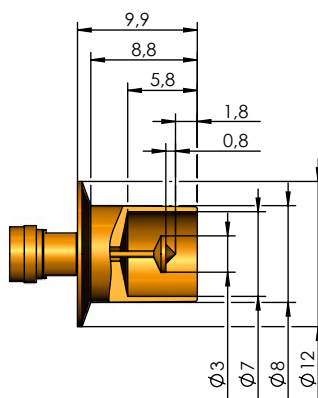
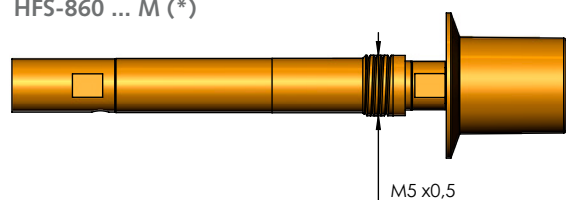
Available  
Tip Styles:

Ordering Description:

HFS-860 ...



HFS-860 ... M (\*)



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.

### Note: (\*)

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

|                                     | HFS-860<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> |

## Mechanical Data

### HFS-860 and HFS-860 M

Outer Cond. Inner Cond.

Working Stroke: 2.7 mm 2.0 mm

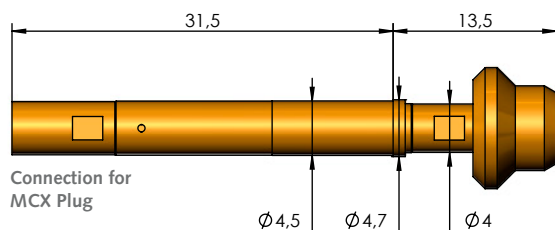
Maximum Stroke: 3.4 mm 3.7 mm

Series:

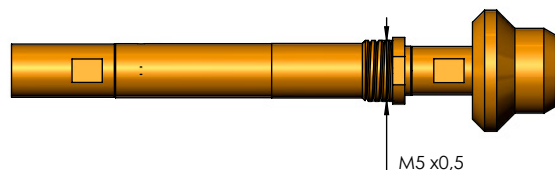
Available  
Tip Styles:

Ordering Description:

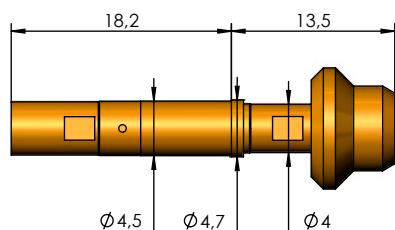
## HFS-810 ...



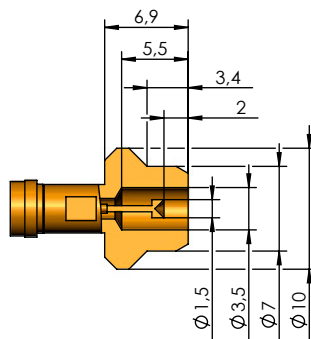
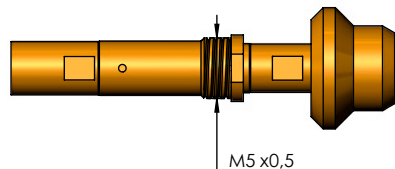
## HFS-810 ... M (\*)



## HFS-410 ...



## HFS-410 ... M (\*)



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

## 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

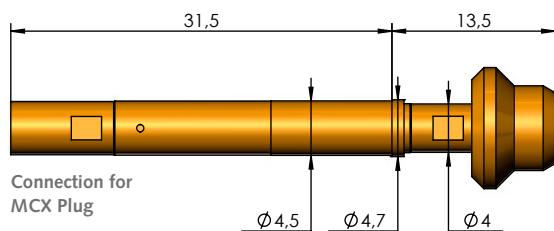
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

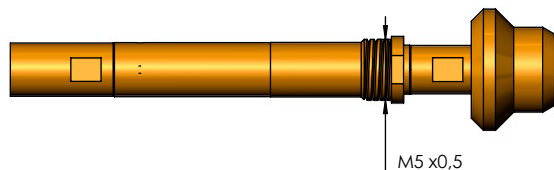
Available  
Tip Styles:

Ordering Description:

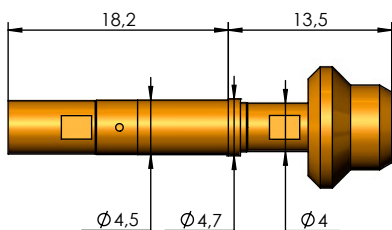
HFS-840 ...



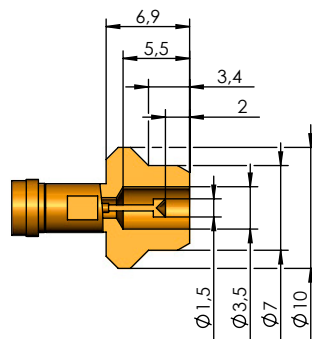
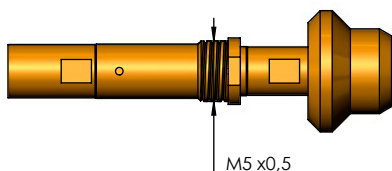
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... M (\*)



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<br>HFS-840 M |     |     |     | HFS-440<br>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

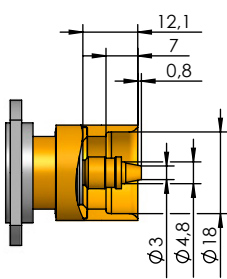
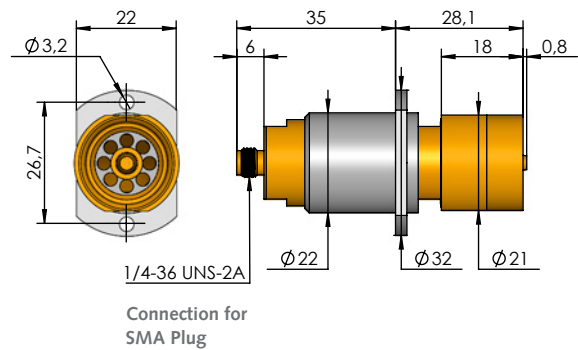
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-864 ...



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

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

**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.

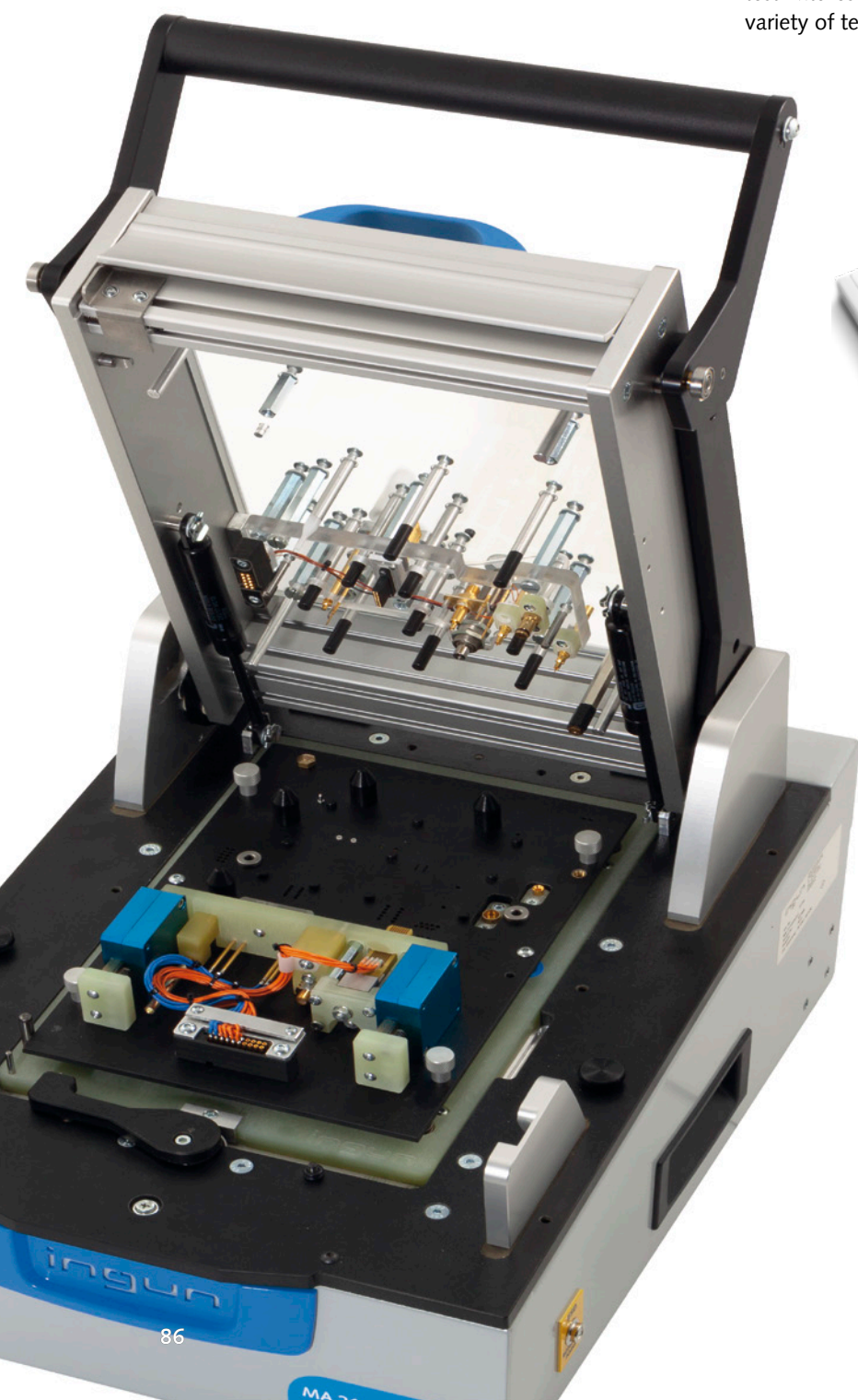
|                                     |         |
|-------------------------------------|---------|
|                                     | HFS-864 |
| Spring Force of Inner Conductor (N) | 5.0     |
| Spring Force of Outer Conductor (N) | 23.6    |
| Character for ordering              | 286     |

|                 | Mechanical Data |             |
|-----------------|-----------------|-------------|
|                 | HFS-864         |             |
|                 | Outer Cond.     | Inner Cond. |
| Working Stroke: | 4.0 mm          | 2.0 mm      |
| Maximum Stroke: | 5.0 mm          | 4.0 mm      |

# The Test Fixtures Catalog

---

INGUN test fixtures are used by our customers in various industries and enable precise, accurately 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.

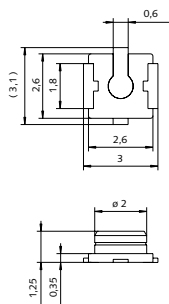


*Ask for our new Test Fixtures Catalog or  
take a look on our Internet homepage  
[www.ingun.com](http://www.ingun.com)*

# Contacting of U.FL Connectors

## Series U.FL

### Connection Dimensions



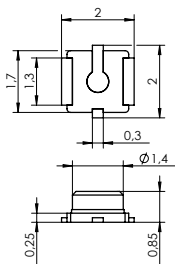
Example:  
U.FL Signal Conductor Plug



# Contacting of W.FL Connectors

## Series W.FL

### Connection Dimensions



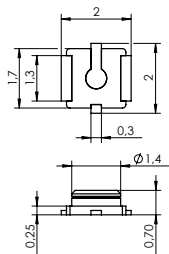
Example:  
W.FL Signal Conductor Plug



# Contacting of W.FL2 Connectors

## Series W.FL 2

### Connection Dimensions



Example:  
W.FL 2 Signal Conductor Plug



## Contents

## U.FL

### Signal Conductor Plug

|                    |         |
|--------------------|---------|
| 2 GHz              | 90      |
| HFS-810, HFS-810 M |         |
| HFS-410, HFS-410 M |         |
| 4 GHz              | 91      |
| HFS-840, HFS-840 M |         |
| HFS-440, HFS-440 M |         |
| 6 GHz              | 92 - 95 |
| HFS-860, HFS-860 M |         |
| HFS-822            |         |
| HFS-852            |         |
| HFS-856            |         |

## W.FL

### Signal Conductor Plug

|                    |         |
|--------------------|---------|
| 6 GHz              | 96 - 97 |
| HFS-860, HFS-860 M |         |
| HFS-856            |         |

## W.FL2

### Signal Conductor Plug

|                    |         |
|--------------------|---------|
| 6 GHz              | 96 - 97 |
| HFS-860, HFS-860 M |         |
| HFS-856            |         |

## X.FL s. page 96 - 97

## MM5829

s. page 98

|                  |           |
|------------------|-----------|
| Receptacles (KS) | 192 - 194 |
|------------------|-----------|

|                            |     |
|----------------------------|-----|
| Spacer of Receptacles (DS) | 195 |
|----------------------------|-----|

|                          |           |
|--------------------------|-----------|
| Cable plug assembly (SE) | 196 - 199 |
|--------------------------|-----------|

|       |           |
|-------|-----------|
| Tools | 200 - 201 |
|-------|-----------|

|                                  |           |
|----------------------------------|-----------|
| Inner Conductor/Signal Conductor | 202 - 204 |
|----------------------------------|-----------|

## X.FL

### Signal Conductor Plug

6 GHz 96 - 97  
HFS-860, HFS-860 M  
HFS-856

## MM5829

### Signal Conductor Plug

6 GHz 98  
HFS-822

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

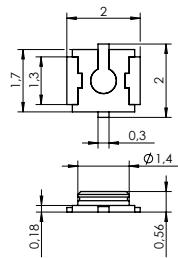
Tools 200 - 201

Inner Conductor/ Signal Conductor 202 - 204

# Contacting of X.FL Connectors

## Series X.FL

### Connection Dimensions



Example:

X.FL Signal Conductor Plug

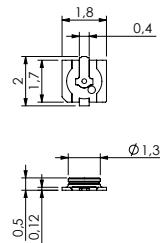


# Contacting of MM5829 Connectors

## Series MM5829

### Connection Dimensions

#### Signal Conductor Plug

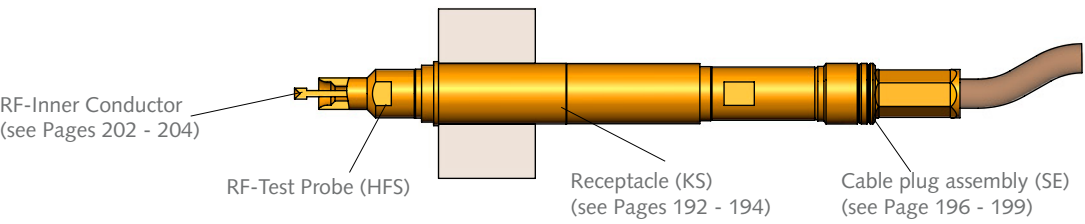


Example:

MM5829 Signal Conductor Plug

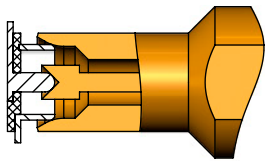


# U.FL / W.FL / W.FL2 / X.FL / MM5829 Connectors

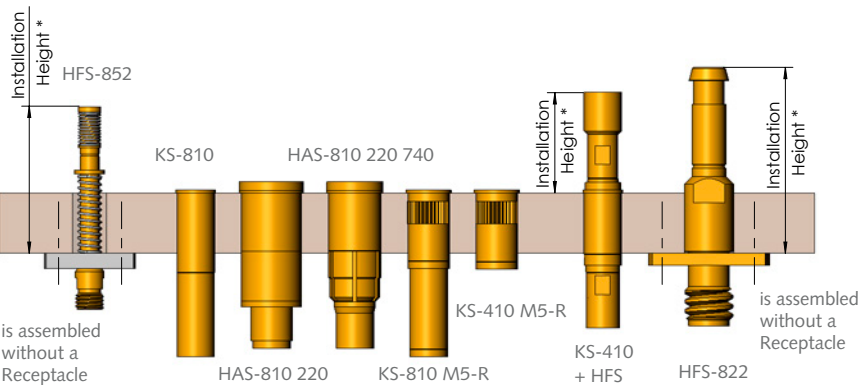


## Contacting Example U.FL:

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 <sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) | without KS |
|----------------------------------------|-----------------|----------------------------------------------------------------|----------------------------------------|------------|
| Variant                                |                 | *Installation Height HFS in KS                                 |                                        |            |
| U.FL<br>Signal<br>Conductor<br>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<br>Signal<br>Conductor<br>Plug    | ... Y52         | 9.8 mm                                                         | 10.9 mm                                | ---        |
|                                        | ... XFL-H       | ---                                                            | ---                                    | 22.4 mm    |
| W.FL 2<br>Signal<br>Conductor<br>Plug  | ... Y52         | 9.8 mm                                                         | 10.9 mm                                | ---        |
|                                        | ... XFL-H       | ---                                                            | ---                                    | 22.4 mm    |
| X.FL<br>Signal<br>Conductor<br>Plug    | ... Y52         | 9.8 mm                                                         | 10.9 mm                                | ---        |
|                                        | ... XFL-H       | ---                                                            | ---                                    | 22.4 mm    |
| MM5829-<br>Signal<br>Conductor<br>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)

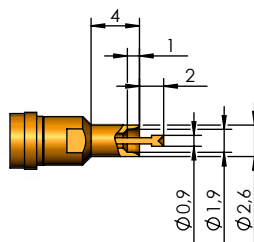
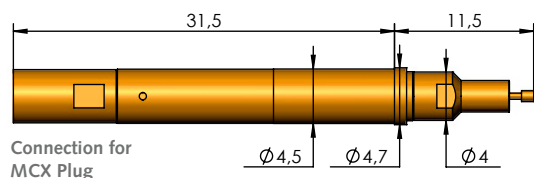
HFS-810 / HFS-810 M  
HFS-410 / HFS-410 M

Series:

Available  
Tip Styles:

Ordering Description:

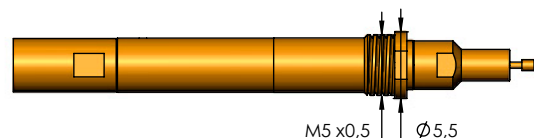
HFS-810 ...



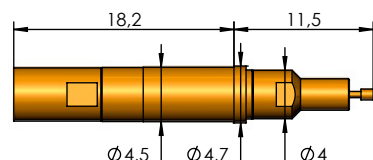
HFS-810 303 090 A **xx** 43 Y6  
HFS-810 303 090 A **xx** 43 Y6 M  
HFS-410 303 090 A **xx** 43 Y6  
HFS-410 303 090 A **xx** 43 Y6 M

**Note:**  
Centering range: ± 0.2 mm

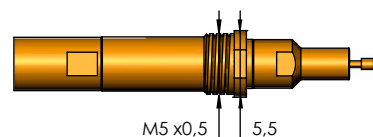
HFS-810 ... M (\*)



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<br>HFS-810 M |           |           |           | HFS-410<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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

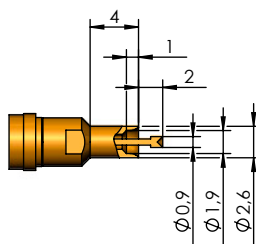
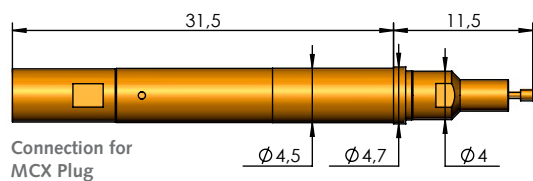
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

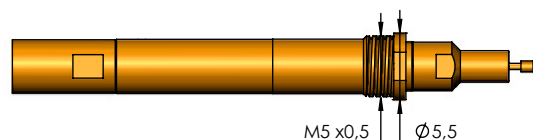
### HFS-840 ...



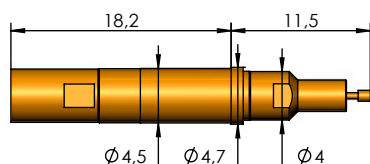
HFS-840 303 090 A **xx** 43 Y6  
HFS-840 303 090 A **xx** 43 Y6 M  
HFS-440 303 090 A **xx** 43 Y6  
HFS-440 303 090 A **xx** 43 Y6 M

**Note:**  
Centering range: ± 0.2 mm

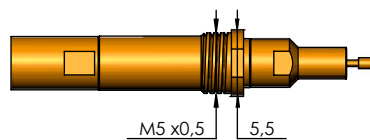
### HFS-840 ... M (\*)



### HFS-440 ...



### HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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)

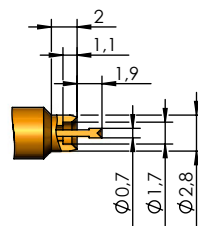
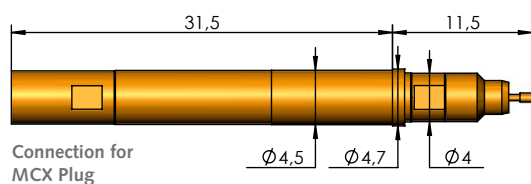
HFS-860 / HFS-860 M

Series:

Available  
Tip Styles:

Ordering Description:

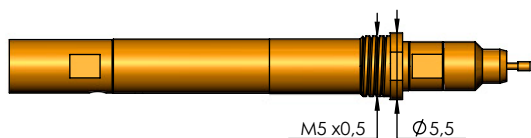
HFS-860 ...



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

**Note:**  
Centering range: ± 0.2 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<br>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  |

## 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      |

## Note: (\*)

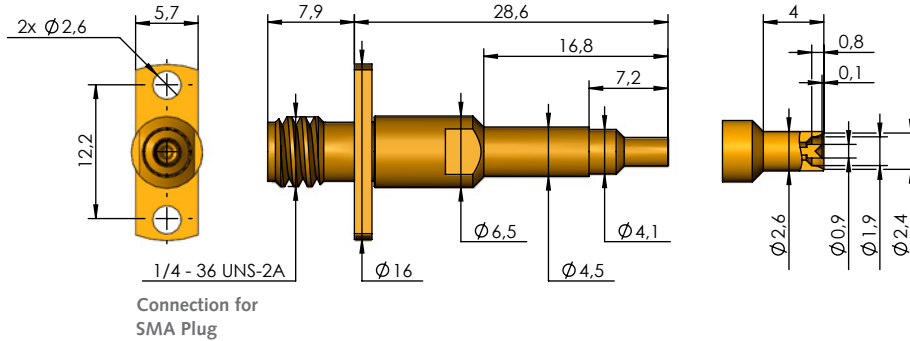
For usage in the case of vibration, shaking, snapping or assembly upside down.

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:  $\pm 0.2$  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              | <b>50</b> |

**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

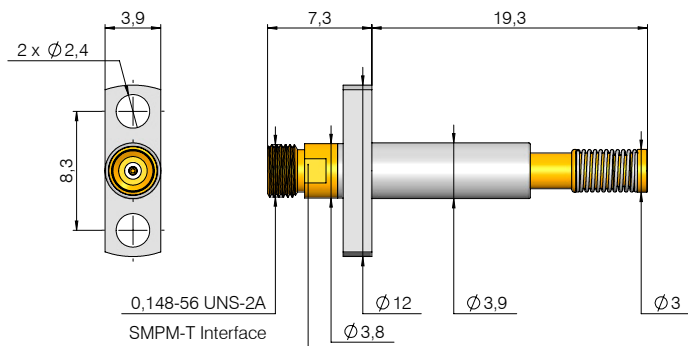
Series:



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  $\pm 2,0^\circ$ . Centering range:  $\pm 0.3$  mm

## 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-852   |
|-------------------------------------|-----------|
| Spring Force of Inner Conductor (N) | 1.0       |
| Spring Force of Outer Conductor (N) | 3.0       |
| Character for ordering              | <b>40</b> |

## Mechanical Data

### HFS-852

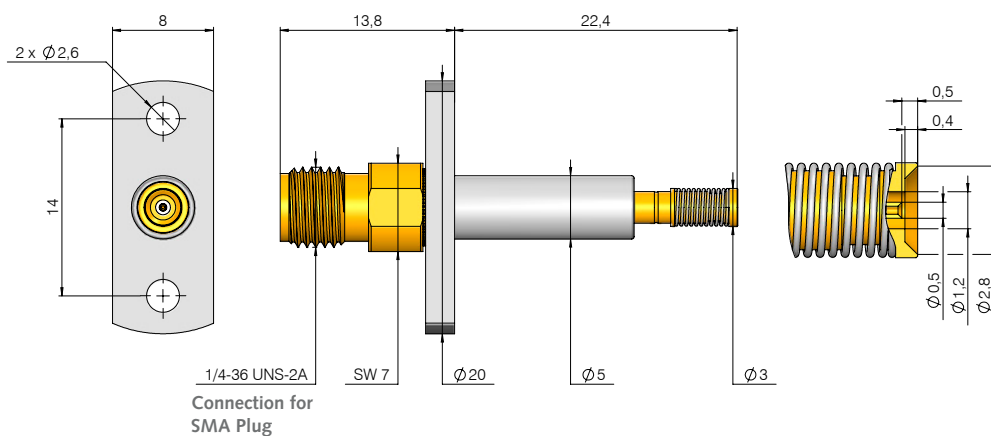
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.2 mm      | 1.0 mm      |
| Maximum Stroke  | 5.2 mm      | 1.5 mm      |

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  $\pm 3,0^\circ$ . Centering range:  $\pm 0.3$  mm

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

**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) | 1.0     |
| Spring Force of Outer Conductor (N) | 4.2     |
| Character for ordering              | 55      |

**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)

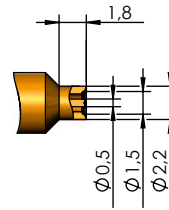
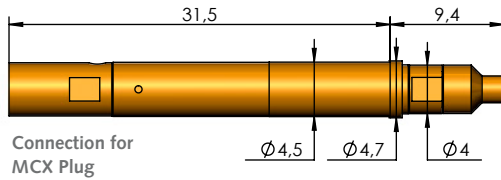
HFS-860 / HFS-860 M

Series:

Available  
Tip Styles:

Ordering Description:

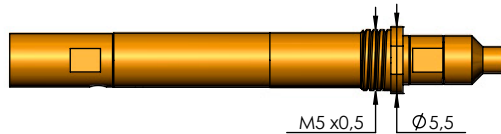
HFS-860 ...



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

**Note:**  
Centering range: ± 0.3 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.

### Note: (\*)

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

|                                     | HFS-860<br>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  |

## Mechanical Data

### HFS-860 and HFS-860 M

Outer Cond. Inner Cond.

Working Stroke: 4.0 mm 0.2 mm

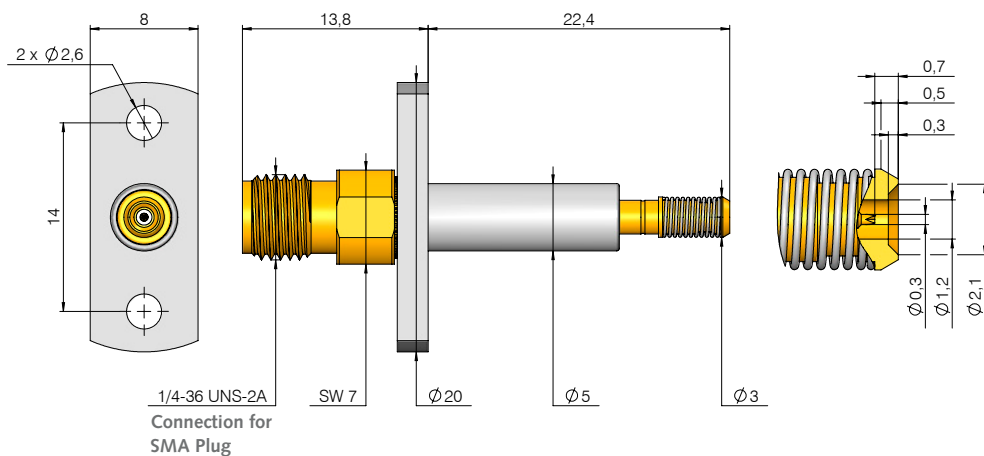
Maximum Stroke: 5.0 mm 1.8 mm

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  $\pm 3,0^\circ$ . Centering range:  $\pm 0.3$  mm

**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      | 0,9 mm      |
| Maximum Stroke: | 5.2 mm      | 1,5 mm      |



# MM5829 Signal Conductor Plug

up to 6 GHz  
(50 Ω)

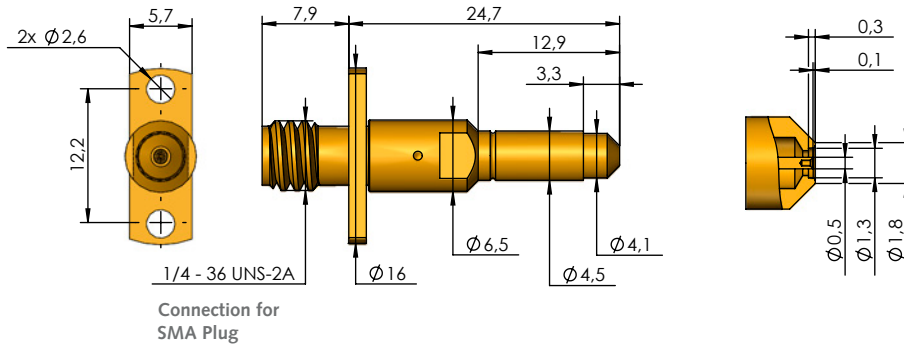
HFS-822

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:  $\pm 0.1$  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.

### 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              | <b>50</b> |

## Mechanical Data

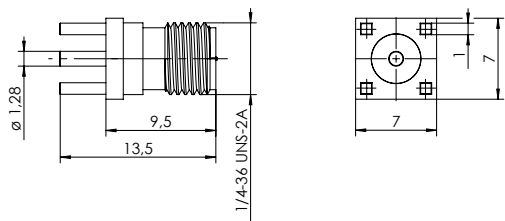
### HFS-822

|                 | 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



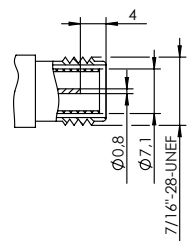
Example:  
R-SMA Signal Conductor Plug



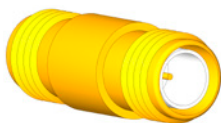
# Contacting of R-TNC Reverse Polarity Connectors

## Series R-TNC

Connection Dimensions  
Signal Conductor Plug



Example:  
R-TNC Signal Conductor Plug



## Contents

## R-SMA

### Signal Conductor Plug

6 GHz 101  
HFS-860, HFS-860 M

## R-TNC

### Signal Conductor Plug

2 GHz 102  
HFS-810, HFS-810 M  
HFS-410, HFS-410 M

4 GHz 103  
HFS-840, HFS-840 M  
HFS-440, HFS-440 M

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

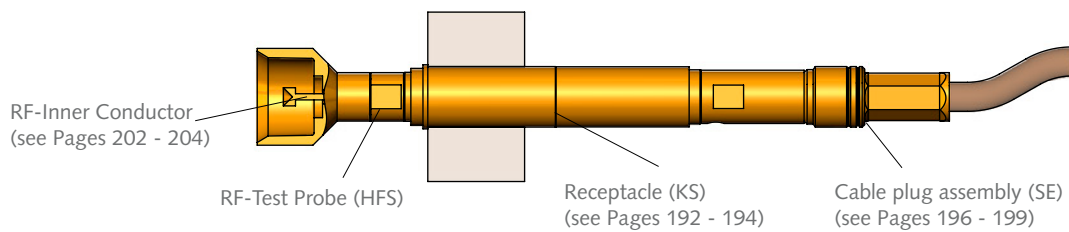
Cable plug assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/ Signal Conductor 202 - 204

# R-SMA / R-TNC

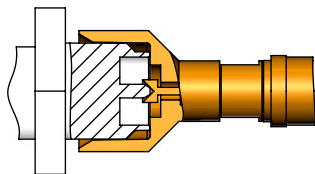
## Reverse Polarity Connectors



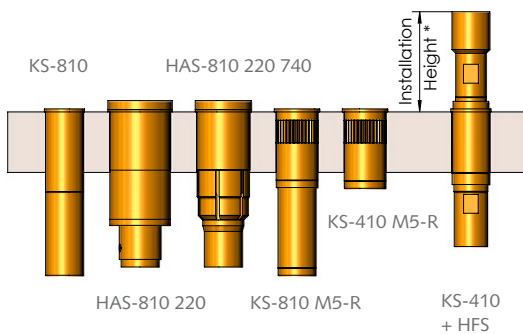
### Contacting Example R-SMA:

#### Contacting of R-SMA Signal Conductor Plug

HFS-860 303 150 A 5343 ER



### Customizing Example:



| Installation Height in Receptacle    |                   | KS-810 (F)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) |
|--------------------------------------|-------------------|----------------------------------------------------------------|----------------------------------------|
| Variant                              |                   | *Installation Height HFS in KS                                 |                                        |
| R-SMA<br>Signal<br>Conductor<br>Plug | ... ER / ... ER M | 14.1 mm                                                        | 15.2 mm                                |
| R-TNC<br>Signal<br>Conductor<br>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<sub>i</sub> typical Inner Conductor ≤ 10 mΩ

Impedance Test Probe: 50 Ω

Impedance Cable 50 Ω

#### Operating Temperature Range

–40 up to +80° C

#### Note:

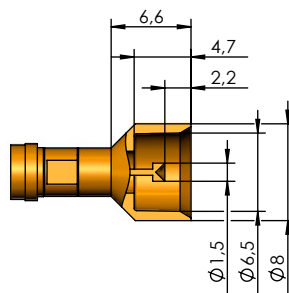
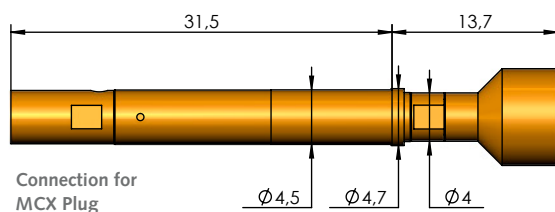
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

## Series:

Available  
Tip Styles:

## Ordering Description:

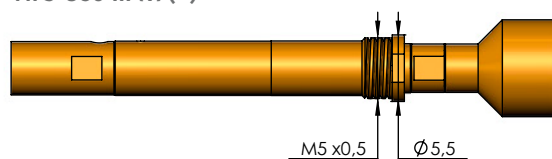
## HFS-860 ...



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

## 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<br>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  |

## 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

## Note: (\*)

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

# ⊙ R-TNC Signal Conductor Plug

up to 2 GHz  
(50 Ω)

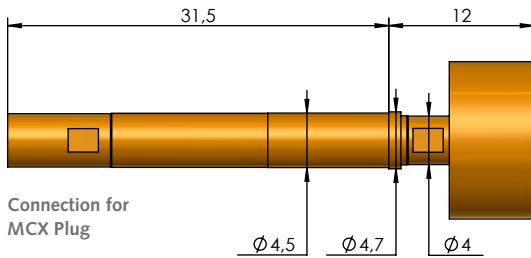
HFS-810 / HFS-810 M  
HFS-410 / HFS-410 M

Series:

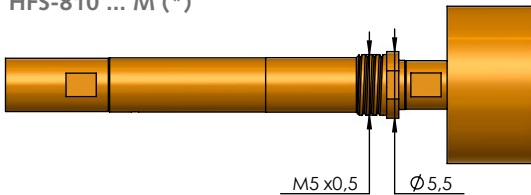
Available  
Tip Styles:

Ordering Description:

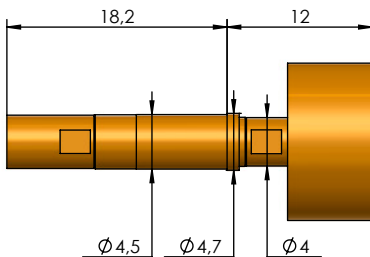
HFS-810 ...



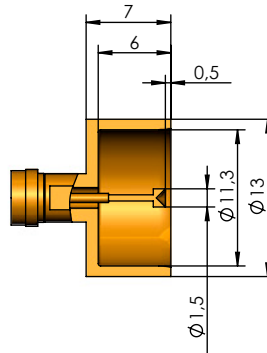
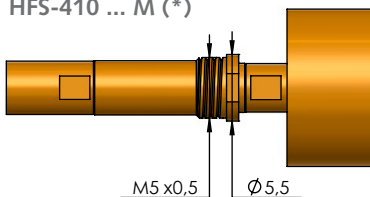
HFS-810 ... M (\*)



HFS-410 ...



HFS-410 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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

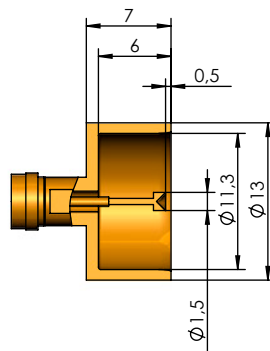
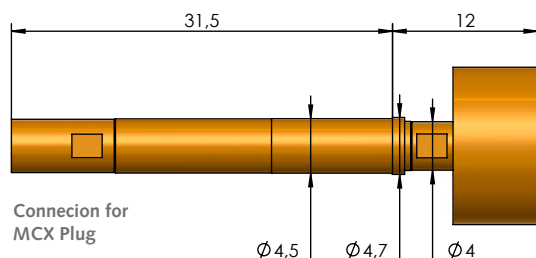
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 1.7 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

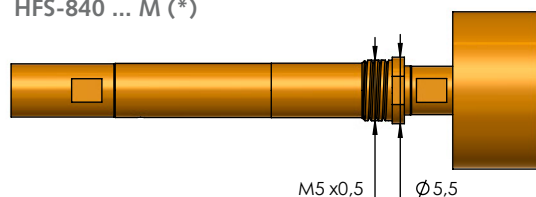
### HFS-840 ...



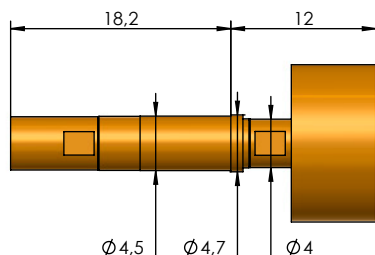
HFS-840 303 150 A **xx** 43 QN  
HFS-840 303 150 A **xx** 43 QN M  
HFS-440 303 150 A **xx** 43 QN  
HFS-440 303 150 A **xx** 43 QN M

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

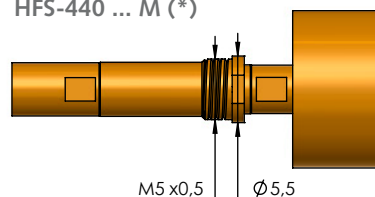
### HFS-840 ... M (\*)



### HFS-440 ...



### HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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      |

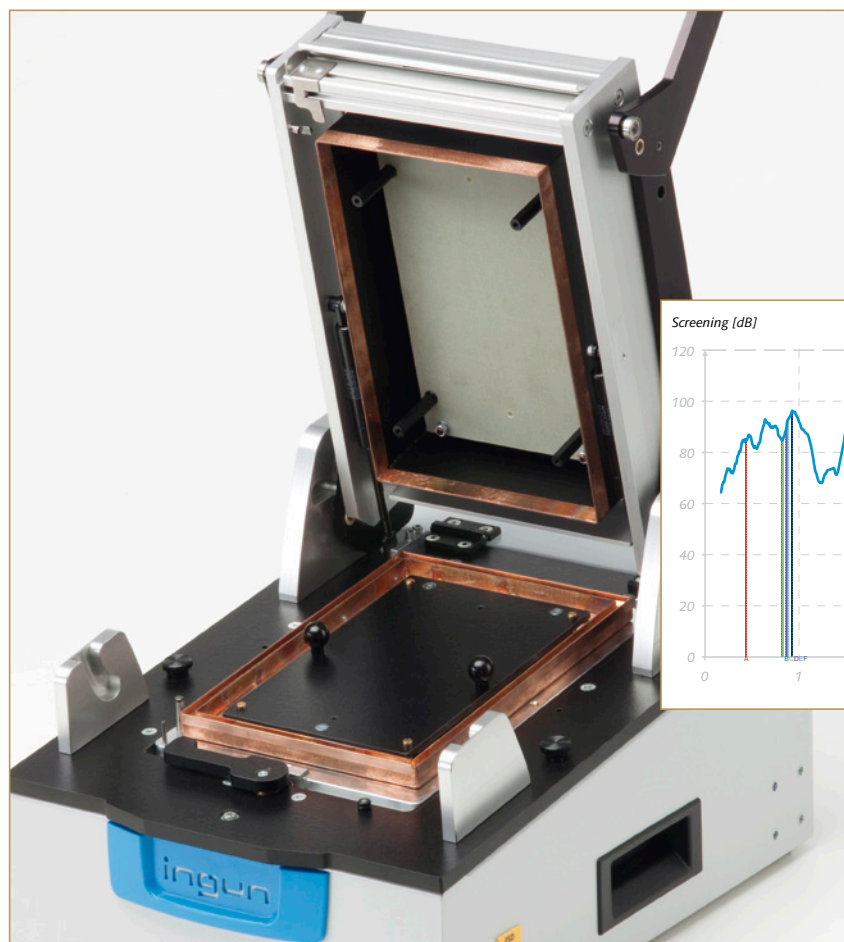
## Mechanical Data

### HFS-440 and HFS-440 M

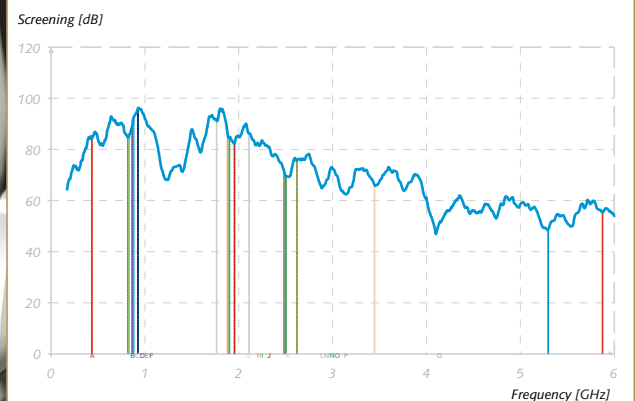
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 1.7 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

# 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!

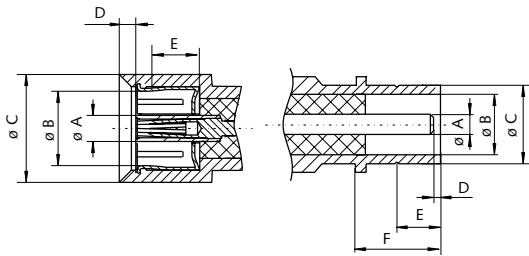
# Contacting of IEC Connectors

## 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

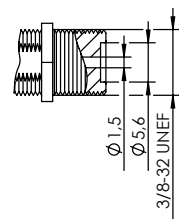


# Contacting of F Connectors

## Series F

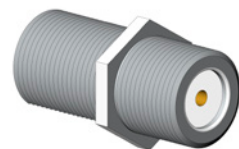
Connection Dimension

Signal Conductor Jack



Example:

F Signal Conductor Jack



## Contents

# IEC

Signal Conductor Plug

1,5 GHz  
HFS-409 107

Signal Conductor Jack

1,5 GHz  
HFS-409 107

# F

Signal Conductor Jack

1,5 GHz  
HFS-409 108

Receptacles  
(KS) 192 - 194

Spacer of  
Receptacles (DS) 195

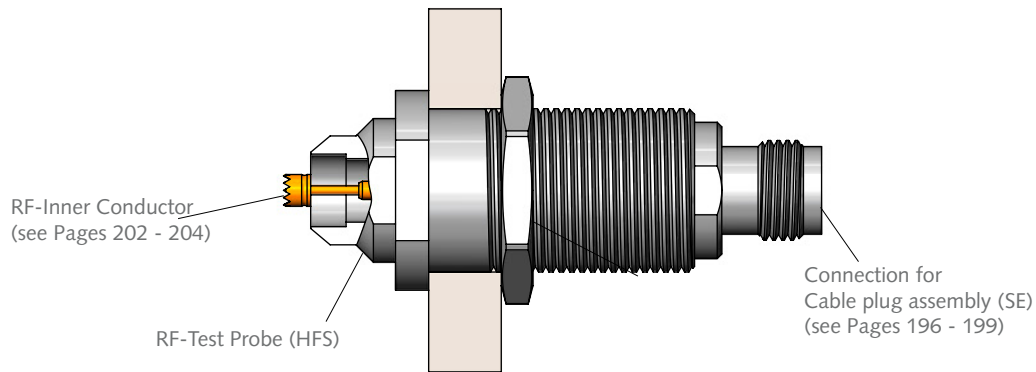
Cable plug  
assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/  
Signal Conductor 202 - 204

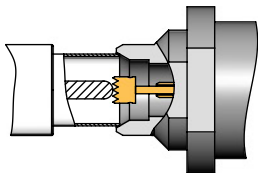


# IEC, F Connectors

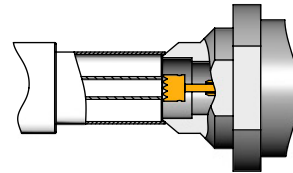


## Contacting Example IEC:

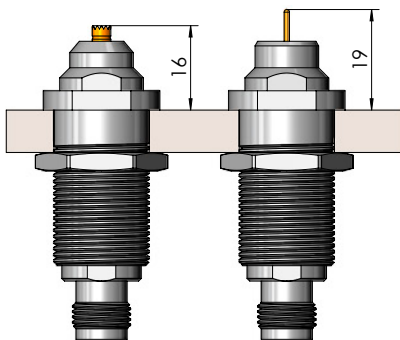
**Contacting of IEC Signal Conductor Plug**  
HFS-409 306 350 A 8343 M



**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 <sub>i</sub> typical Inner Conductor: | ≤ 10 mΩ       |
| Impedance Test Probe:                   | 75 Ω          |
| Impedance Cable:                        | 75 Ω          |

### Operating Temperature Range

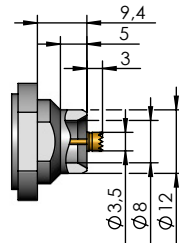
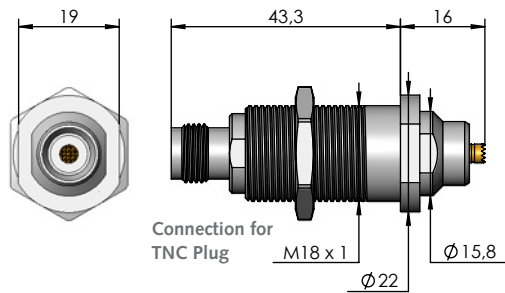
–40 up to +80° C

## Series: Plug

Available  
Tip Styles:

## Ordering Description:

HFS-409 ...

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

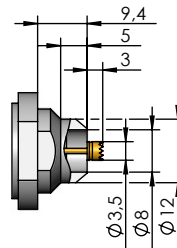
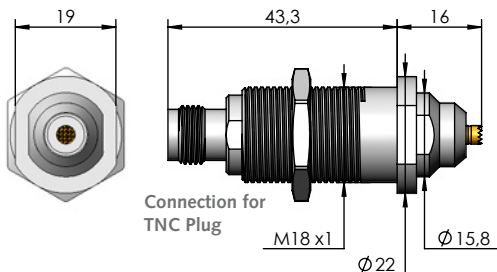
**Note:** Version with outer centering on Connector.  
Centering range:  $\pm 0.2$  mm

## Series: Jack

Available  
Tip Styles:

## Ordering Description:

HFS-409 ...

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

**Note:** Version with centering on the inner side of the Connector Outer Contact.  
Centering range:  $\pm 0.2$  mm

**Note:**

The RF Probes of the series HFS-409 are secured in a bore ( $\varnothing 18.5$  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      |

|                                     | HFS-409   |
|-------------------------------------|-----------|
| Spring Force of Inner Conductor (N) | 2.3       |
| Spring Force of Outer Conductor (N) | 6.0       |
| Character for ordering              | <b>83</b> |

# ◎ F-Signal Conductor Jack

up to 1.5 GHz  
(75 Ω)

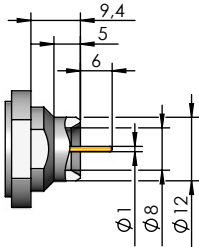
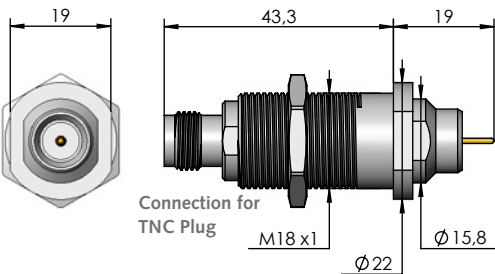
HFS-409

Series:

Available  
Tip Styles:

Ordering Description:

HFS-409 ...



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

**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.

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

## Mechanical Data

### HFS-409

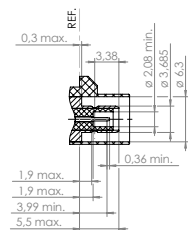
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 2.3 mm      |
| Maximum Stroke: | 5.0 mm      | 8.0 mm      |

# Contacting of FAKRA Connectors

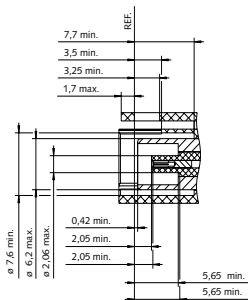
## Series FAKRA

### Connection Dimensions

#### Signal Conductor Plug

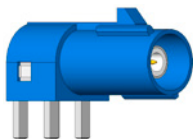


#### Signal Conductor Jack

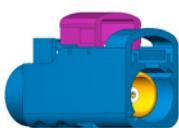


### Examples:

#### FAKRA Signal Conductor Plug



#### FAKRA Signal Conductor Jack

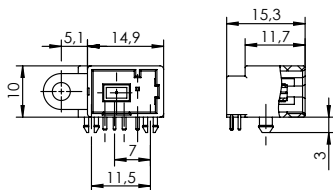


# Contacting of GT13 Connectors

## Series GT13

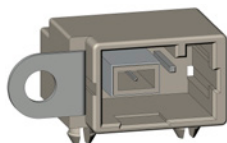
### Connection Dimensions

#### Signal Conductor Plug



### Example:

#### GT13 Signal Conductor Plug

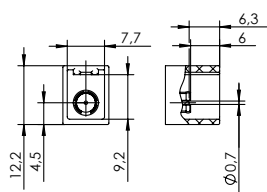


# Contacting of GT16 Connectors

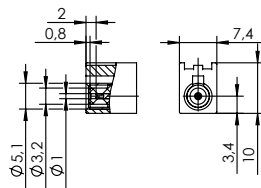
## Series GT16

### Connection Dimensions

#### Signal Conductor Plug



#### Signal Conductor Jack



### Example:

#### GT16 Signal Conductor Plug



#### GT16 Signal Conductor Jack



## Contents

# FAKRA

## Signal Conductor Plug

|                    |     |
|--------------------|-----|
| 2 GHz              | 111 |
| HFS-810, HFS-810 M |     |
| HFS-410, HFS-410 M |     |

|                    |     |
|--------------------|-----|
| 4 GHz              | 112 |
| HFS-840, HFS-840 M |     |
| HFS-440, HFS-440 M |     |

## Signal Conductor Jack

|                    |     |
|--------------------|-----|
| 2 GHz              | 113 |
| HFS-810, HFS-810 M |     |
| HFS-410, HFS-410 M |     |

|                    |     |
|--------------------|-----|
| 4 GHz              | 114 |
| HFS-840, HFS-840 M |     |
| HFS-440, HFS-440 M |     |

# GT13

## Signal Conductor Plug

|                     |     |
|---------------------|-----|
| 2 GHz               | 115 |
| HFS-810, HFS-810 4M |     |
| HFS-410, HFS-410 4M |     |

|                     |     |
|---------------------|-----|
| 4 GHz               | 116 |
| HFS-840, HFS-840 4M |     |
| HFS-440, HFS-440 4M |     |

# GT16

## Signal Conductor Plug

|                    |     |
|--------------------|-----|
| 2 GHz              | 117 |
| HFS-810, HFS-810 M |     |
| HFS-410, HFS-410 M |     |

|                    |     |
|--------------------|-----|
| 4 GHz              | 118 |
| HFS-840, HFS-840 M |     |
| HFS-440, HFS-440 M |     |

## Signal Conductor Jack

|                    |     |
|--------------------|-----|
| 2 GHz              | 119 |
| HFS-810, HFS-810 M |     |
| HFS-410, HFS-410 M |     |

|                    |     |
|--------------------|-----|
| 4 GHz              | 120 |
| HFS-840, HFS-840 M |     |
| HFS-440, HFS-440 M |     |

|                  |           |
|------------------|-----------|
| Receptacles (KS) | 192 - 194 |
|------------------|-----------|

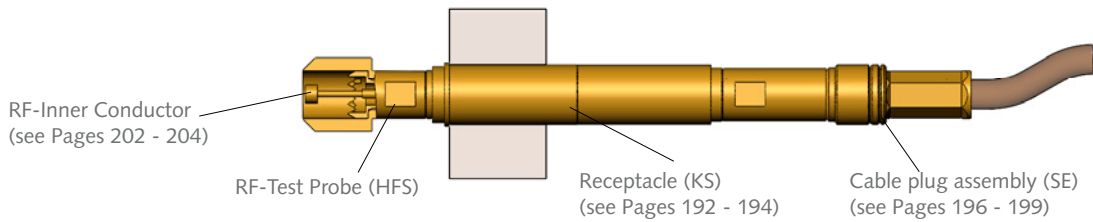
|                            |     |
|----------------------------|-----|
| Spacer of Receptacles (DS) | 195 |
|----------------------------|-----|

|                          |           |
|--------------------------|-----------|
| Cable plug assembly (SE) | 196 - 199 |
|--------------------------|-----------|

|       |           |
|-------|-----------|
| Tools | 200 - 201 |
|-------|-----------|

|                                  |           |
|----------------------------------|-----------|
| Inner Conductor/Signal Conductor | 202 - 204 |
|----------------------------------|-----------|

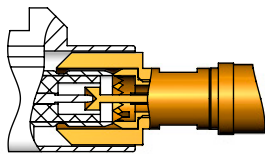
# FAKRA, GT13, GT16 Connectors



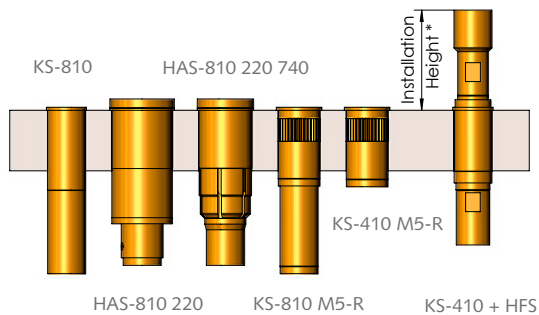
## Contacting Example FAKRA:

### 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<sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>HAS-810 220 740 (F) |
|--------------------------------------|---------------------------|----------------------------------------------------------------|----------------------------------------|
| Variant                              |                           | *Installation Height HFS in KS                                 |                                        |
| FAKRA<br>Signal<br>Conductor<br>Plug | ...F / ... F M            | 12.1 mm                                                        | 13.2 mm                                |
|                                      | ... FS1 / ... FS1 M       |                                                                |                                        |
|                                      | ... RF3 / ... RF3 M       |                                                                |                                        |
| FAKRA<br>Signal<br>Conductor<br>Jack | ... ZE3 / ... ZE3 M       | 12.3 mm                                                        | 13.4 mm                                |
| GT13<br>Signal<br>Conductor<br>Plug  | ... GT13 / ... GT13 4M    | 13.9 mm                                                        | 15.0 mm                                |
| GT16<br>Signal<br>Conductor<br>Plug  | ... GT16 / ... GT16 M     | 12.4 mm                                                        | 13.5 mm                                |
| GT16<br>Signal<br>Conductor<br>Jack  | ... GT16 F / ... GT16 F M | 11.9 mm                                                        | 13.0 mm                                |

### Note:

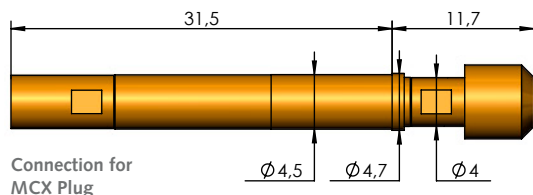
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

Series:

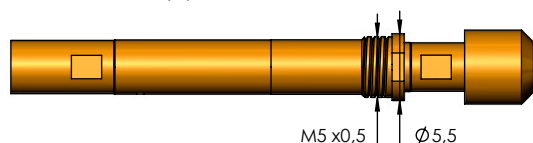
Available  
Tip Styles:

Ordering Description:

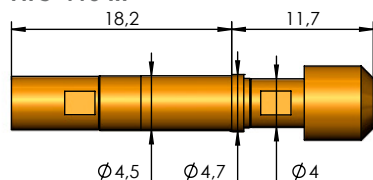
HFS-810 ...



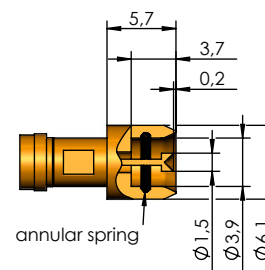
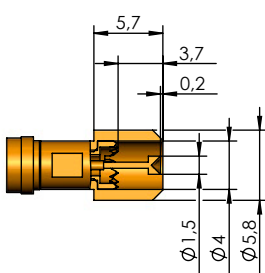
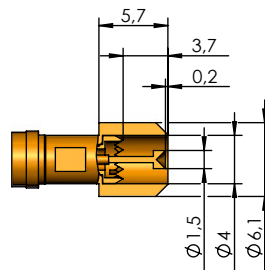
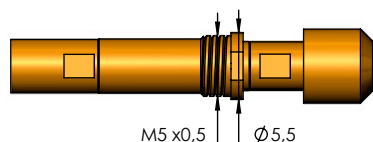
HFS-810 ... M (\*)



HFS-410 ...



HFS-410 ... M (\*)



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:  $\pm 0.8$  mm

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:  $\pm 0.8$  mm

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  $\geq 6,0$  N.  
Centering range:  $\pm 0.5$  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<br>HFS-810 M |           |           |           | HFS-410<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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)

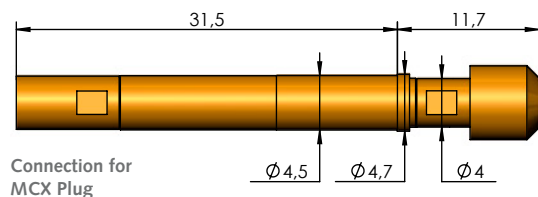
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

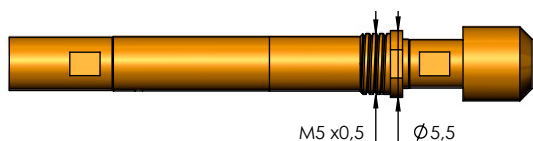
Available  
Tip Styles:

Ordering Description:

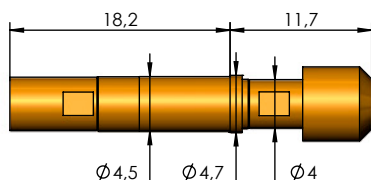
HFS-840 ...



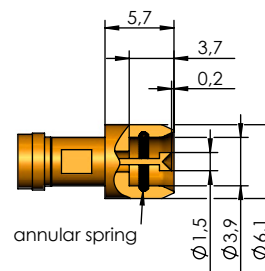
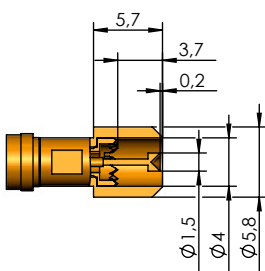
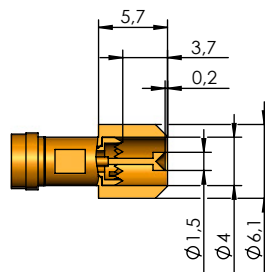
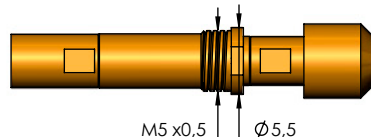
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... M (\*)



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:  $\pm 0.8$  mm

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  $\varnothing 6.1$  mm to  $\varnothing 5.8$  mm.  
Centering range:  $\pm 0.8$  mm

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

**Note:** 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  $\geq 6.0$  N.  
Centering range:  $\pm 0.5$  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<br>HFS-840 M |     |     |     | HFS-440<br>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      |

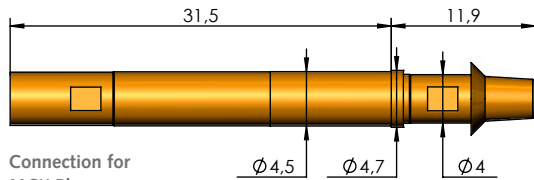
## Mechanical Data

### HFS-440 and HFS-440 M

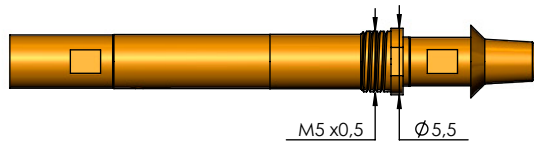
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

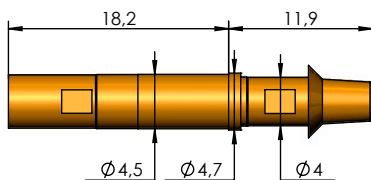
### HFS-810 ...



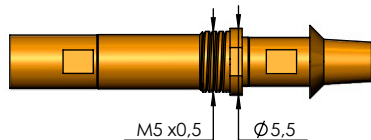
### HFS-810 ... M (\*)



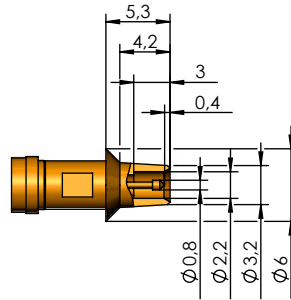
### HFS-410 ...



### 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<br>HFS-810 M |           |           |           | HFS-410<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>            |

## 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)

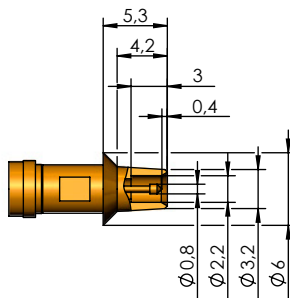
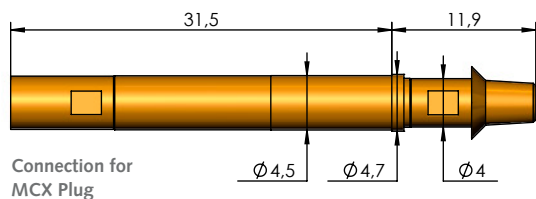
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

Available  
Tip Styles:

Ordering Description:

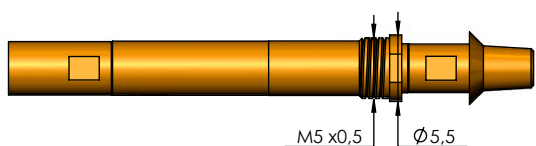
HFS-840 ...



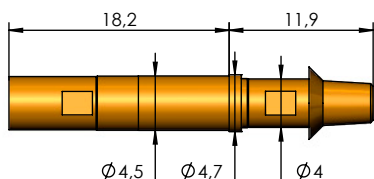
HFS-840 308 080 A **xx** 42 ZE3  
HFS-840 308 080 A **xx** 42 ZE3 M  
HFS-440 308 080 A **xx** 42 ZE3  
HFS-440 308 080 A **xx** 42 ZE3 M

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

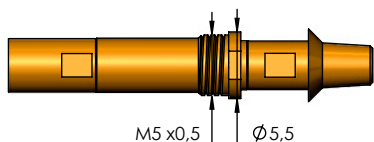
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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      |

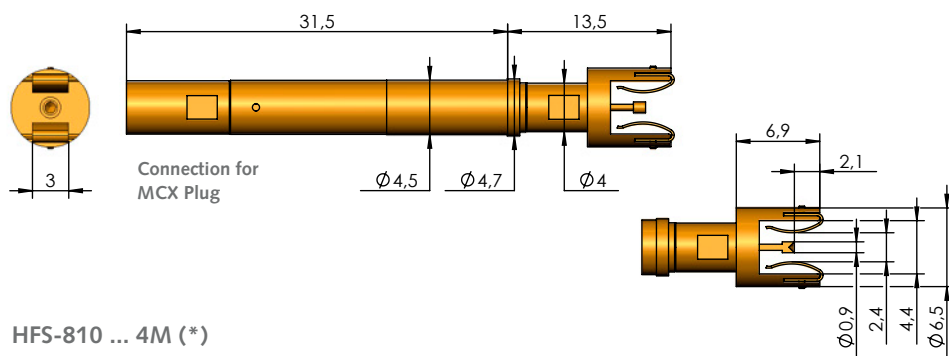
Series:



Available  
Tip Styles:

Ordering Description:

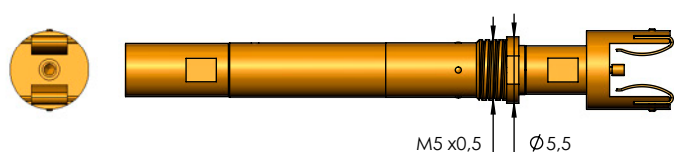
HFS-810 ...



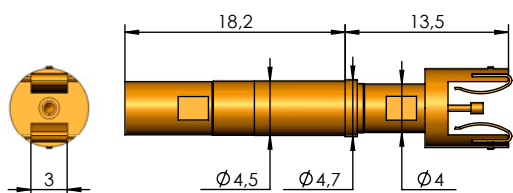
HFS-810 303 090 A **xx** 40 GT13  
HFS-810 303 090 A **xx** 40 GT13 4M  
HFS-410 303 090 A **xx** 40 GT13  
HFS-410 303 090 A **xx** 40 GT13 4M

**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:  $\pm 0.3 \text{ mm}$

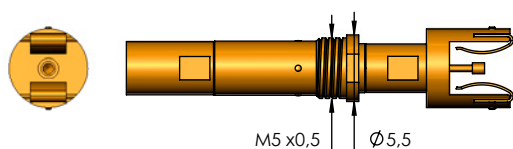
HFS-810 ... 4M (\*)



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

## Mechanical Data

## HFS-810 and HFS-810 4M

|                        | Outer Cond. | Inner Cond. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 4.0 mm      | 2.0 mm      |
| <b>Maximum Stroke:</b> | 5.0 mm      | 3.7 mm      |

### Mechanical Data

## HFS-410 and HFS-410 4M

|                        | Outer Cond. | Inner Cond. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 2.0 mm      | 2.0 mm      |
| <b>Maximum Stroke:</b> | 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

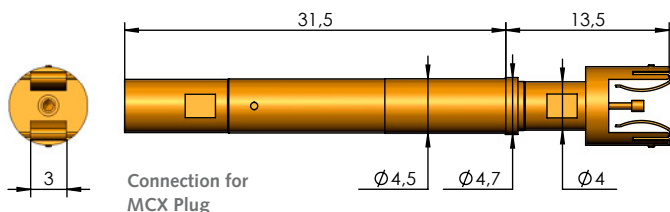
Series:



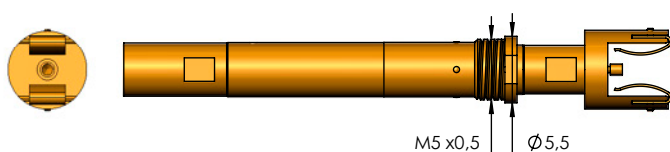
Available  
Tip Styles:

Ordering Description:

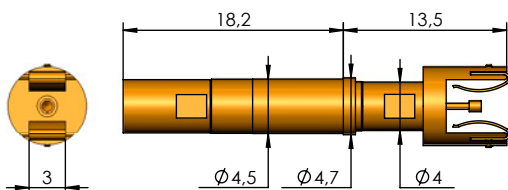
HFS-840 ...



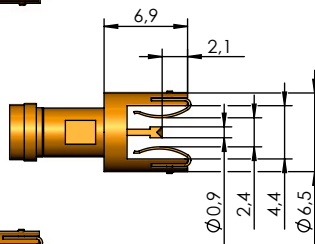
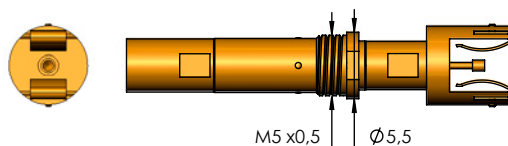
HFS-840 ... 4M (\*)



HFS-440 ...



HFS-440 ... 4M (\*)



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:  $\pm 0.3$  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: (\*)

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<br>HFS-840 4M |     |     |     | HFS-440<br>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

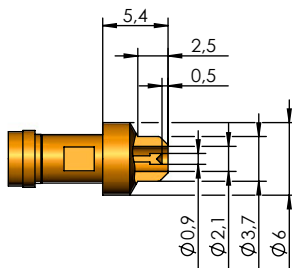
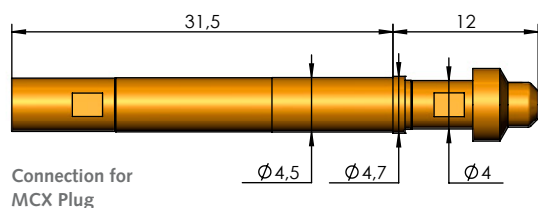
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

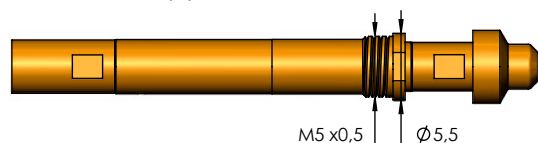
### HFS-810 ...



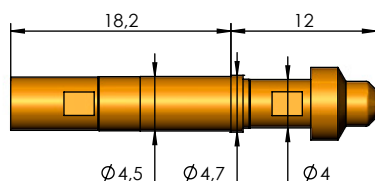
HFS-810 303 090 A **xx** 42 GT16  
HFS-810 303 090 A **xx** 42 GT16 M  
HFS-410 303 090 A **xx** 42 GT16  
HFS-410 303 090 A **xx** 42 GT16 M

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

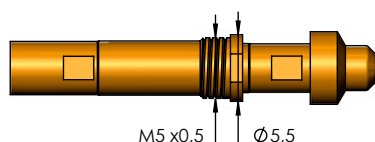
### HFS-810 ... M (\*)



### 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<br>HFS-810 M |     |     |     | HFS-410<br>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)

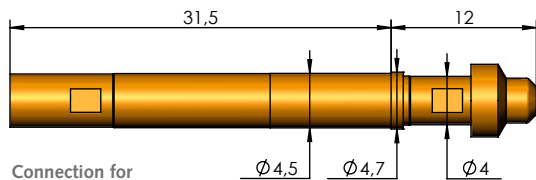
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

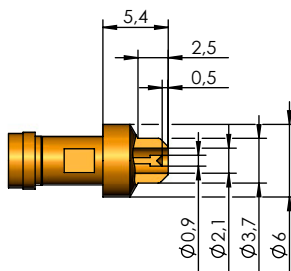
Available  
Tip Styles:

Ordering Description:

HFS-840 ...



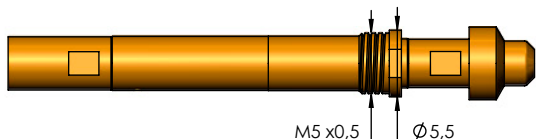
Connection for  
MCX Plug



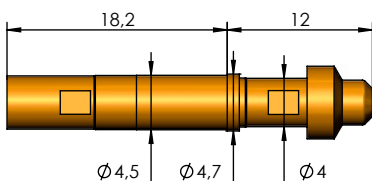
HFS-840 303 090 A **xx** 42 GT16  
HFS-840 303 090 A **xx** 42 GT16 M  
HFS-440 303 090 A **xx** 42 GT16  
HFS-440 303 090 A **xx** 42 GT16 M

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

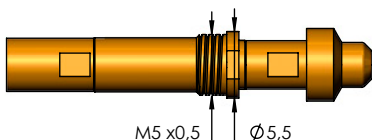
HFS-840 ... M (\*)



HFS-440 ...



HFS-440 ... 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-840<br>HFS-840 M |     |     |     | HFS-440<br>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

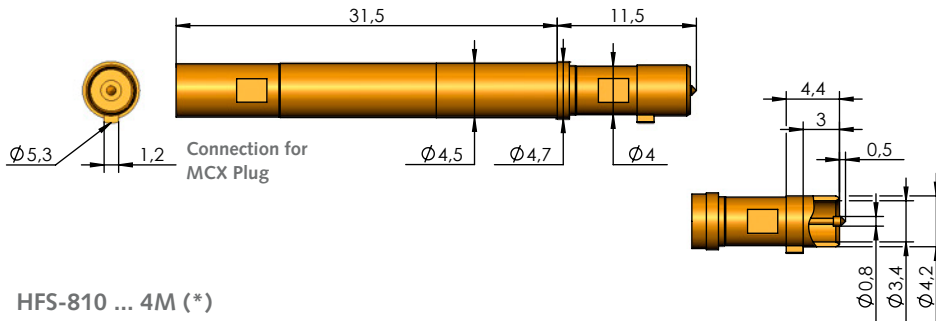
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

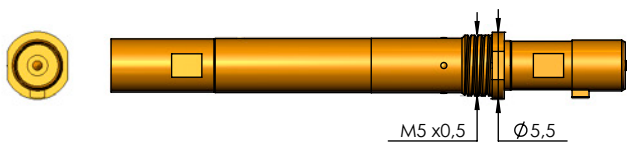
HFS-810 ...



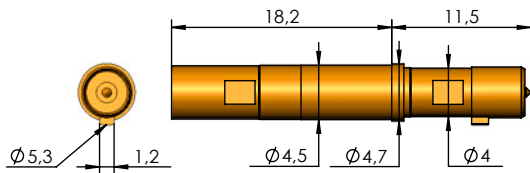
HFS-810 308 080 A **xx** 42 GT16-F  
HFS-810 308 080 A **xx** 42 GT16-F 4M  
HFS-410 308 080 A **xx** 42 GT16-F  
HFS-410 308 080 A **xx** 42 GT16-F 4M

**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

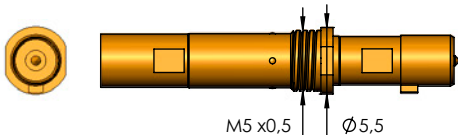
HFS-810 ... 4M (\*)



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<br>HFS-810 4M |     |     |     | HFS-410<br>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)

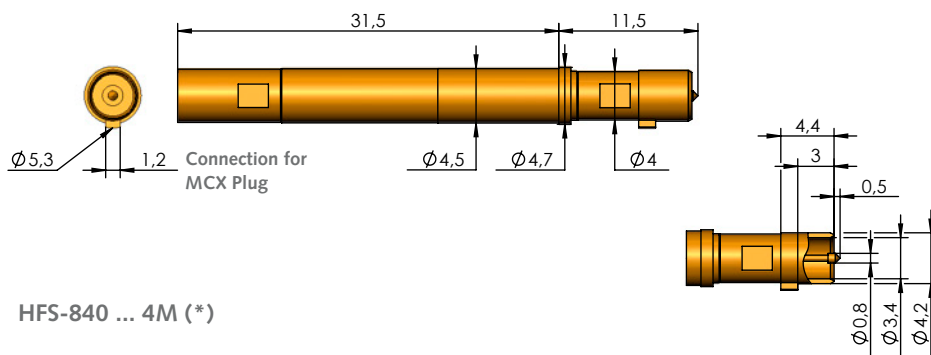
HFS-840 / HFS-840 M  
HFS-440 / HFS-440 M

Series:

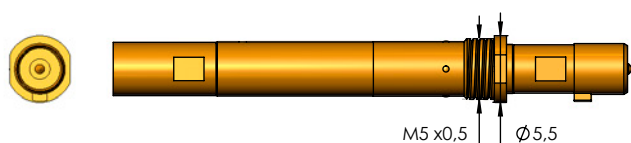
Available  
Tip Styles:

Ordering Description:

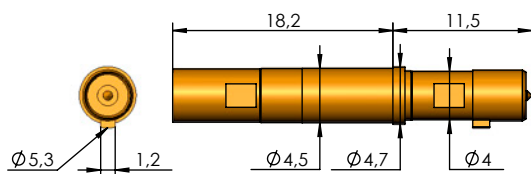
HFS-840 ...



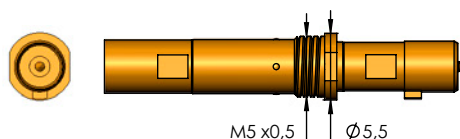
HFS-840 ... 4M (\*)



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<br>HFS-840 4M |     |     |     | HFS-440<br>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

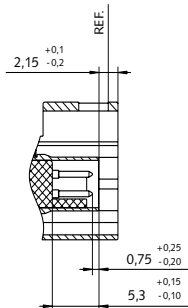
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

# Contacting of HSD Connectors for differential signal transmission

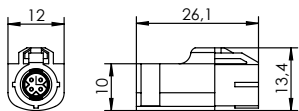
## Series HSD

### Connection Dimensions

#### Signal Conductor Plug

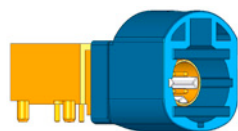


#### Signal conductor Jack

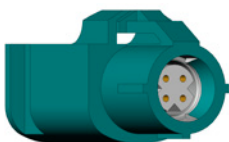


### Example:

#### HSD Signal Conductor Plug



#### HSD Signal Conductor Jack

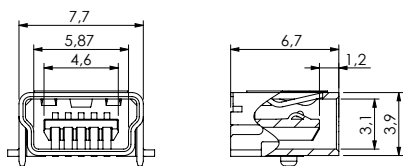


# Contacting of USB Mini Connectors for differential signal transmission

## Series USB Mini

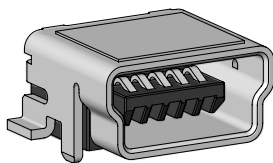
### Connection Dimensions

#### Signal Conductor Plug



### Example:

#### USB Mini Signal Conductor Plug

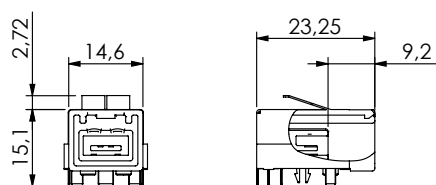


# Contacting of MX38 Connectors for differential signal transmission

## Series MX38

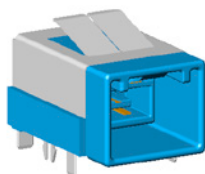
### Connection Dimensions

#### Signal Conductor Jack



### Example:

#### MX38 Signal Conductor Jack



## Contents

## HSD

### Signal Conductor Plug

HFS-819 124 - 127

### Signal Conductor Jack

HFS-819 128

## USB Mini

### Signal Conductor Plug

HFS-821 129

## MX38

### Signal Conductor Jack

HFS-821 130

**MX48** s. page 131

**MX49** s. page 132

**MX62** s. page 133

**MX68** s. page 134

**USB, RJ, HDMI** s. page 136 - 137

**Receptacles (KS)** 192 - 194

**Spacer of Receptacles (DS)** 195

**Cable plug assembly (SE)** 196 - 199

**Tools** 200 - 201

**Inner Conductor/Signal Conductor** 201 - 204



## MX48

Signal Conductor Jack

HFS-821 131

## MX49

Signal Conductor Jack

HFS-821 132

## MX62

Signal Conductor Jack

HFS-821 133

## MX68

Signal Conductor Jack

HFS-821 134

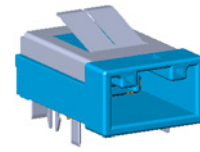
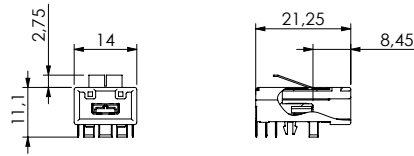
Receptacles  
(KS) 192 - 194Spacer of  
Receptacles (DS) 195Cable plug  
assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/  
Signal Conductor 202 - 204

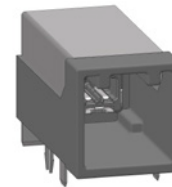
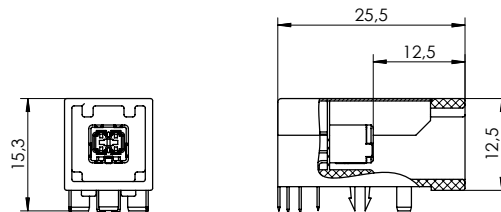
# Contacting of MX48 Connectors for differential signal transmission

## Series MX48

Connection Dimensions  
Signal Conductor JackExample:  
MX48 Signal Conductor Jack

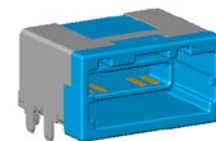
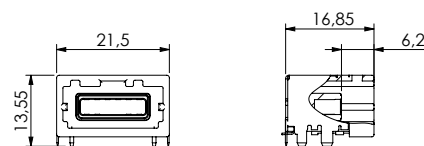
# Contacting of MX49 Connectors for differential signal transmission

## Series MX49

Connection Dimensions  
Signal Conductor JackExample:  
MX49 Signal Conductor Jack

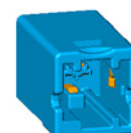
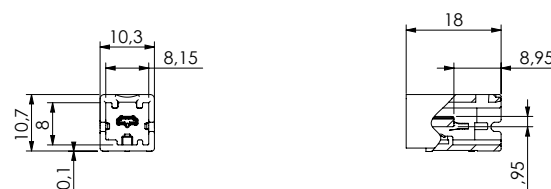
# Contacting of MX62 Connectors for differential signal transmission

## Series MX62

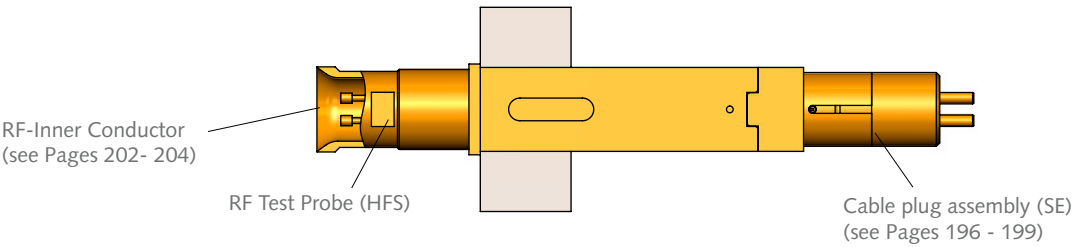
Connection Dimensions  
Signal Conductor JackExample:  
MX62 Signal Conductor Jack

# Contacting of MX68 Connectors for differential signal transmission

## Series MX68

Connection Dimensions  
Signal Conductor JackExample:  
MX68 Signal Conductor Jack

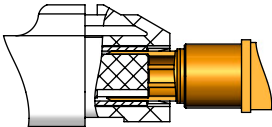
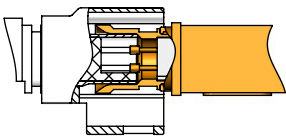
# HSD / USB-Mini / MX-Connectors for differential signal transmission



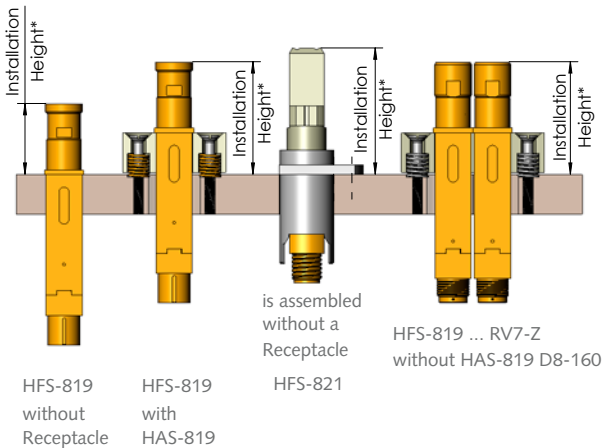
## Contacting Example HSD:

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:



### 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 <sub>i</sub> typical Inner Conductor: | ≤ 10 mΩ |
| Impedance Test Probe:                   | 100 Ω   |

### Operating Temperature Range

–40 up to +80° C

| 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   |                                |                |            |
| HSD-Signal Conductor Jack         | ... RV7-Z    | 22.9 mm                        | 22.9 mm        | 14.4 mm    |
|                                   | ... V8       | 25.8 mm                        | ---            | 17.3 mm    |
| USB Mini Signal Conductor Jack    | ... V8-Z     |                                |                |            |
|                                   | ... 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    |

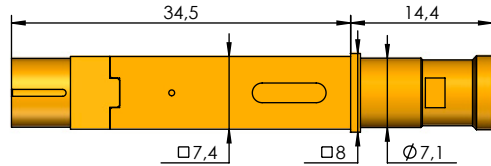
**Note:**  
 Further details of receptacles with and without flange connection (F) see pages 192 - 194.

Series:

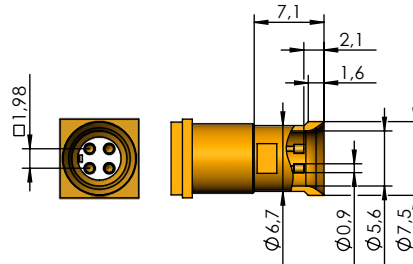
Available  
Tip Styles:

Ordering Description:

HFS-819 ... with Plug Connection

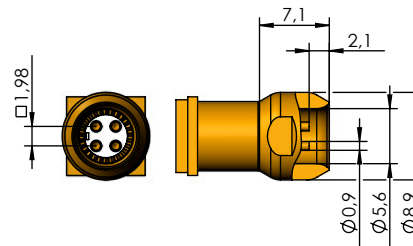


Connection for  
Plug SE-819-V2



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:  $\pm 0.8$  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:  $\pm 1.0$  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      |

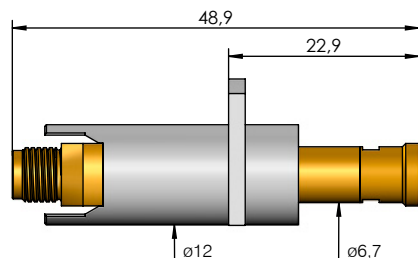
Series:



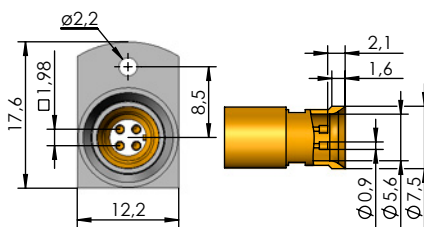
Available  
Tip Styles:

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:  $\pm 1,0$  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)

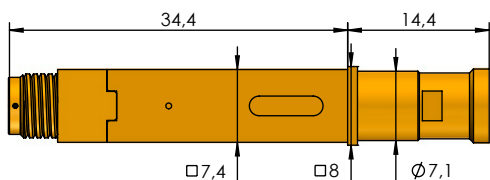
HFS-819  
with Screw-in Connection

Series:

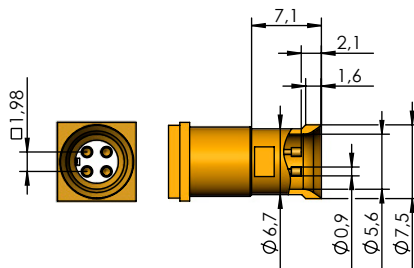
Available  
Tip Styles:

Ordering Description:

## HFS-819 ... with Screw-in Connection

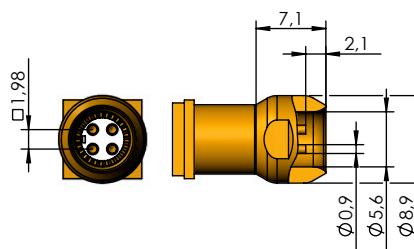


Connection for Screw-in Plug  
SE-819-V5-Z



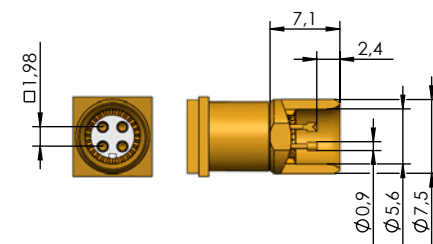
HFS-819 303 090 A **xxx** 43 V2-Z

**Note:** Version with passive tip-style on Outer conductor and Inner Conductor with tip-style 03 (inverse cone).  
Centering range:  $\pm 0.8$  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:  $\pm 1.0$  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:  $\pm 0.3$  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

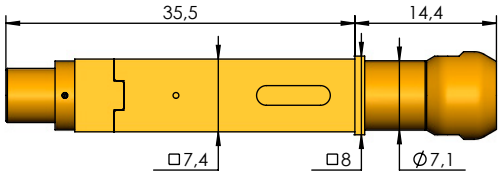
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 5.0 mm      | 2.0 mm      |
| Maximum Stroke: | 6.0 mm      | 3.7 mm      |

Series:

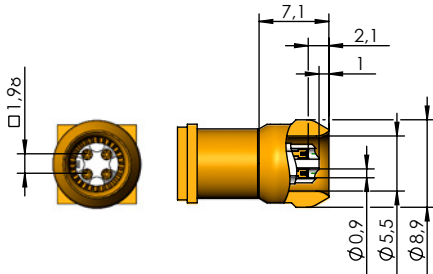
Available  
Tip Styles:

Ordering Description:

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.



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

**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 Jack

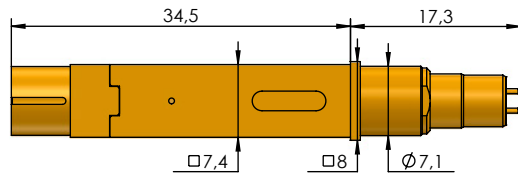
**GBit/s** HFS-819 with Plug Connection  
(100  $\Omega$ ) HFS-819 with Screw-in Connection

Series:

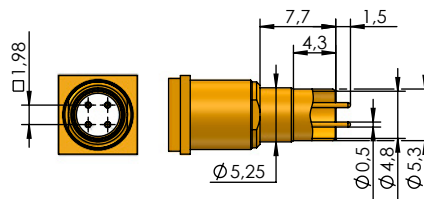
Available  
Tip Styles:

Ordering Description:

## HFS-819 ... V8 with Plug Connection



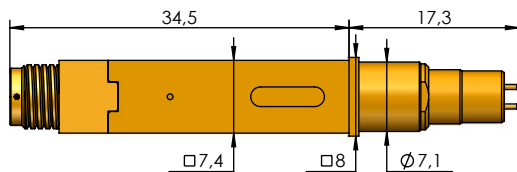
Connection for Plug  
SE-819-V2



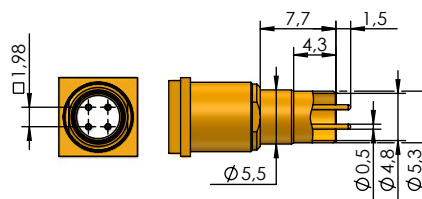
HFS-819 355 051 A **xxx** 42 V8

**Note:** Version with Plug Connection.  
Centering range:  $\pm 0.2$  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:  $\pm 0.2$  mm

### 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

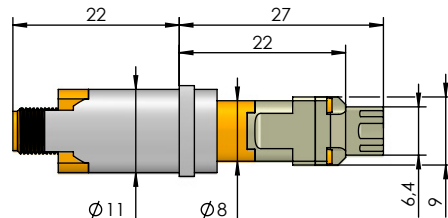
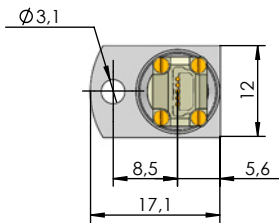
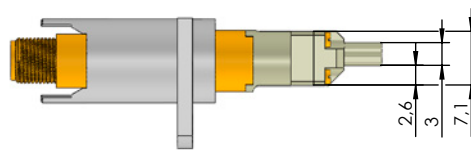
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 5.0 mm      | 2.0 mm      |
| Maximum Stroke: | 6.0 mm      | 3.7 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-821 ...

HFS-821 313 050 A **xx** 05 USB-MiniConnection for screw-in Plug  
SE-821 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  $\pm 1.0^\circ$ . After a minimum contacting stroke of 0.5 mm the Probe can balance out radial positioning inaccuracies of the Connector by up to  $\pm 3.5^\circ$ .  
Centering range:  $\pm 0.6$  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              | <b>99</b>                         |

**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. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 3,5 mm      | not spring  |
| <b>Maximum Stroke:</b> | 5,0 mm      | loaded      |

**Mechanical Data****HFS-821**

|                            |                                            |
|----------------------------|--------------------------------------------|
| <b>Axial off-set:</b>      | 1,0 mm                                     |
| <b>Radial positioning:</b> | $\pm 3,5^\circ$ (after min. 0,5 mm Stroke) |



# MX38 Signal Conductor Jack

Gbit/s  
(100 Ω)

HFS-821

Series:

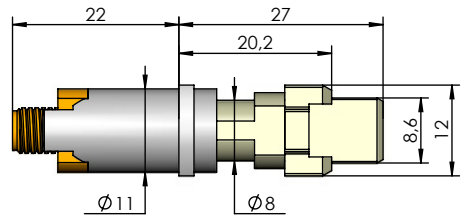
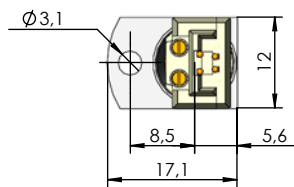


Available  
Tip Styles:

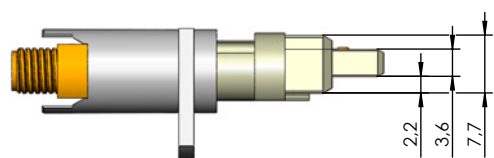
Ordering Description:

HFS-821 ...

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



Connection  
for MX38 Plug



**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  $\pm 1.0^\circ$ . After a minimum contacting stroke of 0.5 mm the Probe can balance out radial positioning inaccuracies of the Connector by up to  $\pm 3.5^\circ$ . Centering range:  $\pm 0.6$  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:      | $\pm 1.0$ mm                               |
| Radial positioning: | $\pm 3.5^\circ$ (after min. 0.5 mm Stroke) |

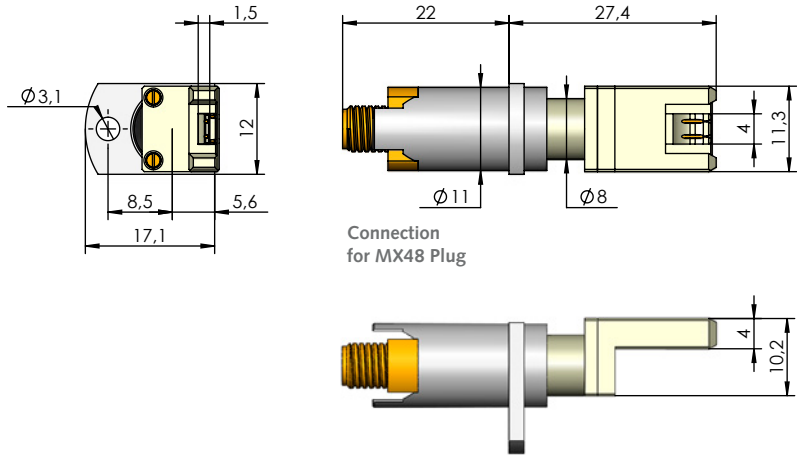
Series:



Available Tip Styles:

Ordering Description:

HFS-821 ...



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  $\pm 1.0^\circ$ . After a minimum contacting stroke of 0.5 mm the Probe can balance out radial positioning inaccuracies of the Connector by up to  $\pm 3.5^\circ$ . Centering range:  $\pm 0.6$  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 |             |             | Mechanical Data     |                             |
|-----------------|-------------|-------------|---------------------|-----------------------------|
| HFS-821         |             |             | HFS-821             |                             |
|                 | Outer Cond. | Inner Cond. | Axial off-set:      | $\pm 1.0$ mm                |
| Working Stroke: | 3.5 mm      | not spring  | Radial positioning: | $\pm 3.5^\circ$ (after min. |
| Maximum Stroke: | 5.0 mm      | loaded      |                     | 0.5 mm Stroke)              |

# MX49 Signal Conductor Jack

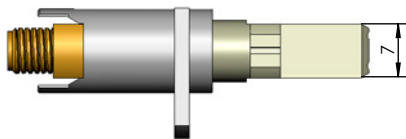
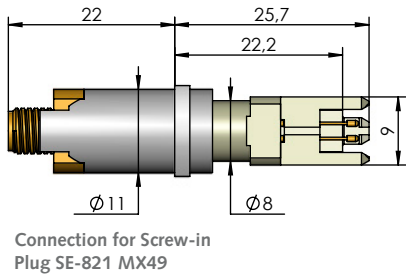
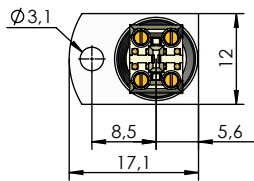
Gbit/s  
(100 Ω)

HFS-821

Series:



HFS-821 ...



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.

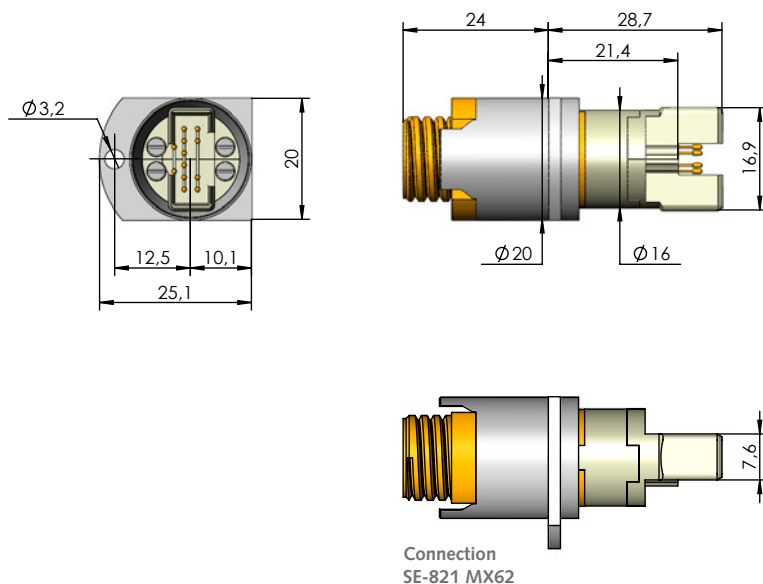
| Mechanical Data |             |                   |
|-----------------|-------------|-------------------|
| HFS-821         |             |                   |
|                 | Outer Cond. | Inner Cond.       |
| Working Stroke: | 3.5 mm      | not spring-loaded |
| Maximum Stroke: | 5.0 mm      | loaded            |

| Mechanical Data     |                                   |
|---------------------|-----------------------------------|
| HFS-821             |                                   |
| Axial off-set:      | ± 1.0 mm                          |
| Radial positioning: | ± 3.5° (after min. 0.5 mm Stroke) |

Series:



HFS-821 ...



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  $\pm 0.9$  mm. After a minimum contacting stroke of 0.5 mm the Probe can balance out radial positioning inaccuracies of the Connector by up to  $\pm 3.5^\circ$ . Centering range:  $\pm 0.7$  mm

**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.       |
|------------------------|-------------|-------------------|
| <b>Working Stroke:</b> | 3.5 mm      | not spring-loaded |
| <b>Maximum Stroke:</b> | 5.0 mm      | loaded            |

**Mechanical Data****HFS-821**

|                            |                                            |
|----------------------------|--------------------------------------------|
| <b>Axial off-set:</b>      | $\pm 0.9$ mm                               |
| <b>Radial positioning:</b> | $\pm 3.5^\circ$ (after min. 0.5 mm Stroke) |

|                                     | HFS-821                           |
|-------------------------------------|-----------------------------------|
| Spring Force of Inner Conductor (N) | Inner conductor not spring-loaded |
| Spring Force of Outer Conductor (N) | 10.0                              |
| Character for ordering              | <b>99</b>                         |

# MX68 Signal Conductor Jack

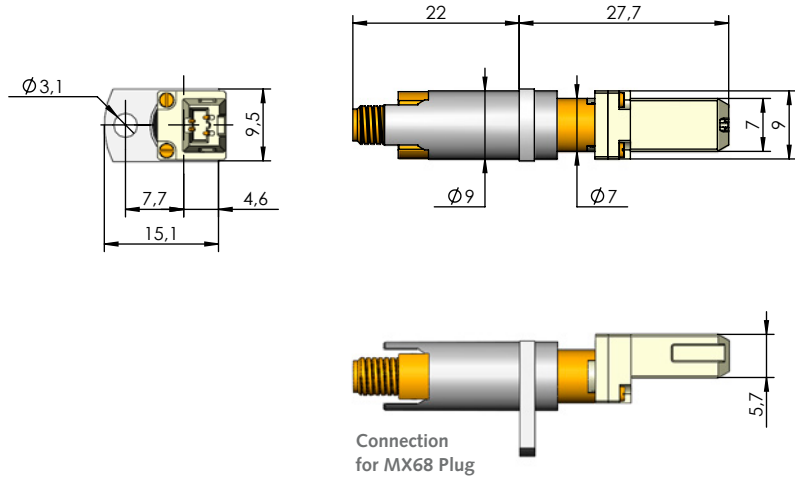
Gbit/s  
(100 Ω)

HFS-821

Series:



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  $\pm 0.5$  mm. After a minimum contacting stroke of 0.5 mm the Probe can balance out radial positioning inaccuracies of the Connector by up to  $\pm 2.0^\circ$ . Centering range:  $\pm 0.5$  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.

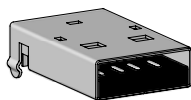
| Mechanical Data |             |                   |
|-----------------|-------------|-------------------|
| HFS-821         |             |                   |
|                 | Outer Cond. | Inner Cond.       |
| Working Stroke: | 3.5 mm      | not spring-loaded |
| Maximum Stroke: | 5.0 mm      | loaded            |

| Mechanical Data     |                                            |
|---------------------|--------------------------------------------|
| HFS-821             |                                            |
| Axial off-set:      | $\pm 0.5$ mm                               |
| Radial positioning: | $\pm 2.0^\circ$ (after min. 0.5 mm Stroke) |

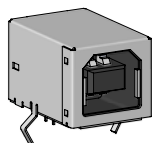
# Contacting of USB Connectors for differential signal transmission

Examples:

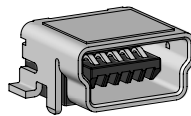
4-channel, Type A  
Signal Conductor Jack



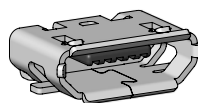
4-channel, Type B  
Signal Conductor Jack



Mini, 4-channel, Type B  
Signal Conductor Jack



Micro, 4-channel, Type B  
Signal Conductor Jack



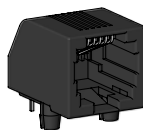
# Contacting of RJ Connectors for differential signal transmission

Examples:

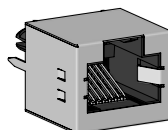
RJ-10, 4-channel  
Signal Conductor Jack



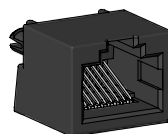
RJ-12, 6-channel  
Signal Conductor Jack



RJ-45, 8-channel  
Signal Conductor Jack



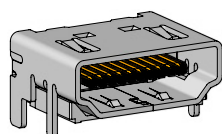
RJ-50, 10-channel  
Signal Conductor Jack



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

Examples:

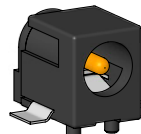
HDMI, 19-channel  
Signal Conductor Jack



TAE, 6-channel  
Signal Conductor Jack



DC-Power, Ø 2,1  
Signal Conductor Jack



## Contents

## USB

136

### Signal Conductor Jack

4-channel , Type A

4-channel , Type B

Mini, 5-channel , Type B

Micro, 5-channel , Type B

## RJ

137

### Signal Conductor Jack

RJ-10, 4-channel

RJ-12, 6-channel

RJ-45, 8-channel

RJ-50, 10-channel

## HDMI / TAE / DC

136

### Signal Conductor Jack

HDMI, 19-channel

TAE, 6-channel

DC-Power

## Mounting Sockets

137

for 4-channel plugs

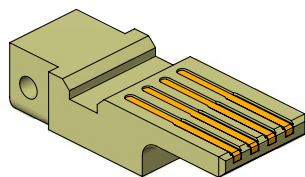
for 6-channel plugs  
and USB

for 8-channel and  
10-channel plugs

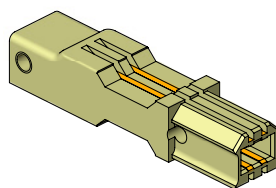
# ◎ USB Signal Conductor Jack

Gbit/s  
(100 Ω)

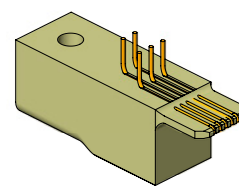
PS-USB



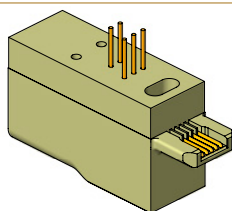
| Description       | USB connector, type A    |
|-------------------|--------------------------|
| Plug              | Four-terminal            |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 21071                    |
| Connection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



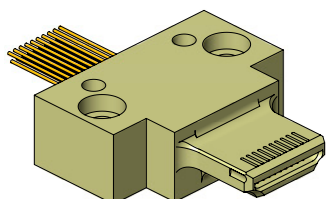
| Description       | USB connector Micro, type B |
|-------------------|-----------------------------|
| Plug              | Five-terminal               |
| Casing material   | High performance plastic    |
| Electrical design | max. 25 VAC / 60 VDC        |
| Article number    | 34816             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

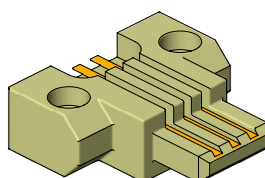
# ◎ HDMI-, TAE-, DC-Power-Signal Conductor Jack

Gbit/s  
(100 Ω)

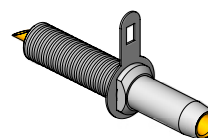
PS-HDMI  
PS-TAE  
PS-Power DC



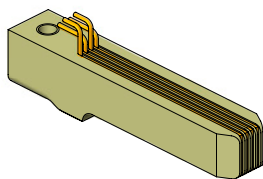
| Description       | HDMI connector           |
|-------------------|--------------------------|
| Plug              | Nineteen-terminal        |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 34814                    |
| Connection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



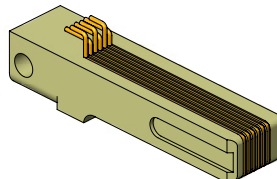
| Description       | TAE connector            |
|-------------------|--------------------------|
| Plug              | Six-terminal             |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 34847                    |



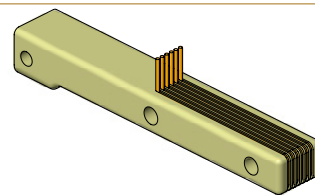
| Description       | Power DC connector, Ø 2,1 |
|-------------------|---------------------------|
| Plug              | Two-terminal              |
| Electrical design | Max. 12 V                 |
| Article number    | 35640                     |



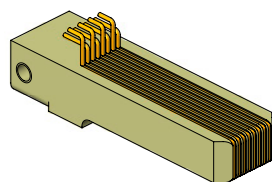
| Description       | RJ-10 connector          |
|-------------------|--------------------------|
| Plug              | Four-terminal            |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 17824                    |
| Connection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



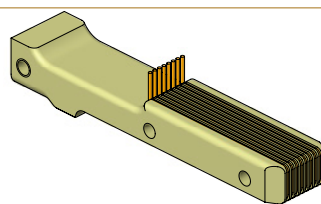
| Description       | RJ-12 connector          |
|-------------------|--------------------------|
| Plug              | Six-terminal             |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 17825                    |
| Connection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



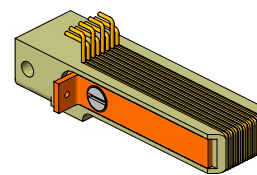
| Description       | RJ-12 connector, extended L-58 mm |
|-------------------|-----------------------------------|
| Plug              | Six-terminal                      |
| Casing material   | High performance plastic          |
| Electrical design | max. 25 VAC / 60 VDC              |
| Article number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



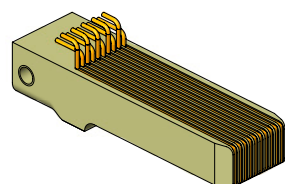
| Description       | RJ-45 connector          |
|-------------------|--------------------------|
| Plug              | Eight-terminal           |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 17826                    |
| Connection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



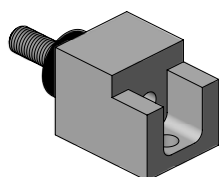
| Description       | RJ-45 connector with shield check |
|-------------------|-----------------------------------|
| Plug              | Eight-terminal                    |
| Casing material   | High performance plastic          |
| Electrical design | max. 25 VAC / 60 VDC              |
| Article number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



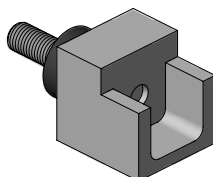
| Description       | RJ-50 connector          |
|-------------------|--------------------------|
| Plug              | Ten-terminal             |
| Casing material   | High performance plastic |
| Electrical design | max. 25 VAC / 60 VDC     |
| Article number    | 17827                    |
| Connection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

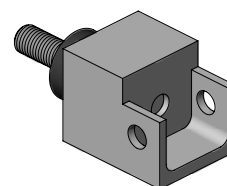
## PSA

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

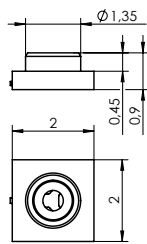


*The radio frequency probes from INGUN are used especially when radio frequency signals must be measured.*

# Contacting of MM8030 Switch Connectors

## Series MM8030

### Connection Dimensions

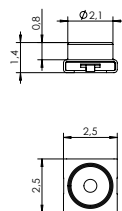


Example:  
MM8030 Switch



# Contacting of MM8130 / MM8430 Switch Connectors

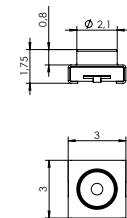
## Series MM8130



Example:  
MM8130 Switch



## Series MM8430



Example:  
MM8430 Switch



### Contents

## MM8030

6 GHz  
HFS-823  
HFS-856 142

12 GHz  
HFS-865 144

## MM8130 MM8430

6 GHz  
HFS-823  
HFS-860, HFS-860 M 145

MS-156 s. Page 147

MS-180 s. Page 150

Pico II s. Page 151  
PN 1551372-1

Receptacles  
(KS) 192 - 194

Spacer of  
Receptacles (DS) 195

Cable plug  
assembly (SE) 196 - 199

Tools 200 - 201

Inner Conductor/  
Signal Conductor 202 - 204

Switch  
connector  
contacting

## MS-156 (HF) MS-156 C

6 GHz 147  
HFS-823  
HFS-856  
HFS-860, HFS-860 M

## MS-180

6 GHz 150  
HFS-856

## Pico II PN 1551372-1

6 GHz 151  
HFS-823

Receptacles (KS) 192 - 194

Spacer of Receptacles (DS) 195

Cable plug assembly (SE) 196 - 199

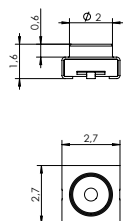
Tools 200 - 201

Inner Conductor/  
Signal Conductor 202 - 204

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

### Series MS-156 (HF)

#### Connection Dimensions



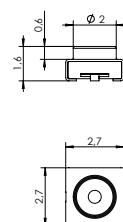
Example:

MS-156 (HF) Switch



### Series MS-156 C

#### Connection Dimensions



Example:

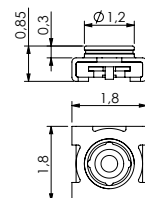
MS-156 C Switch



# Contacting of MS-180 Switch Connectors

### Series MS-180

#### Connection Dimensions



Example:

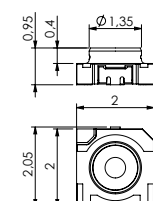
MS-180 Switch



# Contacting of Pico II, PN 1551372-1 Switch Connectors

### Series PN 1551372-1

#### Connection Dimensions

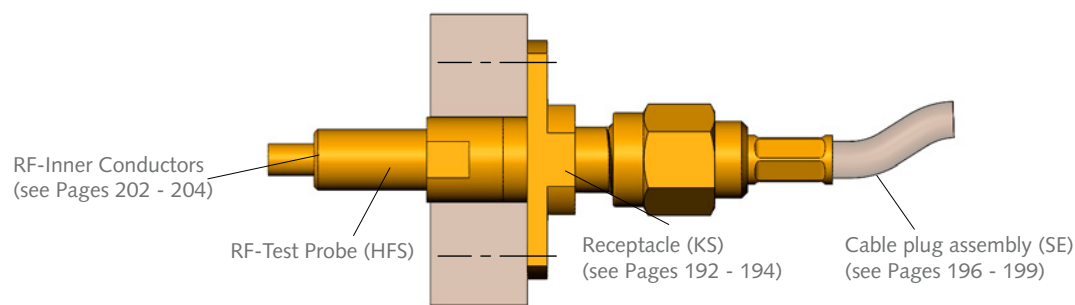


Example:

Pico II, PN 1551372-1 Switch

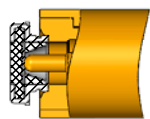


# MM8030 / MM8130 / MM8430 / MS-156 HF / MS-156 C / MS-180 / Pico II, PN 1551372-1 Switch

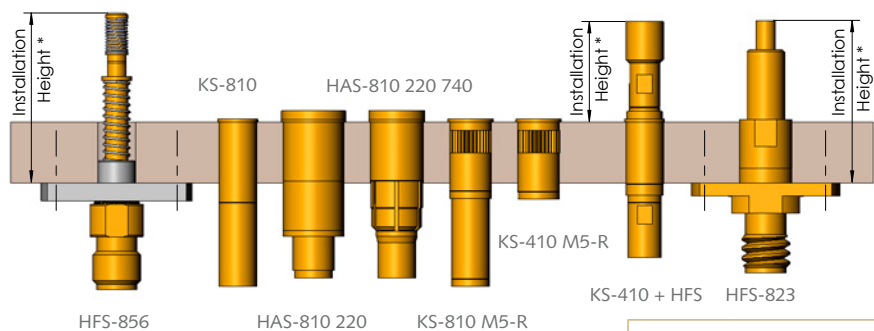


## Contacting Example MM8030:

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 <sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>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<br>MM8430<br>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.

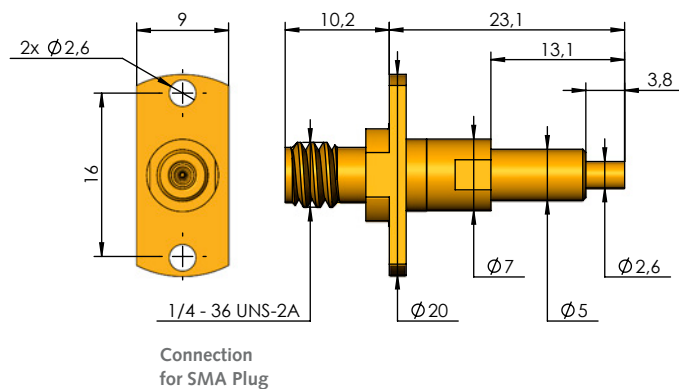
Switch  
connector  
contacting

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: ± 0.2 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-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.

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

## Mechanical Data

### HFS-823

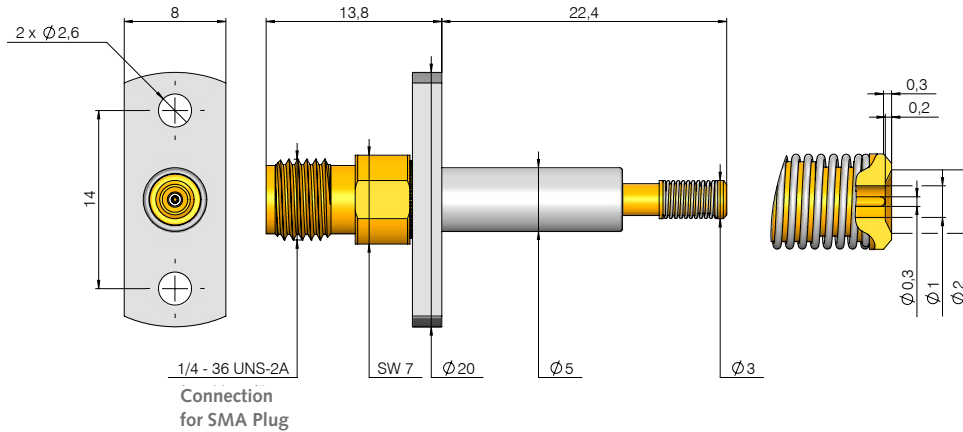
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 0.8 mm      | 0.3 mm      |
| Maximum Stroke: | 1.5 mm      | 1.1 mm      |

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  $\pm 3.0^\circ$ . Centering range:  $\pm 0.4$  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      |

# MM 8030 Switch

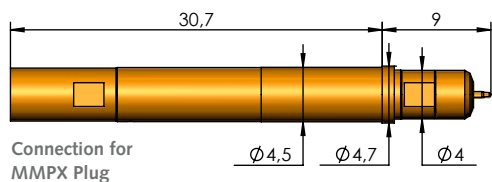
up to 12 GHz  
(50 Ω)

HFS-865

Series:



HFS-865 ...

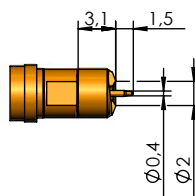


Available  
Tip Styles:

Ordering Description:

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

**Note:**  
Centering range:  $\pm 0.2$  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              | <b>53</b> | <b>73</b> | <b>93</b> |

## Mechanical Data

### HFS-865

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

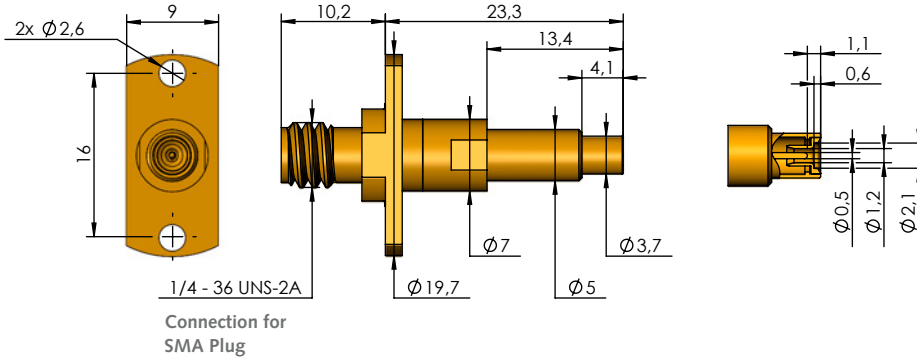


Series:

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:  $\pm 0.3$  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 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.

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

**Mechanical Data****HFS-823**

Outer Cond. Inner Cond.

Working Stroke: 1.8 mm 0.3 mm

Maximum Strokeb: 3.4 mm 1.1 mm

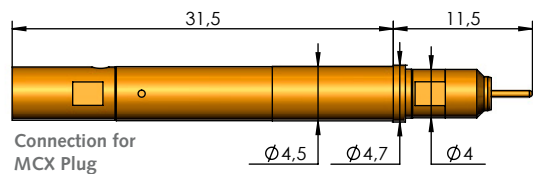


Series:

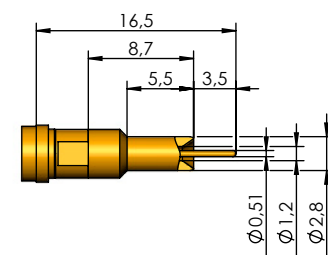
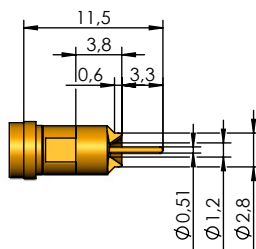
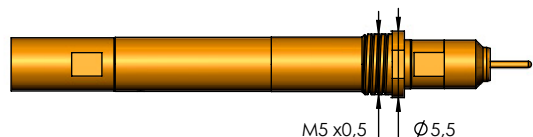
Available  
Tip Styles:

Ordering Description:

HFS-860 ...



HFS-860 ... M (\*)



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

**Note:**  
Centering range:  $\pm 0.2$  mm

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:  $\pm 0.2$  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: (\*)

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

|                                     | HFS-860<br>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              | <b>53</b>            | <b>80</b> | <b>93</b> | <b>99</b> |

## Mechanical Data

### HFS-860 and HFS-860 M

#### Outer Cond. Inner Cond.

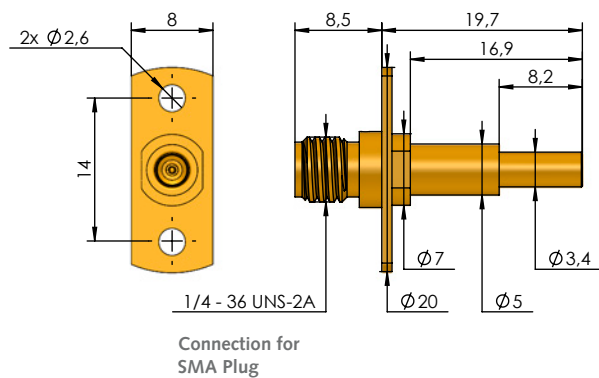
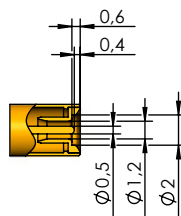
Working Stroke: 4.0 mm 2.0 mm  
Maximum Stroke: 5.0 mm 3.7 mm

Series:

Available  
Tip Styles:

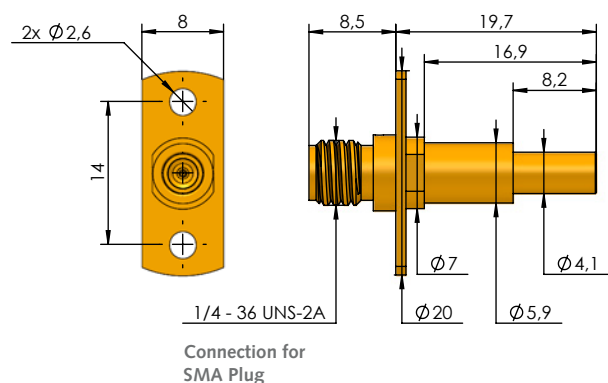
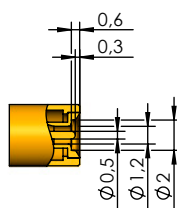
Ordering Description:

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:  $\pm 0.3$  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:  $\pm 0.3$  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 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. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 1.8 mm      | 0.7 mm      |
| <b>Maximum Stroke:</b> | 2.4 mm      | 1.1 mm      |

**Mechanical Data****HFS-823 (MS06)**

|                        | Outer Cond. | Inner Cond. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 1.7 mm      | 0.7 mm      |
| <b>Maximum Stroke:</b> | 2.3 mm      | 1.3 mm      |

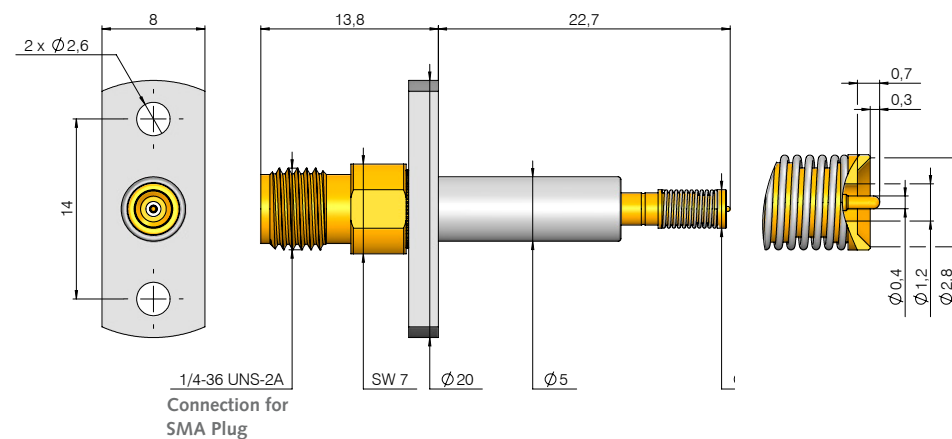
Series:



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  $\pm 3.0^\circ$ . Centering range:  $\pm 0.3$  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 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) | 4.8       |
| Character for ordering              | <b>63</b> |

## Mechanical Data

### HFS-856

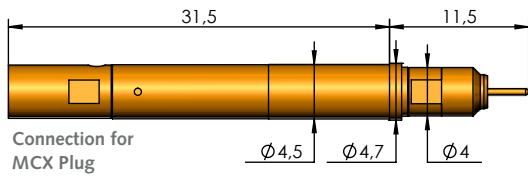
|                  | Outer Cond. | Inner Cond. |
|------------------|-------------|-------------|
| Working Stroke:  | 4.2 mm      | 0.8 mm      |
| Maximum Strokeb: | 5.2 mm      | 2.0 mm      |

## Series:

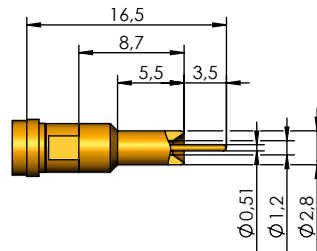
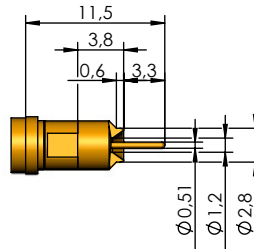
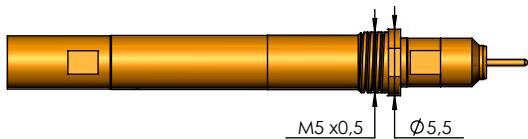
Available  
Tip Styles:

## Ordering Description:

## HFS-860 ...



## HFS-860 ... M (\*)



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

**Note:**  
Centering range:  $\pm 0.2$  mm

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:  $\pm 0.2$  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<br>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:

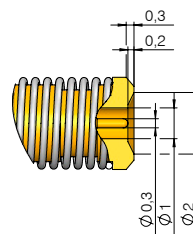
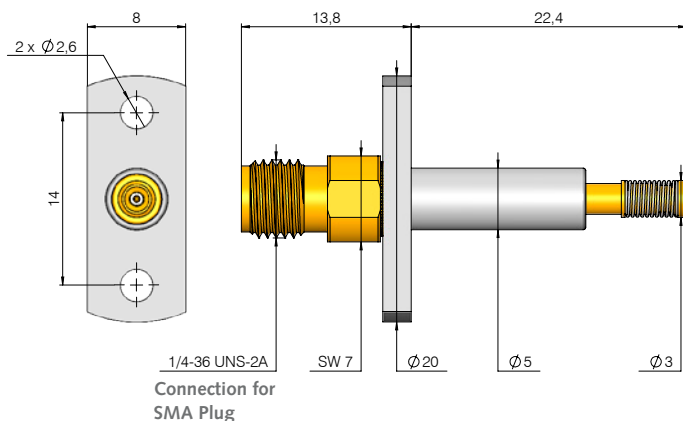


Available  
Tip Styles:

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  $\pm 3,0^\circ$ . Centering range:  $\pm 0.4$  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) | 4.8       |
| Character for ordering              | <b>63</b> |

## Mechanical Data

### HFS-856

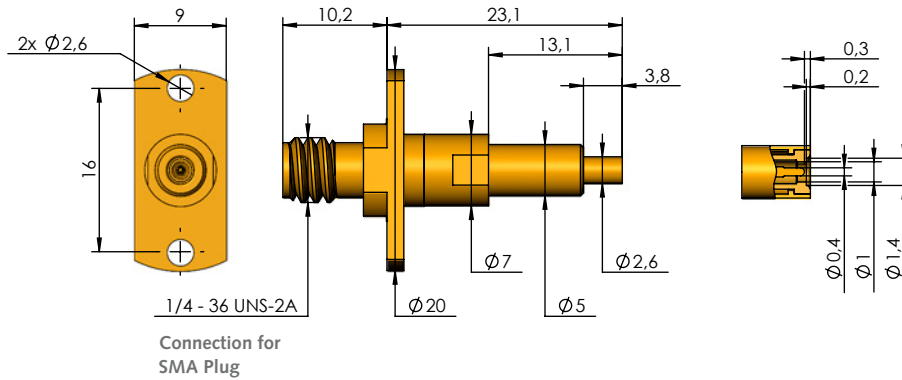
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.2 mm      | 0.8 mm      |
| Maximum Stroke: | 5.2 mm      | 2.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-823 ...

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

**Note:** Version with flange connection. No movement of the connection during stroke movement.  
Centering range:  $\pm 0.3$  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 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.

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

**Mechanical Data****HFS-823**

Outer Cond. Inner Cond.

Working Stroke: 0.8 mm 0.3 mm

Maximum Strokeb: 1.5 mm 1.1 mm

Switch  
connector  
contacting



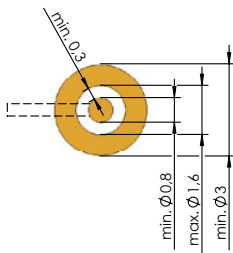
# Applied Radio Frequency Technology



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

# Contacting of PCB-Layout with closed Ground Ring

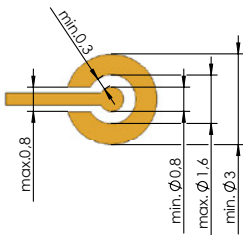
Signal guiding to inwards (Multilayer)



PCB coax closed

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

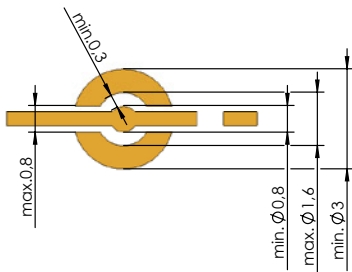
Signal guiding outwards



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)

|                    |     |
|--------------------|-----|
| 2 GHz              | 156 |
| HFS-810, HFS-810 M |     |
| HFS-410, HFS-410 M |     |
| 4 GHz              | 157 |
| HFS-840, HFS-840 M |     |
| HFS-440, HFS-440 M |     |

### PCB coax open (50 Ω)

|                     |     |
|---------------------|-----|
| 2 GHz               | 158 |
| HFS-810, HFS-810 4M |     |
| HFS-410, HFS-410 4M |     |
| 4 GHz               | 159 |
| HFS-840, HFS-840 4M |     |
| HFS-440, HFS-440 4M |     |
| 6 GHz               | 160 |
| HFS-860, HFS-860 4M |     |

### PCB coax kidney-shaped (50 Ω)

|                     |     |
|---------------------|-----|
| 2 GHz               | 161 |
| HFS-810, HFS-810 4M |     |
| HFS-410, HFS-410 4M |     |
| 4 GHz               | 162 |
| HFS-840, HFS-840 4M |     |
| HFS-440, HFS-440 4M |     |
| 6 GHz               | 163 |
| HFS-860, HFS-860 4M |     |

|                  |           |
|------------------|-----------|
| Receptacles (KS) | 192 - 194 |
|------------------|-----------|

|                            |     |
|----------------------------|-----|
| Spacer of Receptacles (DS) | 195 |
|----------------------------|-----|

|                          |           |
|--------------------------|-----------|
| Cable plug assembly (SE) | 196 - 199 |
|--------------------------|-----------|

|       |           |
|-------|-----------|
| Tools | 200 - 201 |
|-------|-----------|

|                                  |           |
|----------------------------------|-----------|
| Inner Conductor/Signal Conductor | 202 - 204 |
|----------------------------------|-----------|

PCB test point



PCB-SG  
PCB-SG-  
filter  
PCB-GSG  
PCB-GGSGG  
(50 Ω)

|                     |     |
|---------------------|-----|
| 2 GHz               | 164 |
| HFS-810, HFS-810 4M |     |
| HFS-410, HFS-410 4M |     |
| 4 GHz               | 165 |
| HFS-840, HFS-840 4M |     |
| HFS-440, HFS-440 4M |     |
| HFS-836             |     |
| 12 GHz              | 166 |
| HFS-837             |     |

PCB coax  
closed  
(75 Ω)

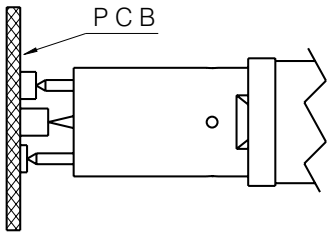
|         |     |
|---------|-----|
| 1 GHz   | 179 |
| HFS-858 |     |

PCB coax  
open (75 Ω)

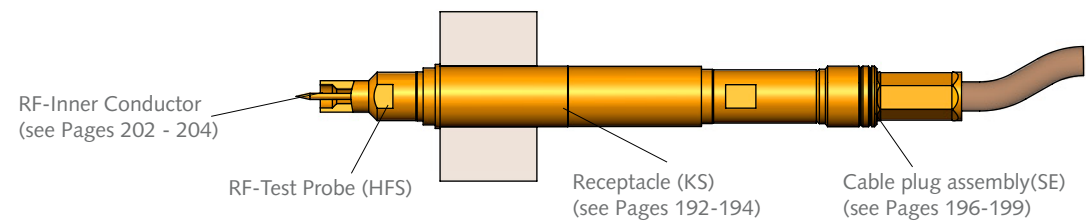
|         |     |
|---------|-----|
| 1 GHz   | 180 |
| HFS-858 |     |

|                                      |           |
|--------------------------------------|-----------|
| Receptacles<br>(KS)                  | 192 - 194 |
| Spacer of<br>Receptacles (DS)        | 195       |
| Cable plug<br>assembly (SE)          | 196 - 199 |
| Tools                                | 200 - 201 |
| Inner Conductor/<br>Signal Conductor | 202 - 204 |

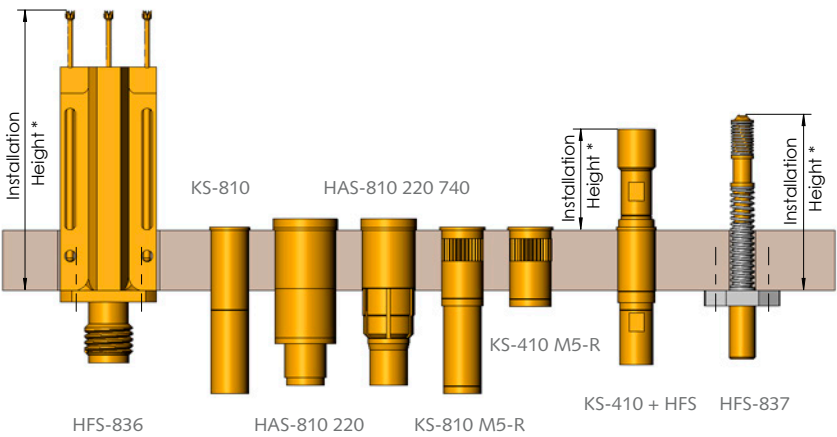
Contacting of PCB-Layout  
with different levels



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



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 <sub>i</sub> 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)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F)<br>KS-858 | HAS-810 220 (F)<br>HAS-810 220 740 (F) |
|-----------------------------------------------------|------------------|--------------------------------------------------------------------------|----------------------------------------|
| Variant                                             |                  | *Installation Height HFS in KS                                           |                                        |
| PCB coax closed<br>(50 Ω / 75 Ω)                    | ... / ... M      | 11.9 mm                                                                  | 13.0 mm                                |
| PCB coax open<br>(50 Ω / 75 Ω)                      | ... S / ... S 4M | 11.9 mm                                                                  | 13.0 mm                                |
| PCB coax<br>kidney-shaped<br>(50 Ω)                 | ... P / ... P 4M | 11.9 mm                                                                  | 13.0 mm                                |
| PCB-SG<br>PCB-SG-<br>Filter<br>PCB-GSG<br>PCB-GSGGG |                  | See illustration<br>on product side                                      |                                        |

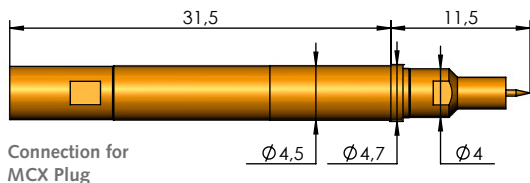
**Note:**  
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

Series:

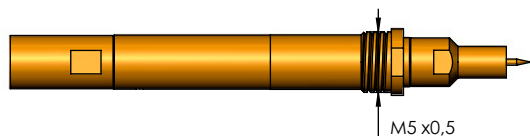
Available  
Tip Styles:

Ordering Description:

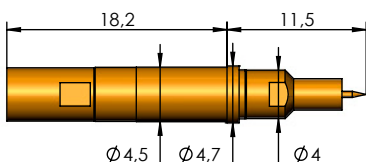
HFS-810 ...



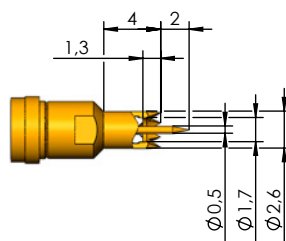
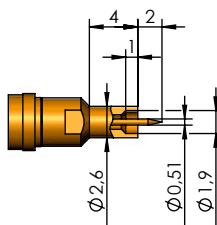
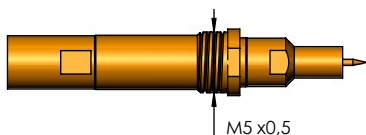
HFS-810 ... M (\*)



HFS-410 ...



HFS-410 ... M (\*)



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<br>HFS-810 M |     |     |     | HFS-410<br>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

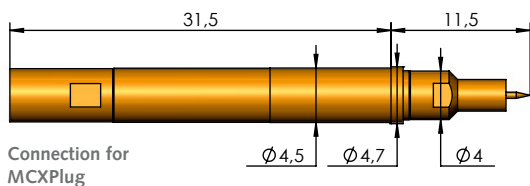
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

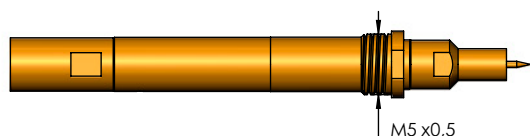
## Available Tip Styles:

## Ordering Description:

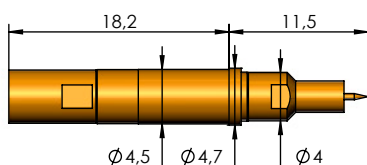
### HFS-840 ...



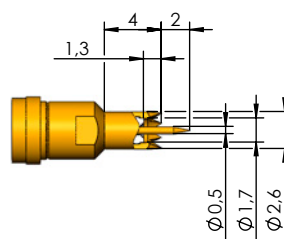
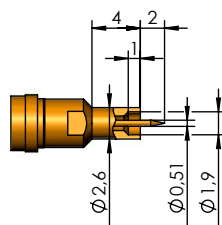
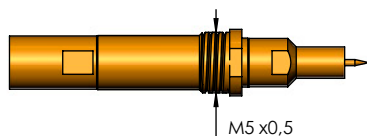
### HFS-840 ... M (\*)



### HFS-440 ...



### HFS-440 ... M (\*)



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<br>HFS-840 M |     |     |     | HFS-440<br>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

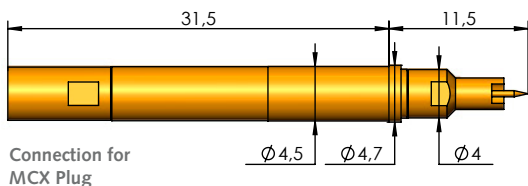
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

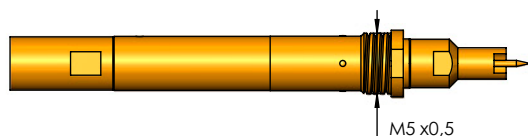
Available  
Tip Styles:

Ordering Description:

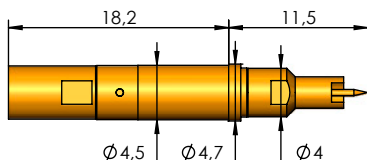
HFS-810 ...



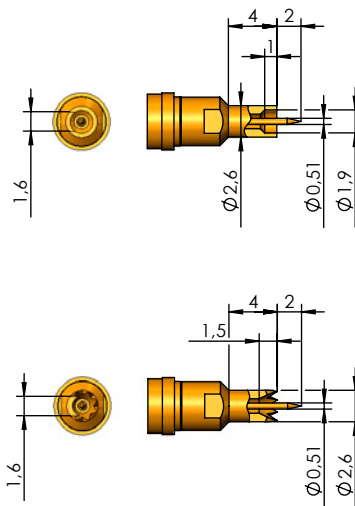
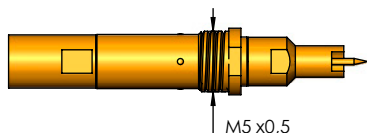
HFS-810 ... 4M (\*)



HFS-410 ...



HFS-410 ... 4M (\*)



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-810 201 051 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.

## 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<br>HFS-810 4M |     |     |     | HFS-410<br>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

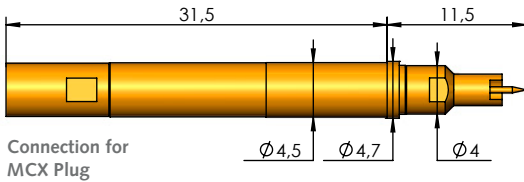
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

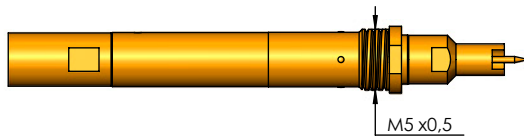
## Available Tip Styles:

## Ordering Description:

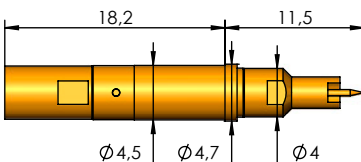
### HFS-840 ...



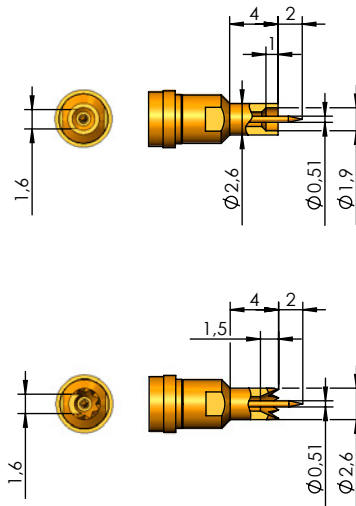
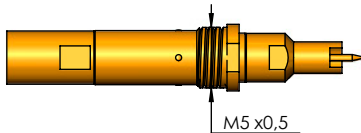
### HFS-840 ... 4M (\*)



### HFS-440 ...



### HFS-440 ... 4M (\*)



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-840 201 051 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.

## 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<br>HFS-840 4M |     |     |     | HFS-440<br>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

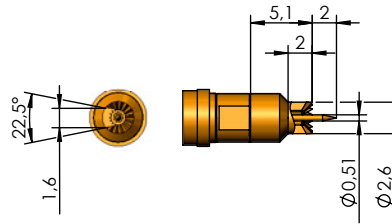
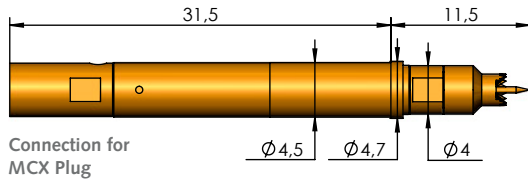
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

Series:

Available  
Tip Styles:

Ordering Description:

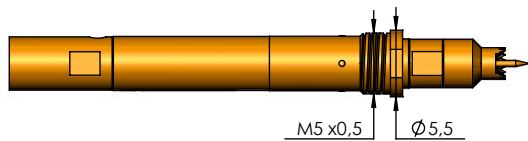
HFS-860 ...



HFS-860 201 051 A **xx** 06 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<br>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

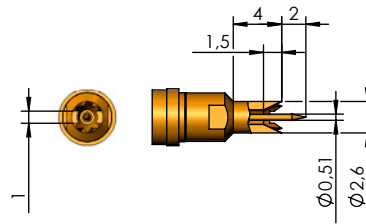
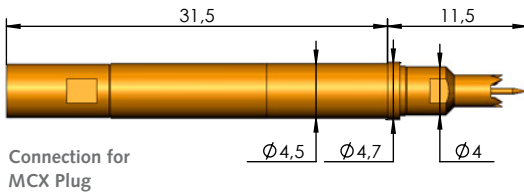
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 2.0 mm      |
| Maximum Stroke: | 5.0 mm      | 3.7 mm      |

## Series:

## Available Tip Styles:

## Ordering Description:

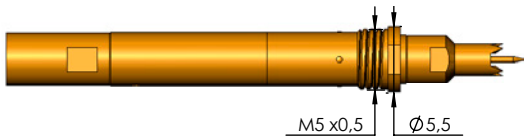
### HFS-810 ...



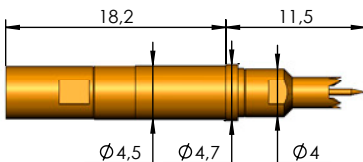
HFS-810 201 051 A **xx** 06 P  
HFS-810 201 051 A **xx** 06 P 4M  
HFS-410 201 051 A **xx** 06 P  
HFS-410 201 051 A **xx** 06 P 4M

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

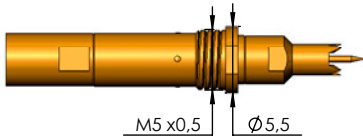
### HFS-810 ... 4M (\*)



### 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<br>HFS-810 4M |           |           |           | HFS-410<br>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              | <b>53</b>             | <b>80</b> | <b>93</b> | <b>99</b> | <b>50</b>             |

## 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      |

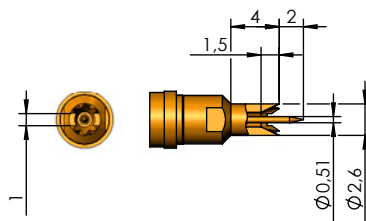
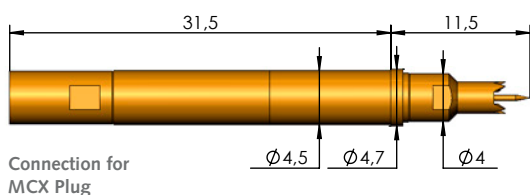


Series:

Available  
Tip Styles:

Ordering Description:

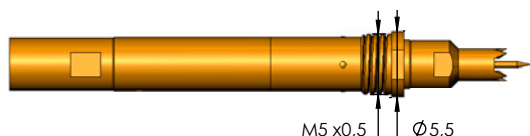
HFS-840 ...



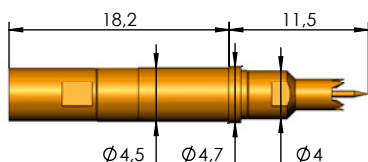
HFS-840 201 051 A **xx** 06 P  
HFS-840 201 051 A **xx** 06 P 4M  
HFS-440 201 051 A **xx** 06 P  
HFS-440 201 051 A **xx** 06 P 4M

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

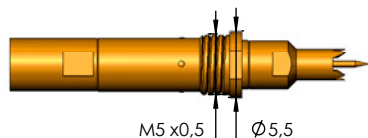
HFS-840 ... 4M (\*)



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<br>HFS-840 4M |     |     |     | HFS-440<br>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

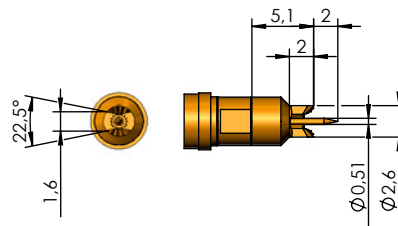
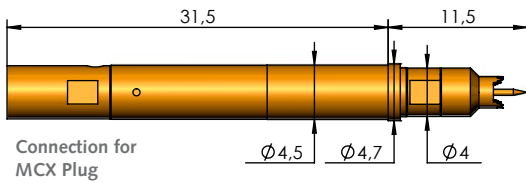
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 2.0 mm      |
| Maximum Stroke: | 3.0 mm      | 3.0 mm      |

## Series:

Available  
Tip Styles:

## Ordering Description:

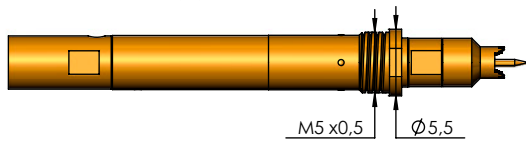
## HFS-860 ...



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<br>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              | <b>53</b>             | <b>80</b> | <b>93</b> | <b>99</b> |

## Mechanical Data

## HFS-860 and HFS-860 4M

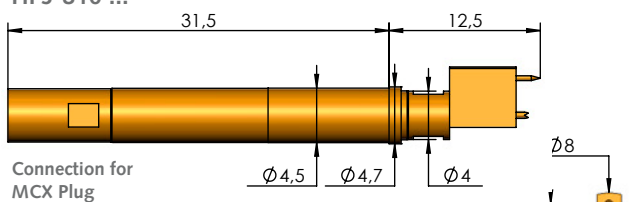
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 2.0 mm      |
| Maximum Stroke: | 5.0 mm      | 3.7 mm      |

Series:

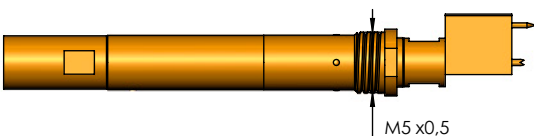
Available  
Tip Styles:

Ordering Description:

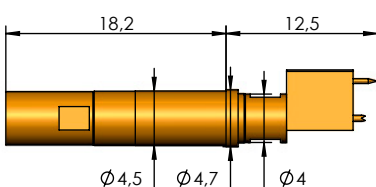
HFS-810 ...



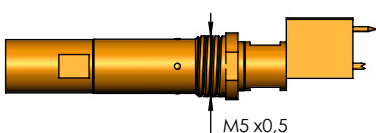
HFS-810 ... 4M (\*)



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.

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

## Mechanical Data

### HFS-810 and HFS-810 4M

|                        | Outer Cond.<br>Body | Outer Cond. Point<br>(Ground) | Inner Cond.<br>(Signal) |
|------------------------|---------------------|-------------------------------|-------------------------|
| <b>Working Stroke:</b> | 3.5 mm (4.0 mm)**   | 1.0 mm                        | not spring-loaded       |
| <b>Max. Stroke:</b>    | 4.0 mm (5.0 mm)**   | 1.5 mm                        | loaded                  |

## Mechanical Data

### HFS-410 and HFS-410 4M

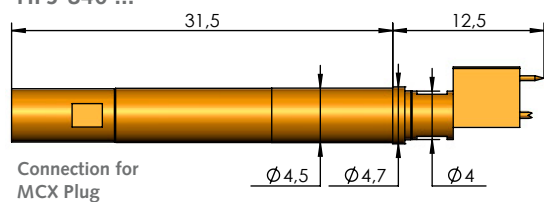
|                        | Outer Cond.<br>Body | Outer Cond. Point<br>(Ground) | Inner Cond.<br>(Signal) |
|------------------------|---------------------|-------------------------------|-------------------------|
| <b>Working Stroke:</b> | 2.0 mm              | 1.0 mm                        | not spring-loaded       |
| <b>Maximum Stroke:</b> | 3.0 mm              | 1.5 mm                        | loaded                  |

## Series:

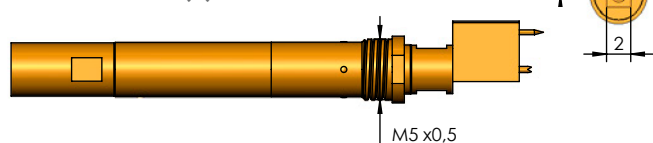
Available  
Tip Styles:

## Ordering Description:

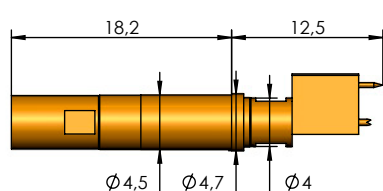
## HFS-840 ...



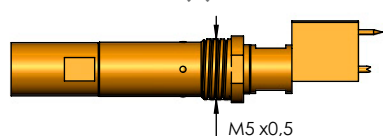
## HFS-840 ... 4M (\*)



## HFS-440 ...



## HFS-440 ... 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-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.

**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<br>HFS-840 4M             |     |     | HFS-440<br>HFS-440 4M |
|--------------------------------------------------------------------------------------------|-----------------------------------|-----|-----|-----------------------|
| Spring Force of Inner Conductor (N) (Signal)                                               | Inner conductor not spring-loaded |     |     |                       |
| Spring Force at working stroke<br>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                    |

**Mechanical Data****HFS-840 and HFS-840 4M**

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

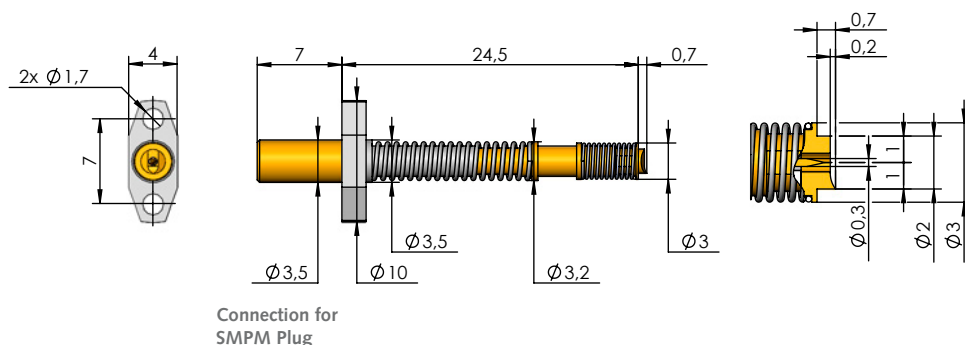
Series:



Available  
Tip Styles:

Ordering Description:

HFS-837 ...



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.

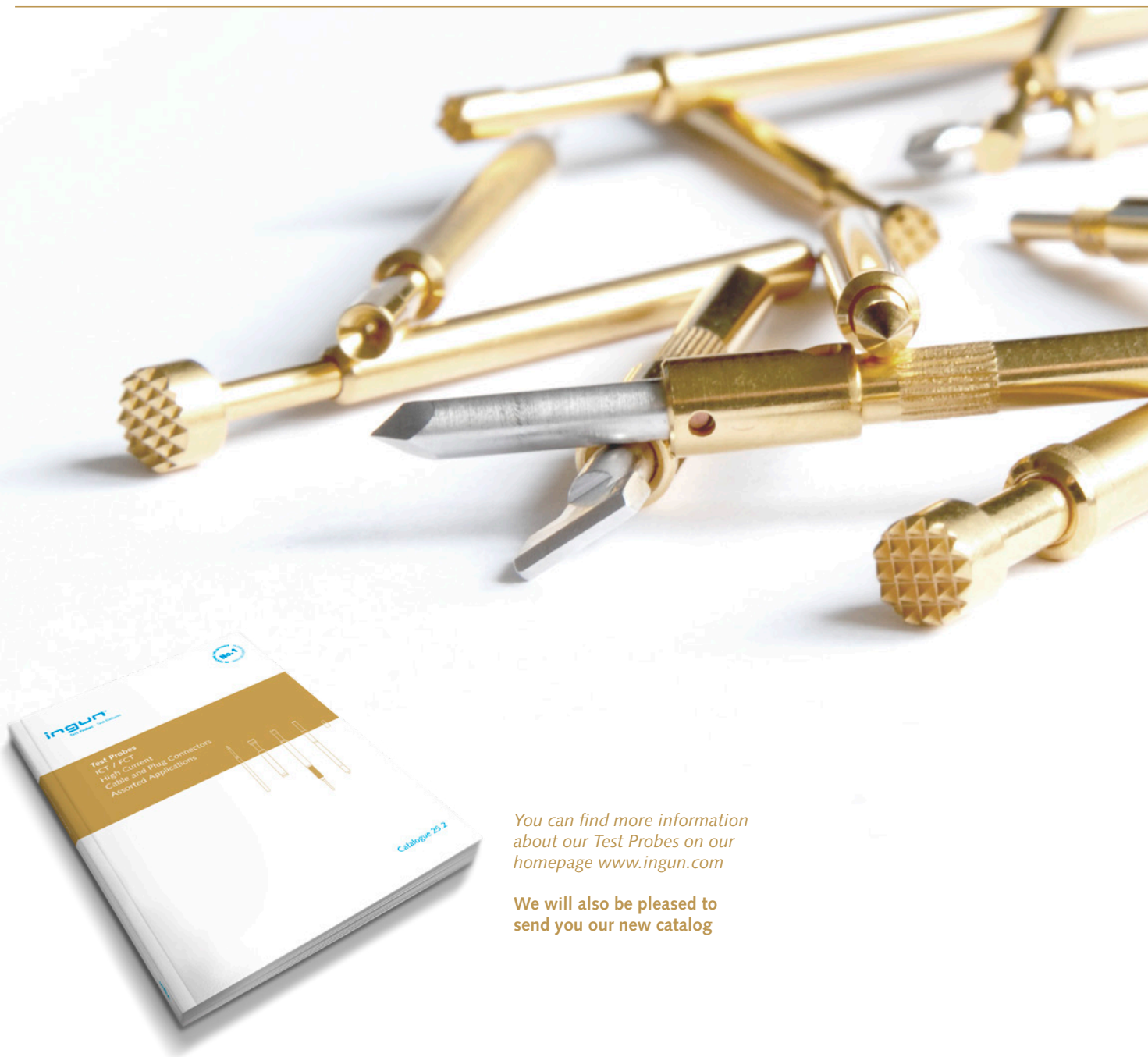
For use with high packing density.

## 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](http://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.

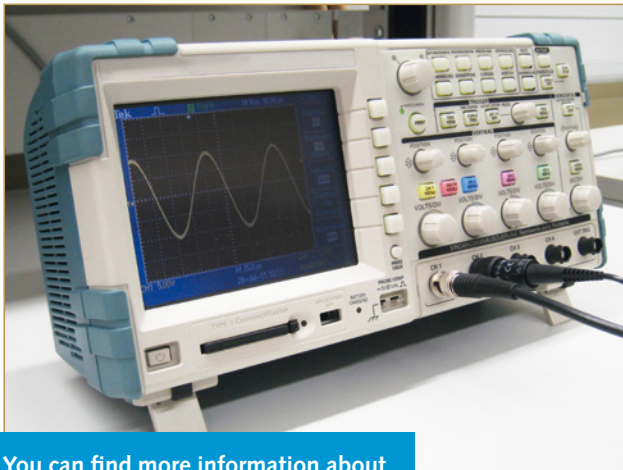
Apart from this there is a separate section with numerous new Test Probes for Cable Harness Testing – from Screw-in High-current Probes through to Push-back Probes.

## RF Probes with Integrated Filter

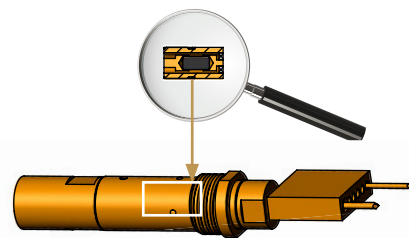


INGUN RF Probes with an Integrated Filter are generally used when the signal to be measured is picked up directly from the PCB conductor and, if possible, must not be influenced. This is achieved, among other, with an integrated ohmic Resistor near the probe tip, the value of which is derived from an 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.



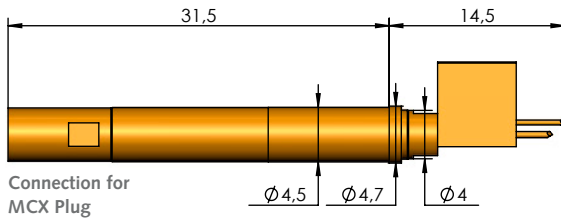
*HFS with integrated Filter*  
Example: HFS-440 007 051 A 4807 P5-AS 4M



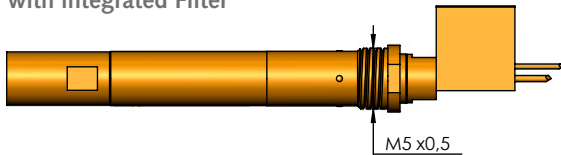
Series:



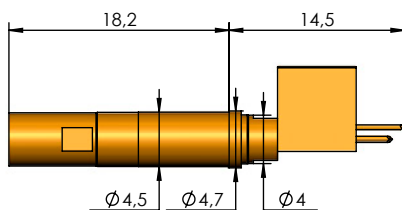
#### HFS-840 ... with integrated Filter



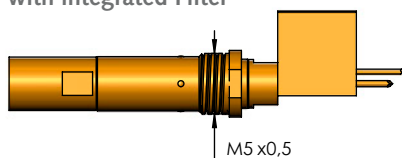
#### HFS-840 ... 4M (\*) with integrated Filter



#### HFS-440 ... with integrated Filter

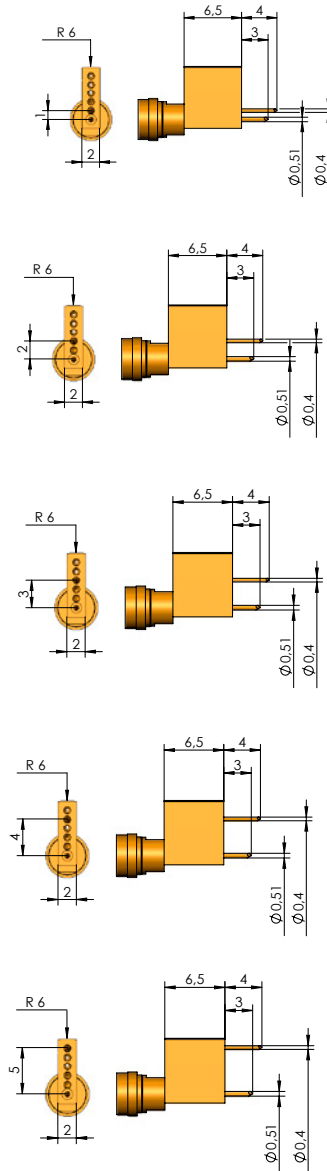


#### HFS-440 ... 4M (\*) with integrated Filter



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<br>HFS-840 4M             |     |     | HFS-440<br>HFS-440 4M |     |
|-----------------------------------------------------------------------------------------------|-----------------------------------|-----|-----|-----------------------|-----|
| Spring Force of Inner Conductor (N) (Signal)                                                  | Inner conductor not spring-loaded |     |     |                       |     |
| Spring Force at working stroke<br>Spring loaded point (Ground) on<br>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.<br>Body | Outer cond. Point<br>(Ground) | Inner Cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 2.0 mm              | 1.0 mm                        | not spring-loaded       |
| Maximum Stroke: | 3.0 mm              | 1.5 mm                        |                         |

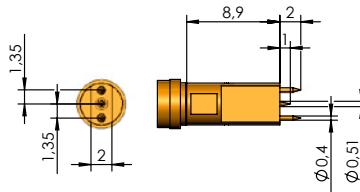
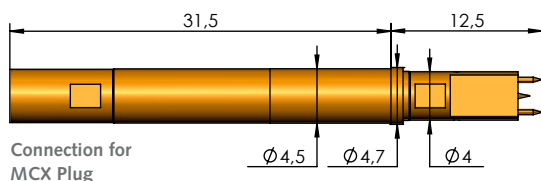


Series:

Available  
Tip Styles:

Ordering Description:

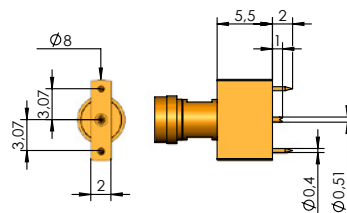
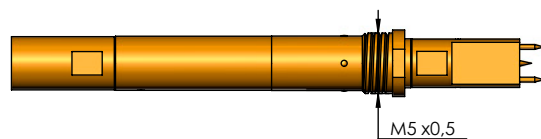
HFS-810 ...



HFS-810 201 051 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

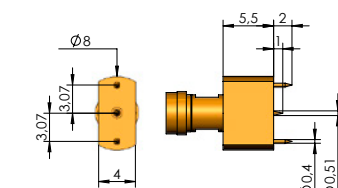
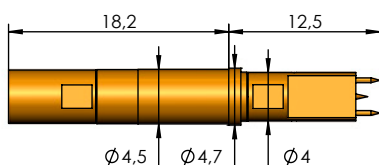
HFS-810 204 051 A **xx** 29 V2-S2  
HFS-810 204 051 A **xx** 29 V2-S2 4M  
HFS-410 204 051 A **xx** 29 V2-S2  
HFS-410 204 051 A **xx** 29 V2-S2 4M

HFS-810 ... 4M (\*)



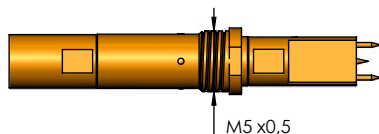
**Note:** (Version 1 \*\* + Version 2)  
For contacting ground pads with different heights. Outer conductor (Ground) with two spring-loaded tip (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N. Width of Outer conductor 2.0 mm and asymmetric for applications with high component density.

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

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

**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.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(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

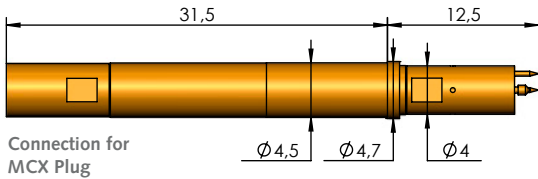
|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 2.0 mm              | 1.0 mm                        | not spring-loaded       |
|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

## Series:

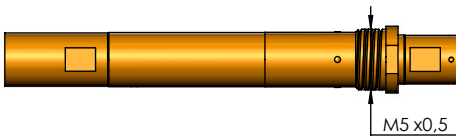
Available  
Tip Styles:

## Ordering Description:

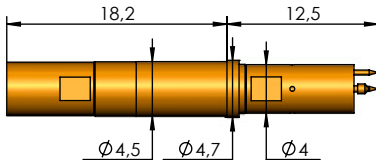
## HFS-810 ...



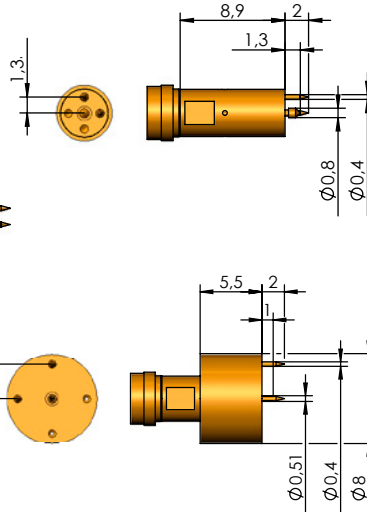
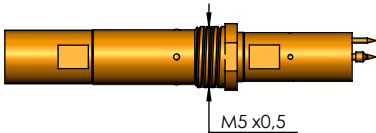
## HFS-810 ... 4M (\*)



## HFS-410 ...



## HFS-410 ... 4M (\*)



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-810 204 051 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.

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

**Mechanical Data****HFS-810 and HFS-810 4M**

|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(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**

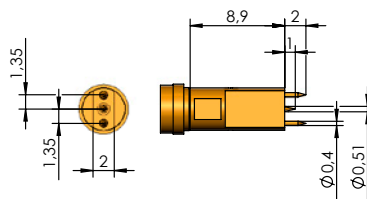
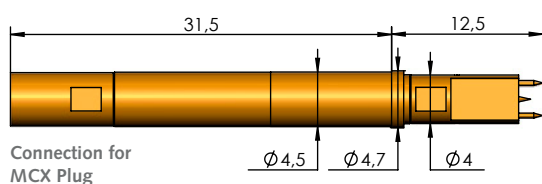
|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 2.0 mm              | 1.0 mm                        | not spring-loaded       |
|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

Series:

Available  
Tip Styles:

Ordering Description:

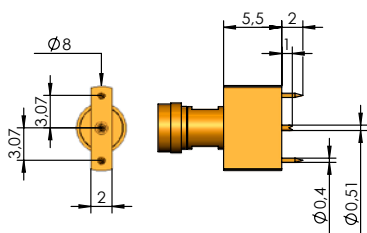
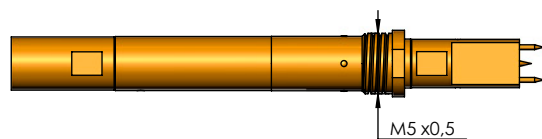
HFS-840 ...



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

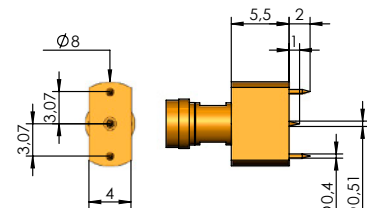
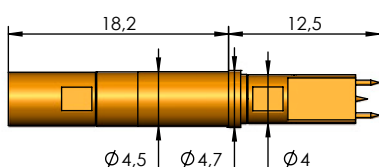
HFS-840 204 051 A **xx** 29 V2-S2  
HFS-840 204 051 A **xx** 29 V2-S2 4M  
HFS-440 204 051 A **xx** 29 V2-S2  
HFS-440 204 051 A **xx** 29 V2-S2 4M

HFS-840 ... 4M (\*)



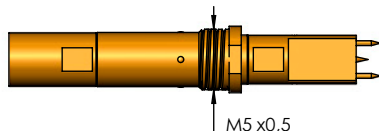
**Note:** (Version 1 \*\* + Version 2)  
For contacting ground pads with different heights. Outer conductor (Ground) with two spring-loaded tip (tip-style 01 spear-point), working stroke 1.0 mm, spring force 0.8 N. Width of Outer conductor 2.0 mm and asymmetric for applications with high component density.

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

HFS-440 ... 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-840<br>HFS-840 4M             | HFS-440<br>HFS-440 4M |
|--------------------------------------------------------------------------------------------|-----------------------------------|-----------------------|
| Spring Force of Inner Conductor (N) (Signal)                                               | Inner conductor not spring-loaded |                       |
| Spring Force at working stroke<br>Spring loaded point (Ground) on Outer Conductor Body (N) | 2 x 0.8                           | 2 x 0.8               |
| Spring Force of Outer Conductor Body (N)                                                   | 6.0                               | 8.0                   |
| Character for ordering                                                                     | 76                                | 96                    |

| Version 3 ***                                                                              | HFS-840<br>HFS-840 4M             | HFS-440<br>HFS-440 4M |
|--------------------------------------------------------------------------------------------|-----------------------------------|-----------------------|
| Spring Force of Inner Conductor (N) (Signal)                                               | Inner conductor not spring-loaded |                       |
| Spring Force at working stroke<br>Spring loaded point (Ground) on Outer Conductor Body (N) | 0.8                               | 0.8                   |
| Spring Force of Outer Conductor Body (N)                                                   | 4.0                               | 6.0                   |
| Character for ordering                                                                     | 48                                | 68                    |

**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.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(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                        | loaded                  |

## Mechanical Data

### HFS-440 and HFS-440 4M

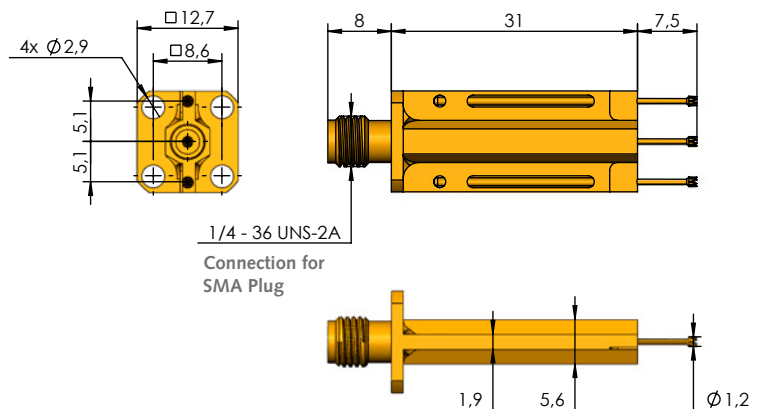
|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 2.0 mm              | 1.0 mm                        | not spring-loaded       |
|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

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   |
| <b>Character for ordering</b>                | <b>45</b> |

**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**

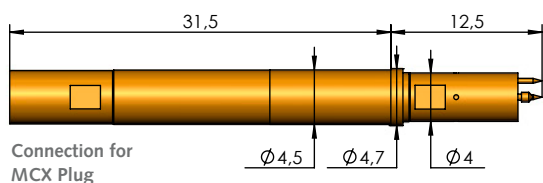
|                        | Outer Cond. (Signal) | Inner Cond. (Ground) |
|------------------------|----------------------|----------------------|
| <b>Working Stroke:</b> | 4.3 mm               | 4.3 mm               |
| <b>Maximum Stroke:</b> | 6.2 mm               | 6.2 mm               |

Series:

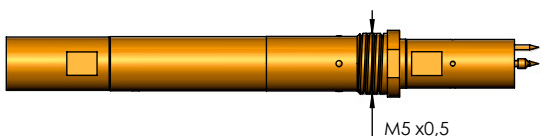
Available  
Tip Styles:

Ordering Description:

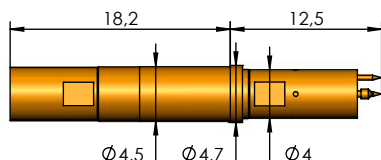
#### HFS-840 ...



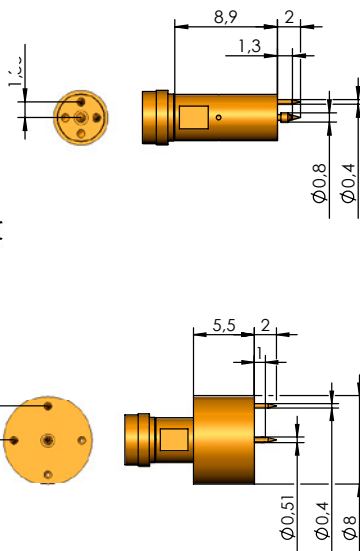
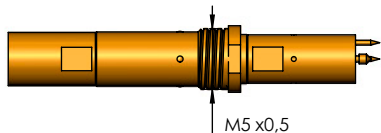
#### HFS-840 ... 4M (\*)



#### HFS-440 ...



#### HFS-440 ... 4M (\*)



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-840 204 051 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.

#### 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<br>HFS-840 4M             | HFS-440<br>HFS-440 4M |
|--------------------------------------------------------------------------------------------|-----------------------------------|-----------------------|
| Spring Force of Inner Conductor (N) (Signal)                                               | Inner conductor not spring-loaded |                       |
| Spring Force at working stroke<br>Spring loaded point (Ground) on Outer Conductor Body (N) | 2 x 0.8                           | 2 x 0.8               |
| Spring Force of Outer Conductor Body (N)                                                   | 6.0                               | 8.0                   |
| Character for ordering                                                                     | 76                                | 96                    |

#### Mechanical Data

##### HFS-840 and HFS-840 4M

|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(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                        | loaded                  |

#### Mechanical Data

##### HFS-440 and HFS-440 4M

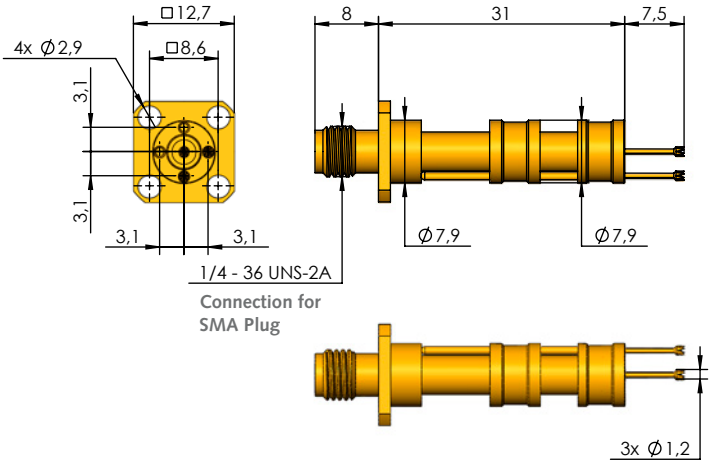
|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 2.0 mm              | 1.0 mm                        | not spring-loaded       |
|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

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.

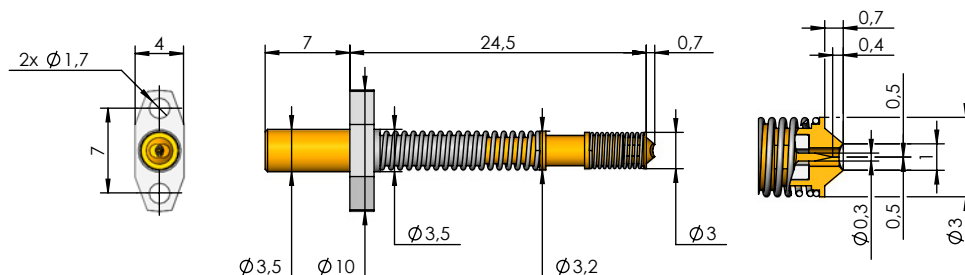
|                 | Mechanical Data      |                      |
|-----------------|----------------------|----------------------|
|                 | HFS-836              |                      |
|                 | Outer Cond. (Signal) | Inner Cond. (Ground) |
| Working Stroke: | 4.3 mm               | 4.3 mm               |
| Maximum Stroke: | 6.2 mm               | 6.2 mm               |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-837 ...

Connection for  
SMPM PlugHFS-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.<br>(Signal) | Inner Cond.<br>(Ground) |
|-----------------|-------------------------|-------------------------|
| Working Stroke: | 4.9 mm                  | 1.0 mm                  |
| Maximum Stroke: | 5.7 mm                  | 1.5 mm                  |

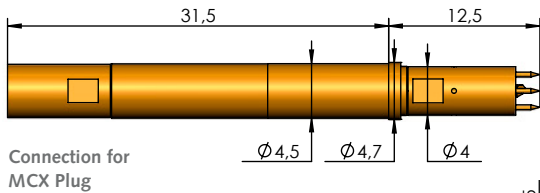


## Series:

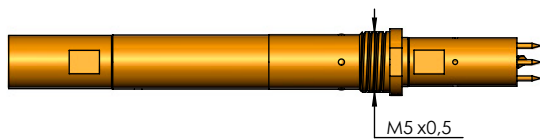
## Available Tip Styles:

## Ordering Description:

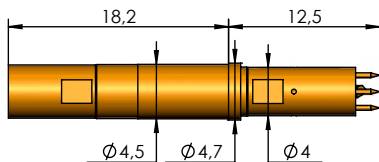
### HFS-810 ...



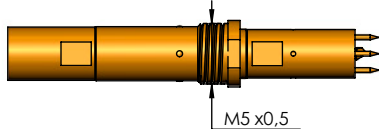
### HFS-810 ... 4M (\*)



### HFS-410 ...



### HFS-410 ... 4M (\*)



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-810 204 051 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

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

### Spring force 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-810<br>HFS-810 4M             | HFS-410<br>HFS-410 4M |
|--------------------------------------------------------------------------------------------|-----------------------------------|-----------------------|
| Spring Force of Inner Conductor (N) (Signal)                                               | Inner conductor not spring-loaded |                       |
| Spring Force at working stroke<br>Spring loaded point (Ground) on Outer Conductor Body (N) | 4 x 0.8                           | 4 x 0.8               |
| Spring Force of Outer Conductor Body (N)                                                   | 6.0                               | 8.0                   |
| Character for ordering                                                                     | 92                                | 11                    |

### Mechanical Data

#### HFS-810 and HFS-810 4M

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

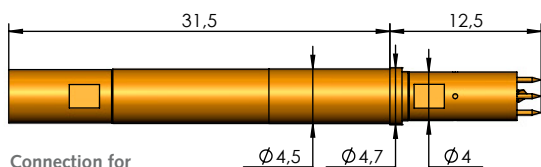


Series:

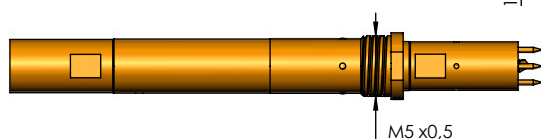
Available  
Tip Styles:

Ordering Description:

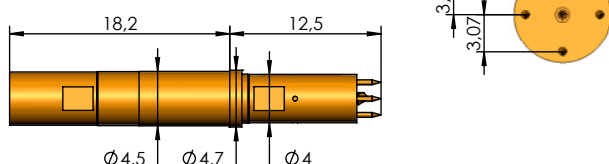
HFS-840 ...



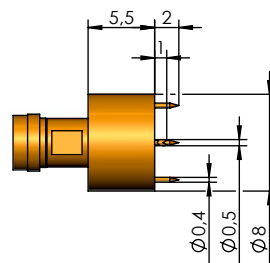
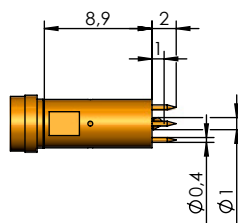
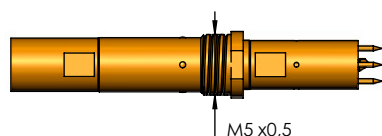
HFS-840 ... 4M (\*)



HFS-440 ...



HFS-440 ... 4M (\*)



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.

## 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<br>HFS-840 4M             | HFS-440<br>HFS-440 4M |
|--------------------------------------------------------------------------------------------|-----------------------------------|-----------------------|
| Spring Force of Inner Conductor (N) (Signal)                                               | Inner conductor not spring-loaded |                       |
| Spring Force at working stroke<br>Spring loaded point (Ground) on Outer Conductor Body (N) | 4 x 0.8                           | 4 x 0.8               |
| Spring Force of Outer Conductor Body (N)                                                   | 6.0                               | 8.0                   |
| Character for ordering                                                                     | 92                                | 11                    |

## Mechanical Data

### HFS-840 and HFS-840 4M

|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(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                        |                         |

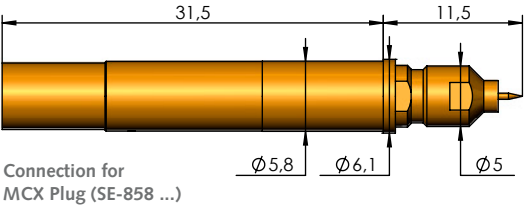
## Mechanical Data

### HFS-440 and HFS-440 4M

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

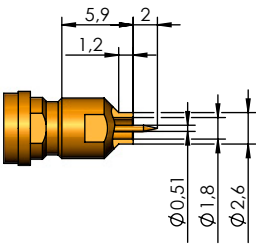
Series:

HFS-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      |

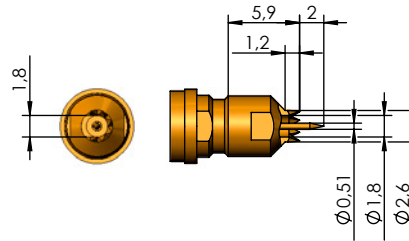
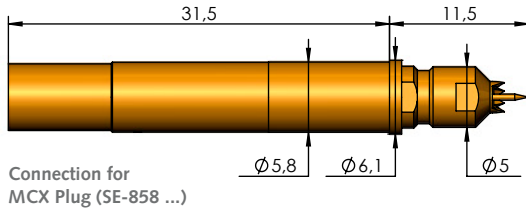
| Mechanical Data |             |            |
|-----------------|-------------|------------|
| HFS-858         |             |            |
|                 | Outer Cond. | Inner Cond |
| Working Stroke: | 4.0 mm      | 2.0 mm     |
| Maximum Stroke: | 5.0 mm      | 3.7 mm     |

Series:

Available  
Tip Styles:

Ordering Description:

HFS-858 ...



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.

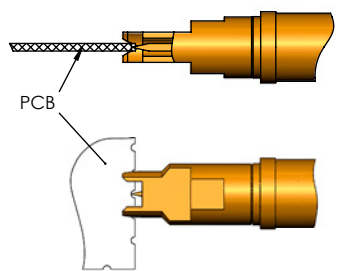
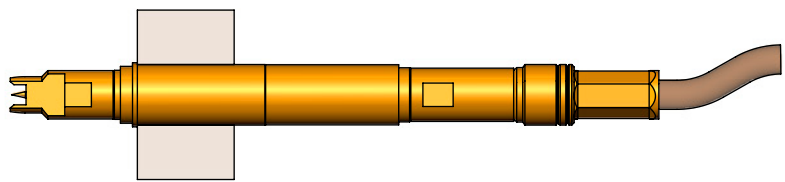
|                                     |         |
|-------------------------------------|---------|
|                                     | HFS-858 |
| Spring Force of Inner Conductor (N) | 1.3     |
| Spring Force of Outer Conductor (N) | 4.0     |
| Character for ordering              | 53      |

## 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



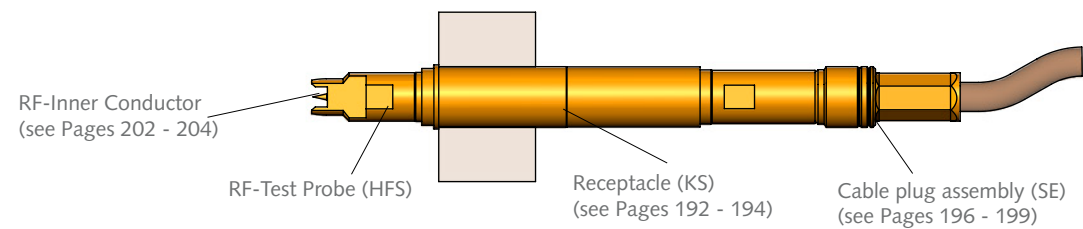
## Contents

### PCB-side

|                     |           |
|---------------------|-----------|
| 2 GHz               | 183 - 184 |
| HFS-810, HFS-810 4M |           |
| HFS-410, HFS-410 4M |           |
| 4 GHz               | 183 - 184 |
| HFS-840, HFS-840 4M |           |
| HFS-440, HFS-440 4M |           |

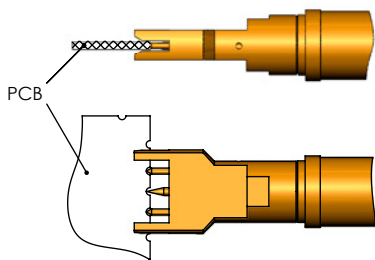
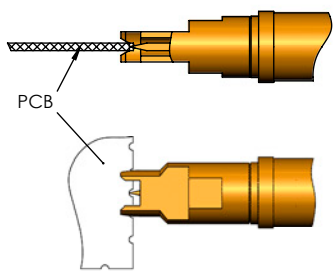
|                                   |           |
|-----------------------------------|-----------|
| Receptacles (KS)                  | 192 - 194 |
| Spacer of Receptacles (DS)        | 195       |
| Cable plug assembly (SE)          | 196 - 199 |
| Tools                             | 200 - 201 |
| Inner Conductor/ Signal Conductor | 202 - 204 |

PCB test  
point side

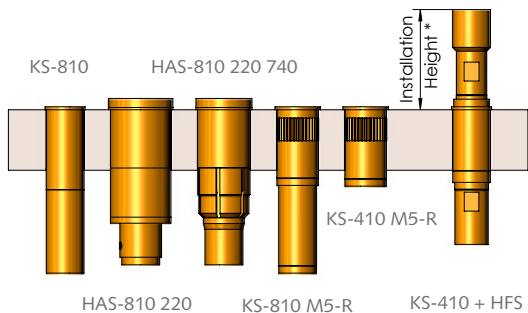


Contacting Example PCB-side:

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| Contacting of PCB's from the side | Contacting of PCB's from the side |
| HFS-810 201 051 A 5314 VZ         | HFS-810 201 051 A 7629-V2-VZ      |



Customizing Example:



| Installation Height in Receptacle |                           | KS-810 (F)<br>KS-410 (F)<br>KS-810 M5-(R/F)<br>KS-410 M5-(R/F) | HAS-810 220 (F)<br>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 <sub>i</sub> typical Inner Conductor: | ≤ 10 mΩ          |
| Impedance Test Probe:                   | 50 Ω             |
| Impedance Cable:                        | 50 Ω             |

| Operating Temperature Range |
|-----------------------------|
| –40 up to +80° C            |

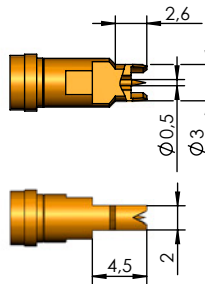
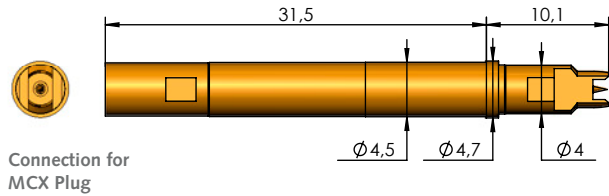
**Note:**  
Further details of receptacles with and without flange connection (F) see pages 192 - 194.

## Series:

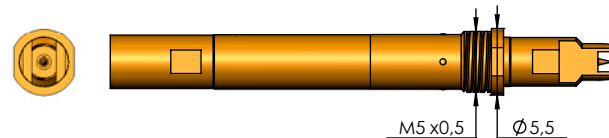
## Available Tip Styles:

## Ordering Description:

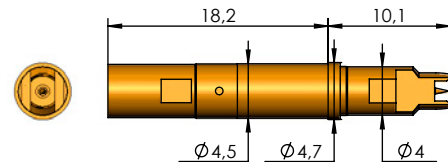
### HFS-810 ... / HFS-840 ...



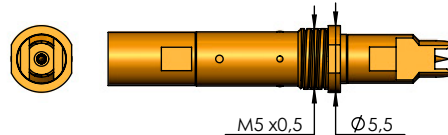
### HFS-810 ... 4M / HFS-840 ... 4M (\*)



### HFS-410 ... / HFS-440 ...



### HFS-410 ... 4M / HFS-440 ... 4M (\*)



### 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<br>HFS-810 4M/840 4M |     |     | HFS-410/440<br>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

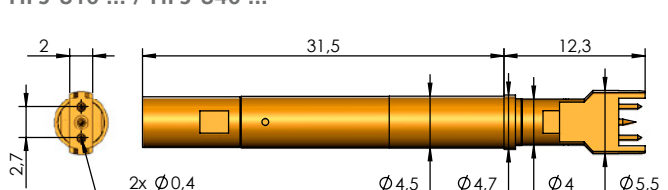
|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 2.0 mm      | 0.5 mm      |
| Maximum Stroke: | 3.0 mm      | 1.5 mm      |

Series:

Available  
Tip Styles:

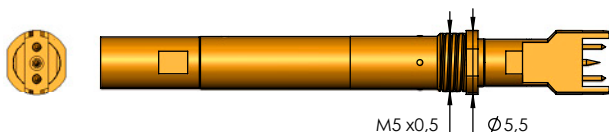
Ordering Description:

HFS-810 ... / HFS-840 ...

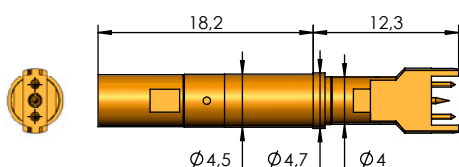


Connection for  
MCX Plug

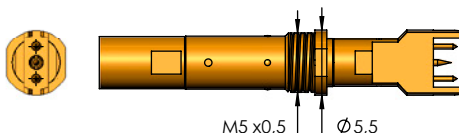
HFS-810 ... 4M / HFS-840 ... 4M (\*)



HFS-410 ... / HFS-440 ...



HFS-410 ... 4M / HFS-440 ... 4M (\*)



### 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.

### 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.

|                                                                                               | HFS-810/840<br>HFS-810 4M/840 4M  |         | HFS-410/440<br>HFS-410 4M/440 4M |
|-----------------------------------------------------------------------------------------------|-----------------------------------|---------|----------------------------------|
| Spring Force of Inner Conductor (N) (Signal)                                                  | Inner conductor not spring-loaded |         |                                  |
| Spring Force at working stroke<br>Spring loaded point (Ground)<br>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                               |

### Mechanical Data

HFS-810 and HFS-810 4M HFS-840 and HFS-840 4M

|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 4.0 mm              | 0.5 mm                        | not spring-loaded       |
| Maximum Stroke: | 5.0 mm              | 1.0 mm                        |                         |

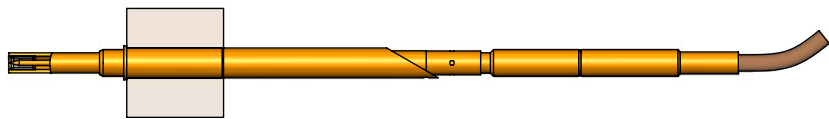
### Mechanische Daten

HFS-410 and HFS-410 4M HFS-440 and HFS-440 4M

|                 | Outer cond.<br>Body | Outer cond. Point<br>(Ground) | Inner cond.<br>(Signal) |
|-----------------|---------------------|-------------------------------|-------------------------|
| Working Stroke: | 2.0 mm              | 0.5 mm                        | not spring-loaded       |
| Maximum Stroke: | 3.0 mm              | 1.0 mm                        |                         |

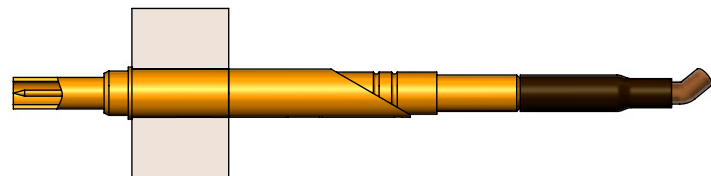
# Contacting of PCB's with coaxial di-pole Probe

Series coaxial di-pole Probe HFS-010



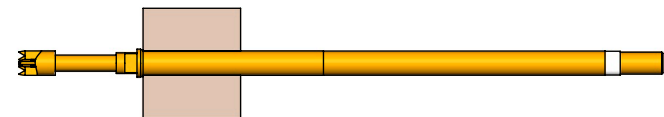
# Contacting of PCB's with coaxial di-pole Probe

Series coaxial di-pole Probe HFS-110



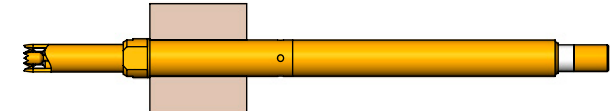
# Contacting of PCB's with coaxial di-pole Probe

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



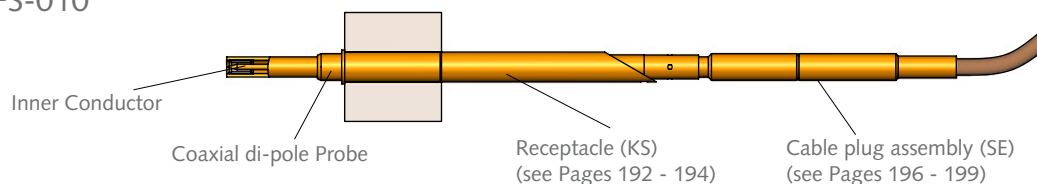
| Contents                               |           |
|----------------------------------------|-----------|
| <b>Coaxial di-pole Probe HFS-010</b>   |           |
| HFS-010                                | 187       |
| <b>Coaxial di-pole Probe HFS-110</b>   |           |
| HFS-110                                | 188       |
| <b>Coaxial di-pole Probe DPS-215 M</b> |           |
| DPS-215 M                              | 189       |
| <b>Coaxial di-pole Probe DPS-465 M</b> |           |
| DPS-465 M                              | 190       |
| Receptacles (KS)                       | 192 - 194 |
| Spacer of Receptacles (DS)             | 195       |
| Cable plug assembly (SE)               | 196 - 199 |
| Tools                                  | 200 - 201 |
| Inner Conductor/Signal Conductor       | 202 - 204 |



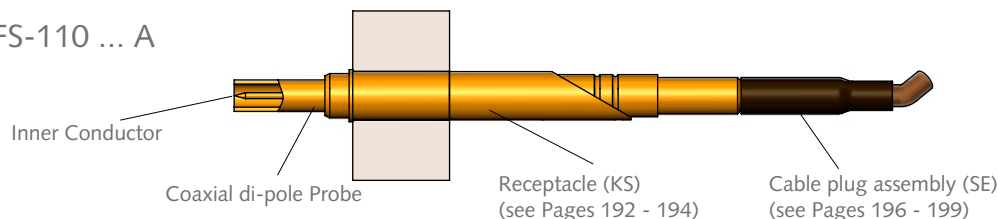
# HFS-010, HFS-110, DPS-215 M, DPS-465 M

## Coaxial di-pole Probes

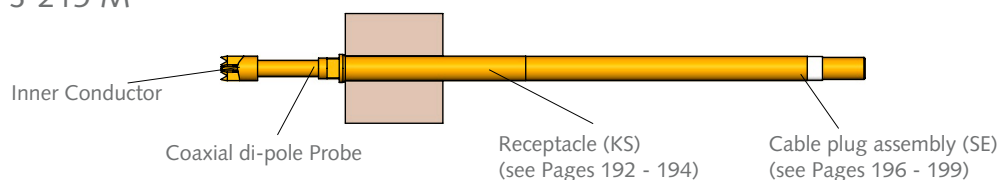
### HFS-010



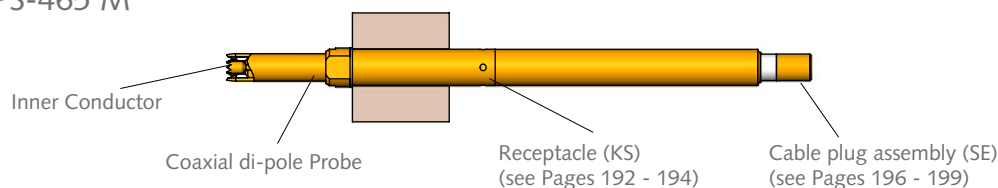
### HFS-110 ... A



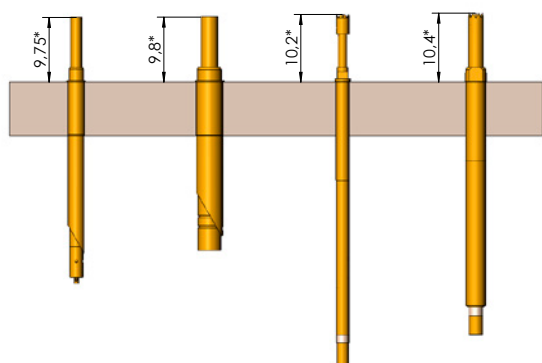
### DPS-215 M



### 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

#### Electrical Data

#### HFS-010      HFS-110

#### DPS-215 M      DPS-465 M

|                        |             | HFS-010 | HFS-110 | DPS-215 | DPS-465 |
|------------------------|-------------|---------|---------|---------|---------|
| Measurement current    | Outer Cond. | 3 A     | 3 A     | 8 A     | 10 A    |
|                        | Inner Cond. | 3 A     | 3 A     | 2 A     | 2 A     |
| Measurement voltage    |             | 400 V   | 500 V   | 300 V   | 1000 V  |
| R <sub>i</sub> typical |             | ≤ 20 mΩ | ≤ 20 mΩ | ≤ 20 mΩ | ≤ 20 mΩ |

| Installation Height in Receptacle |       | KS-010 23                      | KS-110 23 |
|-----------------------------------|-------|--------------------------------|-----------|
| Variant                           |       | *Installation Height HFS in KS |           |
| HFS-010                           | ... A | 9.75 mm                        | ---       |
|                                   | ... A | ---                            | 9.8 mm    |
| HFS-110                           | ... B | ---                            |           |

| Installation Height in Receptacle |                          | KS-215 M1,6<br>KS-215 M1,6-F<br>KS 215 M1,6-F-R | KS-465 M2,5<br>KS-465 M2,5-F<br>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 | ---                                             |                                                 |

#### Operating Temperature Range

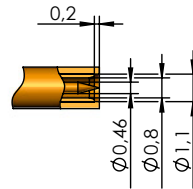
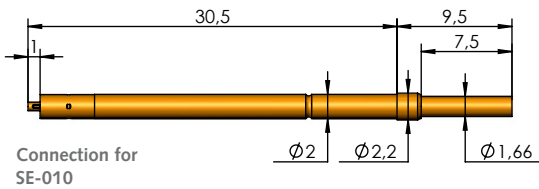
–40 up to +80° C

## Series:

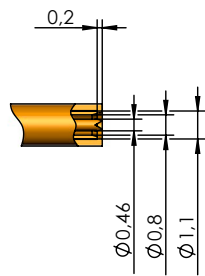
Available  
Tip Styles:

## Ordering Description:

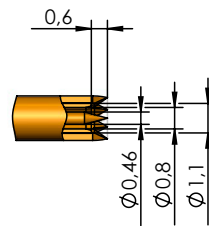
## HFS-010 ...

HFS-010 351 050 A **xx** 02 A

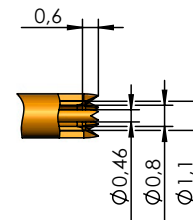
**Note:** Version with Outer conductor tip-style 02 (flat) and Inner Conductor tip-style 51 (crown).

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.

**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. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 5.5 mm      | 5.5 mm      |
| <b>Maximum Stroke:</b> | 7.5 mm      | 7.5 mm      |

**Assembly Hole in CEM1 and FR4****HFS-010**

|                            |                                      |
|----------------------------|--------------------------------------|
| <b>with Receptacle:</b>    | $\varnothing 2.48 - 2.49 \text{ mm}$ |
| <b>without Receptacle:</b> | $\varnothing 2.00 \text{ mm}$        |

# HFS-110

## Coaxial di-pole Probe

Grid:  $\geq 4.50 \text{ mm (*)}$   
 $\geq 180 \text{ Mil}$

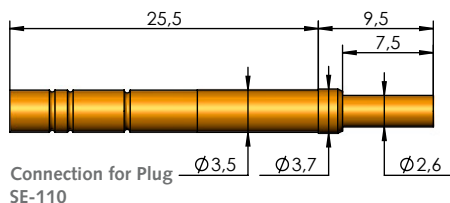
HFS-110

Series:

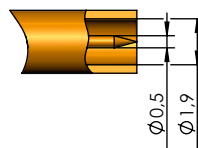
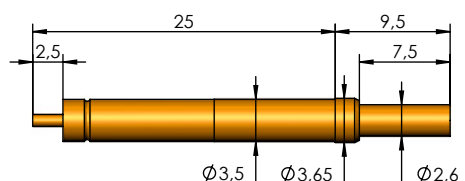
Available  
Tip Styles:

Ordering Description:

HFS-110 ... A



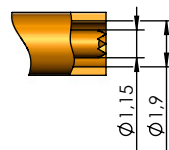
HFS-110 ... B



HFS-110 301 050 A **xx** 02 A  
HFS-110 301 050 A **xx** 02 B

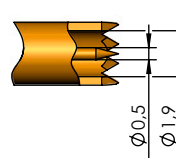
**Note:** Version with Outer conductor tip-style 02 (flat) and Inner Conductor tip-style 01 (spear-point).

HFS-110 306 115 A **xx** 02 A  
HFS-110 306 115 A **xx** 02 B



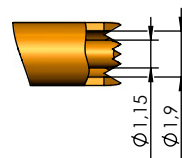
**Note:** Version with Outer conductor tip-style 02 (flat) and Inner Conductor tip-style 06 (serrated).

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.

#### 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.

|                                     | HFS-110 |
|-------------------------------------|---------|
| Spring Force of Inner Conductor (N) | 1.5     |
| Spring Force of Outer Conductor (N) | 3.0     |
| Character for ordering              | 30      |

### 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

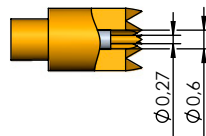
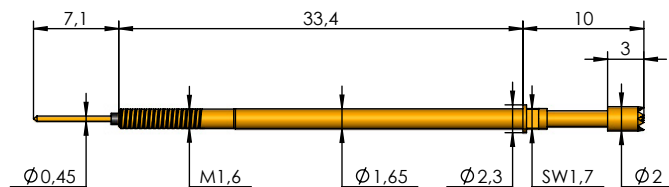
|                     |                  |
|---------------------|------------------|
| with Receptacle:    | Ø 3.98 - 3.99 mm |
| without Receptacle: | Ø 3.50 mm        |

Series:

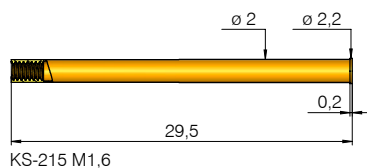
Available  
Tip Styles:

Ordering Description:

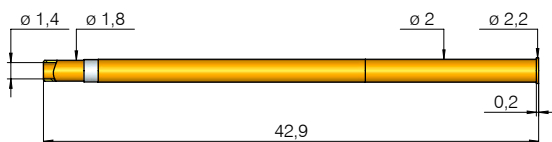
DPS-215 ... M

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.

**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. |
|------------------------|-------------|-------------|
| <b>Working Stroke:</b> | 4.0 mm      | 4.0 mm      |
| <b>Maximum Stroke:</b> | 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:  $\geq 3.50$  mm (\*)  
 $\geq 140$  Mil

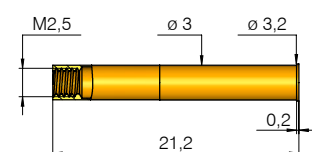
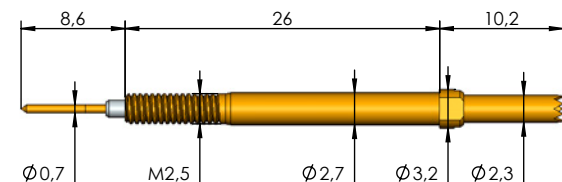
DPS-465 M

Series:

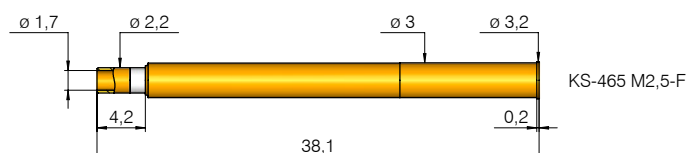
Available  
Tip Styles:

Ordering Description:

DPS-465 ... M



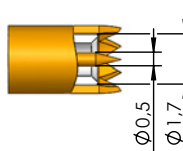
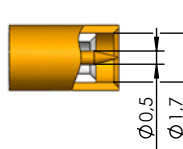
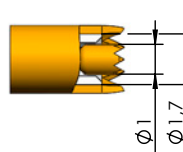
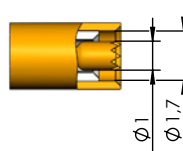
KS-465 M2,5



KS-465 M2,5-F



KS-465 M2,5-F-R  
(mit Rändel)



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.

#### 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.

|                                     |         |
|-------------------------------------|---------|
|                                     | DPS-465 |
| Spring Force of Inner Conductor (N) | 1.0     |
| Spring Force of Outer Conductor (N) | 3.0     |
| Character for ordering              | 40      |

### Mechanical Data

DPS-465 M

### Assembly Hole in CEM1 and FR4

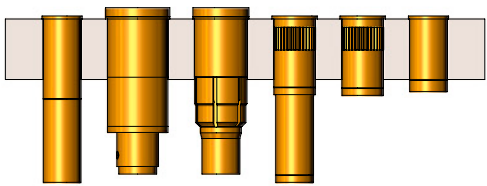
DPS-465 M

|                 | Outer Cond. | Inner Cond. |
|-----------------|-------------|-------------|
| Working Stroke: | 4.0 mm      | 4.0 mm      |
| Maximum Stroke: | 5.0 mm      | 5.0 mm      |

with Receptacle:  $\varnothing 2.98 - 2.99$  mm

# Accessories

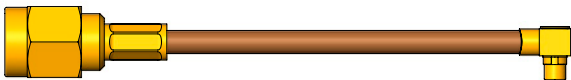
## Receptacles (KS)



## Spacer of Receptacles (DS)



## Cable Connector Assembly (SE)



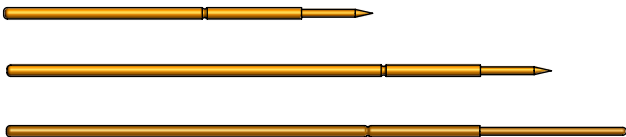
## Adapter



## Tools



## Inner Conductor / Signal Conductor



### Contents

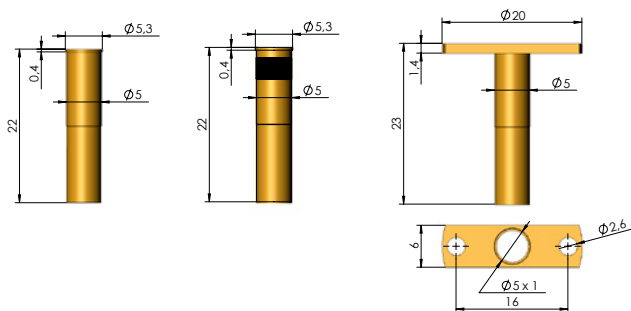
## Accessories

|                                   |           |
|-----------------------------------|-----------|
| Receptacles (KS)                  | 192 - 194 |
| Spacer of Receptacles (DS)        | 195       |
| Cable plug assembly (SE)          | 196 - 199 |
| Tools                             | 200 - 201 |
| Inner Conductor/ Signal Conductor | 202 - 204 |

# 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.



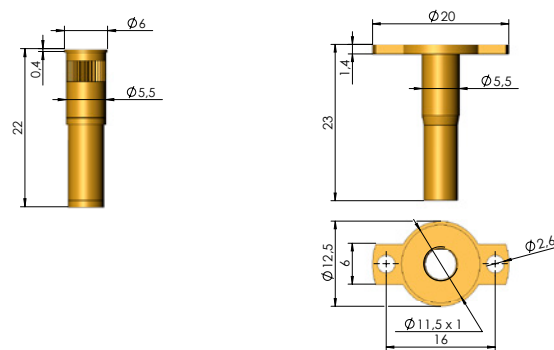
**KS-810**

**KS-810 R**

**KS-810 F**

**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.

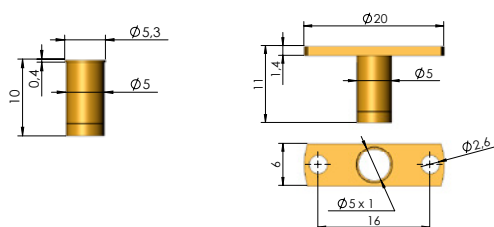


**KS-810 M5-R**

**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.

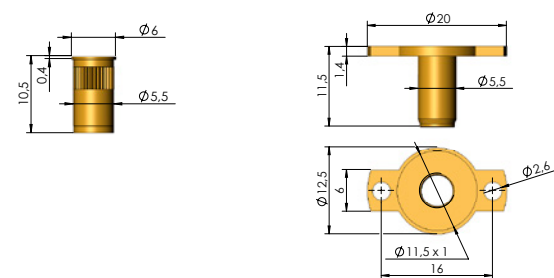


**KS-410**

**KS-410 F**

**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 KM5-R**

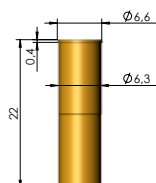
**KS-410 KM5-F**

## 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

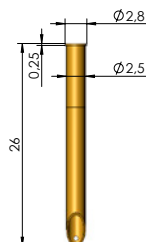
for all HFS of series **HFS-858** without thread



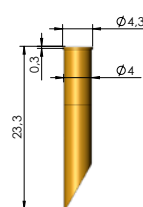
KS-858

## KS-010 23 Receptacle with securing crimps KS-110 23 Receptacle with securing crimps

for all HFS of series **HFS-010** respectively **HFS-110**.



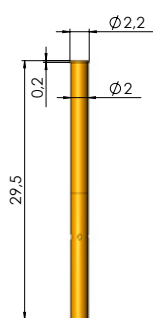
KS-010 23



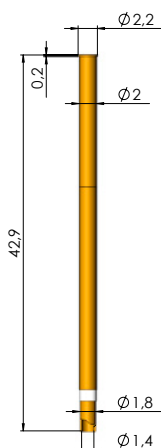
KS-110 23

## 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)

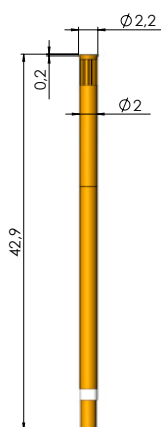
for all DPS of series **DPS-215 M**.



KS-215 M1,6



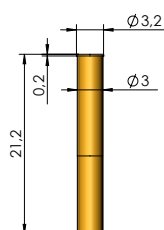
KS-215 M1,6-F



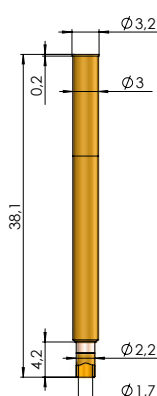
KS-215 M1,6-F-R

## 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)

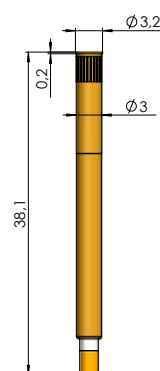
for all DPS of series **DPS-465 M**.



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

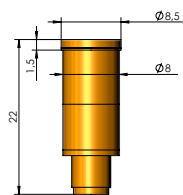
For all HFS of series **HFS-810/840/860/865 without thread**.

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.

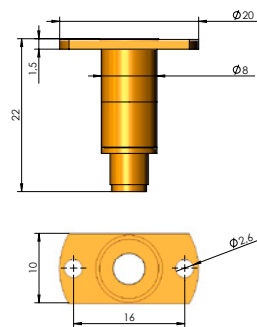
**HAS-810 220** flexible Receptacle  
( $\pm 3,5^\circ$  Angular alignment, Grid  $\geq 9,0$  mm)

**HAS-810 220 F** flexible Flange Receptacle  
( $\pm 3,5^\circ$  Angular alignment)

Operating Temperature Range  $-40^\circ$  up to  $+80^\circ$  C



**HAS-810 220**



**HAS-810 220 F**

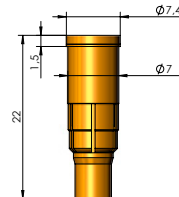
For all HFS of series **HFS-810/840/860/865 without thread**.

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.

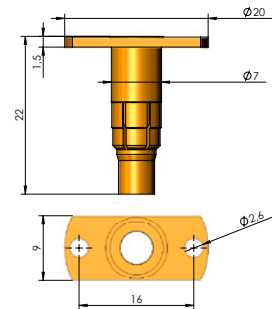
**HAS-810 220 740** flexible Receptacle  
( $\pm 2,5^\circ$  Angular alignment, Grid  $\geq 8,0$  mm)

**HAS-810 220 740 F** flexible Flange Receptacle  
( $\pm 2,5^\circ$  Angular alignment)

Operating Temperature Range  $-40^\circ$  up to  $+80^\circ$  C



**HAS-810 220 740**

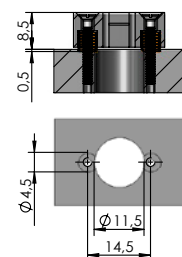
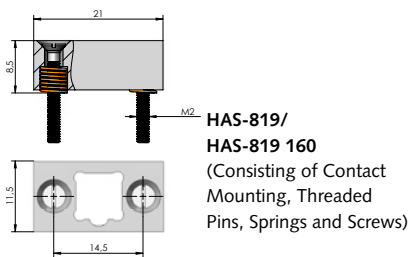


**HAS-810 220 740 F**

**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**.

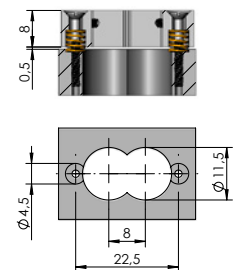
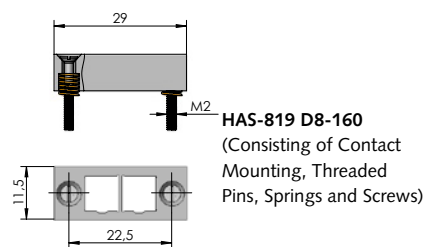
Operating Temperature Range max.  $+40^\circ$  C



Customizing recommendation  
for Mounting Plate

**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.  $+40^\circ$  C



Customizing recommendation  
for Mounting Plate

## Assembly bore in CEM1 and FR4:

|                                             |                                |
|---------------------------------------------|--------------------------------|
| with flexible Receptacle HAS-810 220:       | $\varnothing 7,98 - 7,99$ mm   |
| with flexible Receptacle HAS-810 220 F:     | $\varnothing 8,10$ mm          |
| with flexible Receptacle HAS-810 220 740:   | $\varnothing 6,98 - 6,99$ mm   |
| with flexible Receptacle HAS-810 220 740 F: | $\varnothing 7,10$ mm          |
| with flexible Mounting HAS-819/HAS-819 160: | see customizing recommendation |
| with flexible Mounting HAS-819 D8-160:      | see customizing recommendation |

## DS-810 0x 50 N

Spacers for Barrel of RF Probe

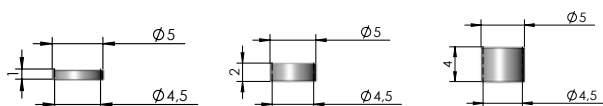
To increase the installation height by 1, 2 or 4 mm the spacers **DS-810 0x 50 N** can be placed over the barrel respectively under the collar of the RF probe before it is pressed in.  
For all HFS of series HFS-410/440/810/840/860/865 without thread.

## 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.

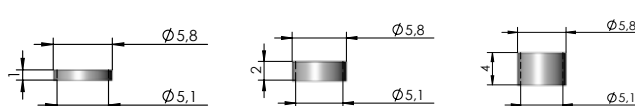
For the Receptacles **KS-810** and **KS-410**.



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:

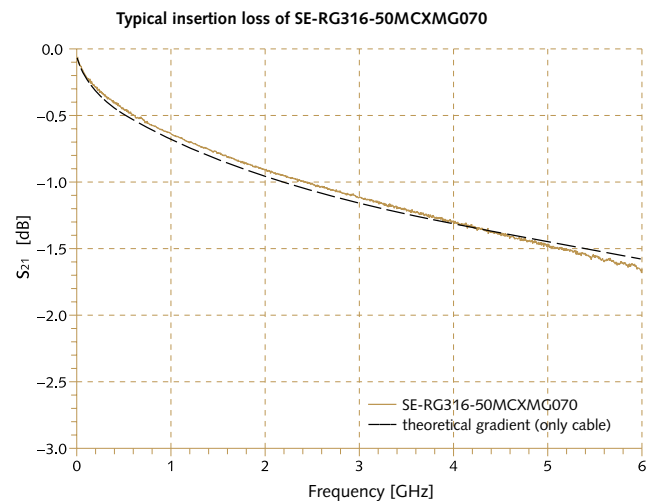
$$\alpha \text{ [dB]} = (a \cdot \sqrt{f} + b \cdot f) \cdot l \quad f \text{ in [GHz]}, l \text{ in [m]}$$

Example: Loss calculation for the cable

SE-RG316-50MCXMG070 (length: 70 cm at  $f = 1.5 \text{ GHz}$ ):

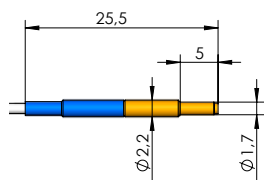
$$\alpha = (0.7727 \cdot \sqrt{1.5} + 0.0972 \cdot 1.5) \cdot 0.7 \text{ dB} \approx 0.8 \text{ dB}$$

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.

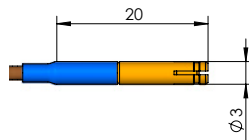


| Cable type                       | K_01152-07     | RG178 B/U                            | ENVIROFLEX_178      | RG316 /U            | ENVIROFLEX_316_D    | MULTIFLEX_86    | RTK-FLEX405-SPC-FEP | RG59 B/U                             | RG179 B/U           |
|----------------------------------|----------------|--------------------------------------|---------------------|---------------------|---------------------|-----------------|---------------------|--------------------------------------|---------------------|
| 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               | .221           | .1408                                | .14067              | .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                  |

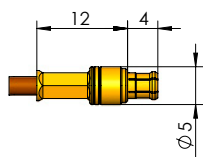
**Plug versions:** (see page 198 for ordering number)



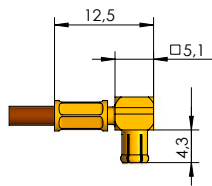
SE-010



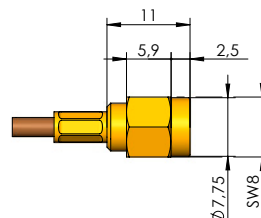
SE-110



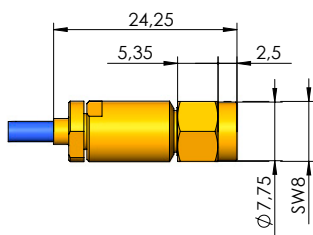
MCX-plug (straight)\*



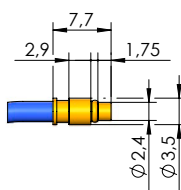
MCX-m (angular 90°)\*



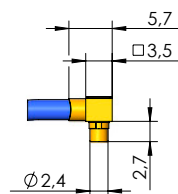
SMA-m (straight)\*



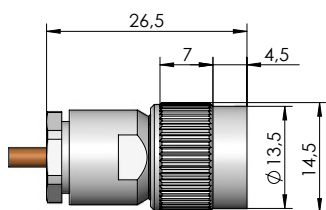
PC3.5-m (straight)



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



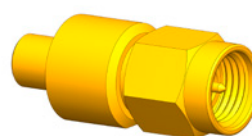
Ordering number  
HFS-ADA-MCX-M-SMA-F

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 up to max. 0.2 GHz for HFS-010 |                 |             |                       |             |                  |
|----------------------------------------------------|-----------------|-------------|-----------------------|-------------|------------------|
| Part number                                        | Ordering number | Interface 1 | Cable length and type | Interface 2 | f <sub>max</sub> |
| 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 <sub>max</sub> |
| 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 <sub>max</sub> |
| 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 <sub>max</sub> |
| 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 <sub>max</sub> |
| 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 <sub>max</sub> | Application                                         |
| SE-RG316-50MCXMG0705                         | SE-RG316-0012   | MCX-m (straight)    | 70 cm, RG316/U             | open             | 3 GHz            | MCX-plug with additional isolation                  |
| SE-RG316-50MCXMG1505                         | 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                                         |

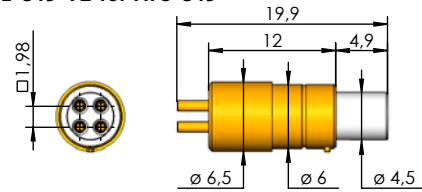
| Nomenclature     |                                |
|------------------|--------------------------------|
| f                | female = Signal Conductor Jack |
| m                | male = Signal Conductor Plug   |
| f <sub>max</sub> | max. frequency                 |

**Note:**  
Other configurations and special lengths on request.

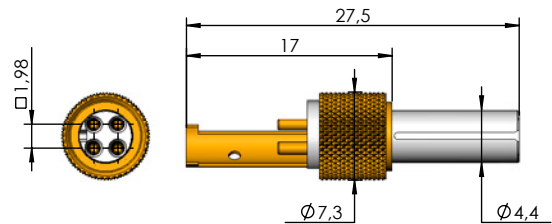
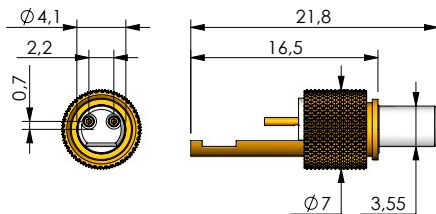
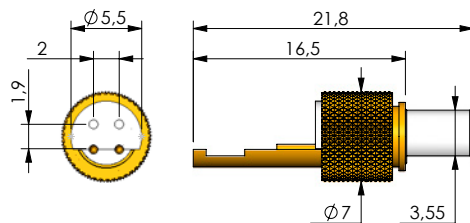
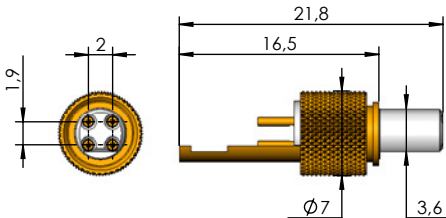
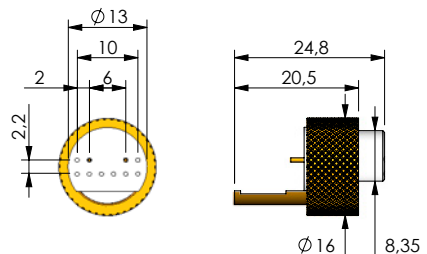
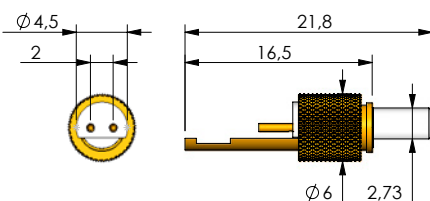
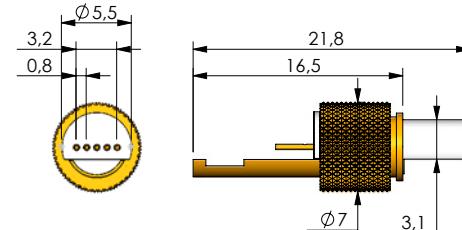
More informationen and data sheets regarding the Cable Assemblies can be downloaded from our homepage [www.ingun.com](http://www.ingun.com) or are available on request.

**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  $\Omega$  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**



## SW-GKS (Insertion Tool for KS)

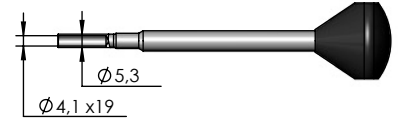
Universal Insertion Tool for Receptacles. The SW-GKS consists of a handle SW-H and a screwed in, flat plastic Insert E-SW GKS with a diameter of 5.8 mm.



SW-GKS

## SW-HFS-810-S (Insertion Tool for HFS)

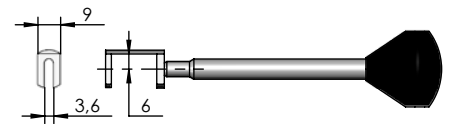
Insertion Tool for RF Probes series HFS-410/440/810/840/ 860 with an Outer conductor diameter < 4.0 mm. The SW-HFS-810-S consists of a handle SW-H and a screwed in Insert E-SW-HFS-810-S



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)

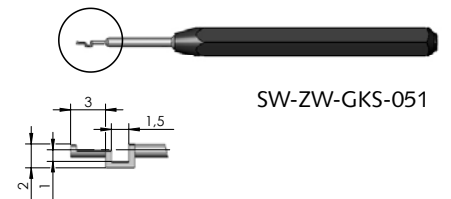
Insertion Tool for the RF Inner Conductor Probe series GKS-051 with tip-diameter ≤ 0.51 mm. The SW-GKS-187 B consists of a handle SW-H and a screwed in Insert E-SW-GKS-187-B.



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

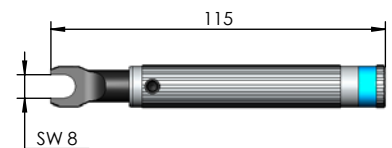
## DW-GS-SW8-45 (Torque Wrench for SMA HF-Connector)

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).



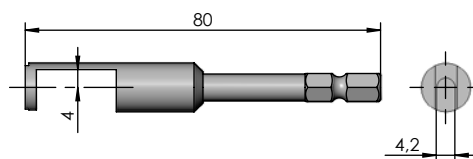
GS-810 SW 3.5 (4.0, 8.0)

## **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.



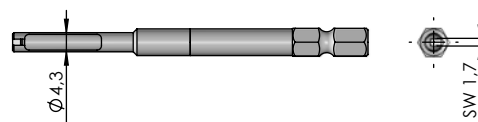
BIT-HFS-810 M

## **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.



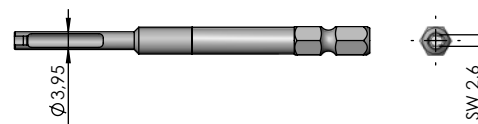
BIT-GKS-112 M

## **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)**

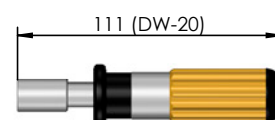
The adjustable torque wrench (20-120 Ncm) is used in combination with the bit tools.



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.



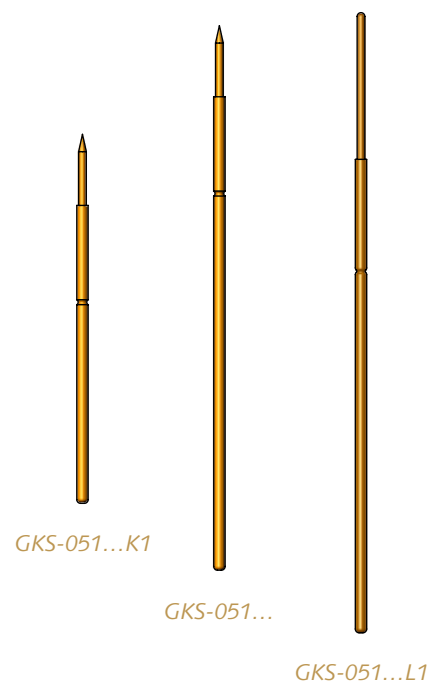
DW-5-S



# 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              |



| 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**

|           |                                                                                       |
|-----------|---------------------------------------------------------------------------------------|
| 01        |  |
| 03        |  |
| 04        |  |
| 05        |  |
| 06        |  |
| 07        |  |
| 08        |  |
| 13        |  |
| 19<br>*** |  |

**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 | Accessories                | Page |
|---------------------------------|---------------------------------|------|----------------------------|------|
| HFS-822 303 051 A xx42 PSMP2    | GKS-051 303 150 A 1000 K1       | 59   | Spacer for receptacle      | 195  |
| HFS-822 303 090 A xx42 SMPL     | GKS-051 303 090 A 1000 K1       | 55   | Inner conductor            | 202  |
| HFS-822 303 090 A xx42 SMPMM    | GKS-051 303 090 A 1000 K1       | 57   | Cable plug assemblies (SE) | 196  |
| HFS-822 303 090 A xx43 UFL      | GKS-051 303 090 A 1000 UFL      | 93   | Receptacles (KS)           | 192  |
| HFS-822 303 150 A xx43 MBXF     | GKS-051 303 150 A 1000 K1       | 34   | Tools                      | 200  |
| 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  |                            |      |

- \* 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    | 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   | 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  | HFS-860 303 090 A xx42 SSMP (M)       | 6 GHz           | 56      |
| MM5829  | 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     |
| MM8130/8430                                                                                | HFS-860 305 051 A xx43 Y82 (M)        | 6 GHz           | 146     |
| 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  | HFS-865 308 080 A xx42 MMPF           | 12 GHz          | 33      |
| MS-156 (HF) / MS-156 C                                                                     | HFS-823 305 051 A 6043 MS03           | 6 GHz           | 147     |
| MS-156 (HF) / MS-156 C                                                                     | HFS-823 305 051 A 6043 MS06           | 6 GHz           | 147     |
| MS-156 (HF) / MS-156 C                                                                     | HFS-856 305 040 A 6343 MS156-H        | 6 GHz           | 148     |

# INGUN RF probes according to Type of Contacting/ Interface

| Type of Contacting and Interface                                                                          | Part No. RF Probe                     | Frequency range | Page    |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|---------|
| MS-156 (HF) / MS-156 C                                                                                    | HFS-860 305 051 A xx43 Y80 (M)        | 6 GHz           | 149     |
| MS-156 (HF) / MS-156 C                                                                                    | HFS-860 305 051 A xx43 Y82 (M)        | 6 GHz           | 149     |
| MS-180                   | HFS-856 305 030 A 6343 MS180-H        | 6 GHz           | 150     |
| MX38                     | HFS-821 305 080 A 9905 MX38           | Gbit/s          | 130     |
| MX48                     | HFS-821 302 045 A 9905 MX48           | Gbit/s          | 131     |
| MX49                                                                                                      | HFS-821 305 080 A 9905 MX49           | Gbit/s          | 132     |
| MX62                     | HFS-821 305 080 A 9905 MX62           | Gbit/s          | 133     |
| MX68                     | 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      |
| N-f                                                                                                       | HFS-860 358 300 A xx42 Q (M)          | 6 GHz           | 82      |
| PC3.5-f                                                                                                   | HFS-865 308 110 A xx42 E2 F           | 12 GHz          | 69      |
| PCB-GSGGG                                                                                                 | HFS-4(8)x0 307 100 A xx02 V2-36S (4M) | 2/4 GHz         | 177/178 |
| PCB-GSGGG                                                                                                 | 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 |
| PCB-GSG                                                                                                   | HFS-4(8)x0 201 051 A xx29 V2-5x (4M)  | 2/4 GHz         | 170/172 |
| PCB-GSG                                                                                                   | HFS-4(8)x0 358 080 A xx02 V2-09S (4M) | 2 GHz           | 171/174 |
| PCB-GSG                                                                                                   | HFS-4(8)x0 204 051 A xx02 V2 (4M)     | 2 GHz           | 171/174 |
| PCB-GSG                                                                                                   | HFS-836 288 120 A 4588 A51F50L        | 4 GHz           | 173     |
| PCB-GSG                                                                                                   | HFS-836 288 120 A 4588 A31R50L        | 4 GHz           | 175     |
| PCB-GSG                                                                                                   | HFS-837 201 030 A 4823 F05            | 12 GHz          | 176     |
| PCB-koax-closed                                                                                           | HFS-4(8)x0 201 051 A xx02 (M)         | 2/4 GHz         | 156/157 |
| PCB-koax-closed                                                                                           | HFS-4(8)x0 201 051 A xx06 (M)         | 2/4 GHz         | 156/157 |
| PCB-koax-closed (75 Ω)                                                                                    | HFS-858 201 051 A 5302                | 1 GHz           | 179     |
| PCB-koax-kidney-shaped                                                                                    | HFS-4(8)x0 201 051 A xx06 P (4M)      | 2/4 GHz         | 161/162 |
| PCB-koax-kidney-shaped                                                                                    | HFS-860 201 051 A xx06 P (4M)         | 6 GHz           | 163     |
| PCB-koax-open                                                                                             | HFS-4(8)x0 201 051 A xx02 S (4M)      | 2/4 GHz         | 158/159 |
| PCB-koax-open                                                                                             | HFS-4(8)x0 201 051 A xx06 S (4M)      | 2/4 GHz         | 158/159 |
| PCB-koax-open                                                                                             | HFS-860 201 051 A xx06 S (4M)         | 6 GHz           | 160     |
| PCB-koax-open (75 Ω)                                                                                      | HFS-858 201 051 A 5306 S              | 1 GHz           | 180     |
| PCB-lateral                                                                                               | HFS-4(8)x0 201 051 A xx14 VZ (4M)     | 2/4 GHz         | 183     |
| PCB-lateral                                                                                               | HFS-4(8)x0 201 051 A xx29 V2-VZ (4M)  | 2/4 GHz         | 184     |
| PCB-SG                                                                                                    | HFS-4(8)x0 204 051 A xx02 V1-AS3 (4M) | 2/4 GHz         | 164/165 |
| PCB-SG                                                                                                    | HFS-4(8)x0 358 051 A xx02 V2-00S (4M) | 2/4 GHz         | 164/165 |
| PCB-SG                                                                                                    | HFS-837 201 030 A 4823 F10            | 12 GHz          | 166     |
| PCB-SG-filter                                                                                             | HFS-4(8)40 007 051 A xx07 Px-AS (4M)  | 4 GHz           | 169     |
| Pico II, PN 1551372-1  | HFS-823 305 040 A 6043 MM310          | 6 GHz           | 151     |
| Power DC-f             | 35640 (PS-PowerDC)                    | Gbit/s          | 136     |
| P-SMP-m                | 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                  | 17824 (PS-RJ)                         | Gbit/s          | 137     |
| RJ-12                  | 17825 (PS-RJ)                         | Gbit/s          | 137     |
| RJ-45                  | 17826 (PS-RJ)                         | Gbit/s          | 137     |
| RJ-50                  | 17827 (PS-RJ)                         | Gbit/s          | 137     |
| R-SMA-m                                                                                                   | HFS-860 303 150 A xx43 ER (M)         | 6 GHz           | 101     |
| R-TNC-m                                                                                                   | HFS-4(8)x0 303 150 A xx43 QN (M)      | 2/4 GHz         | 102/103 |
| SMA-f                                                                                                     | HFS-4(8)x0 308 180 A xx42 E (M)       | 2/4 GHz         | 65/66   |
| SMA-f                                                                                                     | HFS-4(8)x0 308 180 A xx43 E (M)       | 2/4 GHz         | 65/66   |
| SMA-f                                                                                                     | HFS-860 308 200 A xx43 E (M)          | 6 GHz           | 67      |
| SMA-f                                                                                                     | HFS-865 308 110 A xx42 E1 F           | 12 GHz          | 68      |

| Type of Contacting and Interface                                                                         | Part No. RF Probe                   | Frequency range | Page  |
|----------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------|-------|
| SMA-m                                                                                                    | HFS-4(8)x0 303 150 A xx43 E3 (M)    | 2/4 GHz         | 63/64 |
| SMB-f                                                                                                    | HFS-4(8)x0 308 080 A xx42 ZE (M)    | 2/4 GHz         | 45/46 |
| SMB-m                                                                                                    | HFS-4(8)x0 303 150 A xx43 Y (M)     | 2/4 GHz         | 43/44 |
| SMB-m                                                                                                    | HFS-4(8)x0 303 150 A xx43 Y2 (M)    | 2/4 GHz         | 43/44 |
| 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 |
| SMC-m                                                                                                    | HFS-4(8)x0 303 150 A xx43 Y5 (M)    | 2/4 GHz         | 47/48 |
| SMP-L-m                 | 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                   | 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                   | 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    |
| U.FL-m                                                                                                   | HFS-822 303 090 A xx43 UFL          | 6 GHz           | 93    |
| U.FL-m                                                                                                   | HFS-852 303 051 A 4043 UFL-H        | 6 GHz           | 94    |
| U.FL-m                                                                                                   | HFS-856 303 051 A 5543 UFL-H        | 6 GHz           | 95    |
| USB Micro-f (type B)  | 34816 (PS-USB)                      | Gbit/s          | 136   |
| USB Mini-f            | HFS-821 313 050 A 9905 USB Mini     | Gbit/s          | 129   |
| USB Mini-f (type B)   | 21072 (PS-USB)                      | Gbit/s          | 136   |
| USB-f (type A)        | 21071 (PS-USB)                      | Gbit/s          | 136   |
| USB-f (type B)        | 17829 (PS-USB)                      | Gbit/s          | 136   |
| W.FL-m                                                                                                   | HFS-860 353 051 A xx43 Y52 (M)      | 6 GHz           | 96    |
| W.FL-m                                                                                                   | HFS-856 379 030 A 5543 XFL-H        | 6 GHz           | 97    |
| W.FL2-m                                                                                                  | HFS-860 353 051 A xx43 Y52 (M)      | 6 GHz           | 96    |
| W.FL2-m                                                                                                  | HFS-856 379 030 A 5543 XFL-H        | 6 GHz           | 97    |
| 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.

| RF-Probes Part No.                    |     | Page    | RF-Probes Part No.                    |     | Page    |
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| 17824 (PS-RJ)                         | NEW | 137     | HFS-4(8)x0 308 080 A xx42 X4 (M)      |     | 38/39   |
| 17825 (PS-RJ)                         | NEW | 137     | HFS-4(8)x0 308 080 A xx42 ZE (M)      |     | 45/46   |
| 17826 (PS-RJ)                         | NEW | 137     | HFS-4(8)x0 308 080 A xx42 ZE3 (M)     |     | 113/114 |
| 17827 (PS-RJ)                         | NEW | 137     | HFS-4(8)x0 308 080 A xx43 T (M)       |     | 77/78   |
| 17829 (PS-USB)                        | NEW | 136     | HFS-4(8)x0 308 080 A xx43 X (M)       |     | 38/39   |
| 21071 (PS-USB)                        | NEW | 136     | HFS-4(8)x0 308 110 A xx42 BX(M)       |     | 28/29   |
| 21072 (PS-USB)                        | NEW | 136     | HFS-4(8)x0 308 180 A xx42 E (M)       |     | 65/66   |
| 34814 (PS-HDMI)                       | NEW | 136     | HFS-4(8)x0 308 180 A xx42 MBX (M)     |     | 35/36   |
| 34816 (PS-USB)                        | NEW | 136     | HFS-4(8)x0 308 180 A xx43 E (M)       |     | 65/66   |
| 34847 (PS-TAE)                        | NEW | 136     | HFS-4(8)x0 204 051 A xx02 V2 (4M)     |     | 171/174 |
| 35640 (PS-PowerDC)                    | NEW | 136     | HFS-4(8)x0 358 080 A xx02 V2-00S (4M) |     | 171/174 |
| DPS-215 304 027 A 2006 M              | NEW | 189     | HFS-4(8)x0 358 080 A xx02 V2-09S (4M) |     | 164/165 |
| DPS-465 3xx 050 A 400x M              | NEW | 190     | HFS-4(8)x0 358 080 A xx42 Z (M)       |     | 31/32   |
| HFS-010 35x 050 A 200x A              |     | 187     | HFS-4(8)x0 358 180 A xx42 QS (M)      |     | 75/76   |
| HFS-110 30x 050 A 300x x              |     | 188     | HFS-409 305 100 A 8343 MF             |     | 108     |
| HFS-4(8)10 358 180 A xx42 Q (M)       |     | 81      | HFS-409 306 350 8342 M                |     | 107     |
| HFS-4(8)40 007 051 A xx07 Px-AS (4M)  |     | 169     | HFS-409 306 350 8343 M                |     | 107     |
| HFS-4(8)x0 201 051 A xx02 (M)         |     | 156/157 | HFS-819 303 090 A xxx43 F2-Z          |     | 125     |
| HFS-4(8)x0 201 051 A xx02 S (4M)      |     | 158/159 | HFS-819 303 090 A xxx43 RV5           |     | 124     |
| HFS-4(8)x0 201 051 A xx06 (M)         |     | 156/157 | HFS-819 303 090 A xxx43 RV5-Z         |     | 126     |
| HFS-4(8)x0 201 051 A xx06 P (4M)      |     | 161/162 | HFS-819 303 090 A xxx43 RV7-Z         | NEW | 126     |
| HFS-4(8)x0 201 051 A xx06 S (4M)      |     | 158/159 | HFS-819 303 090 A xxx43 V2            |     | 124     |
| HFS-4(8)x0 201 051 A xx14 VZ (4M)     |     | 183     | HFS-819 303 090 A xxx43 V2-Z          |     | 126     |
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| HFS-4(8)x0 201 051 A xx29 V2-Sx (4M)  |     | 170/172 | HFS-819 355 051 A xxx42 V8 (-Z)       |     | 128     |
| HFS-4(8)x0 201 051 A xx29 V2-VZ (4M)  |     | 184     | HFS-821 302 045 A 9905 MX48           | NEW | 131     |
| HFS-4(8)x0 204 051 A xx02 V1-AS3 (4M) |     | 164/165 | HFS-821 302 045 A 9905 MX68           | NEW | 134     |
| HFS-4(8)x0 204 051 A xx02 V2-360 (4M) |     | 177/178 | HFS-821 305 080 A 9905 MX38           | NEW | 130     |
| HFS-4(8)x0 303 090 A xx40 GT13 (4M)   |     | 115/116 | HFS-821 305 080 A 9905 MX49           |     | 132     |
| HFS-4(8)x0 303 090 A xx43 Y6 (M)      |     | 90/91   | HFS-821 305 080 A 9905 MX62           | NEW | 133     |
| HFS-4(8)x0 303 090 xx42 GT16 (M)      |     | 117/118 | HFS-821 313 050 A 9905 USB Mini       | NEW | 129     |
| HFS-4(8)x0 303 150 A xx02 D (M)       |     | 73/74   | HFS-822 303 051 A 5043 MM5829         | NEW | 98      |
| HFS-4(8)x0 303 150 A xx42 E (M)       |     | 52/53   | HFS-822 303 090 A xx42 PSMP2          | NEW | 59      |
| HFS-4(8)x0 303 150 A xx42 F (M)       |     | 111/112 | HFS-822 303 090 A xx42 SMPL           | NEW | 55      |
| HFS-4(8)x0 303 150 A xx42 FS1 (M)     |     | 111/112 | HFS-822 303 090 A xx42 SMPMM          |     | 57      |
| HFS-4(8)x0 303 150 A xx42 RF3 (M)     |     | 111/112 | HFS-822 303 090 A xx43 UFL            | NEW | 93      |
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| HFS-4(8)x0 303 150 A xx43 Y3 (M)      |     | 43/44   | HFS-823 305 051 A 6043 MS03           | NEW | 147     |
| HFS-4(8)x0 303 150 A xx43 Y5 (M)      |     | 47/48   | HFS-823 305 051 A 6043 MS06           | NEW | 147     |
| HFS-4(8)x0 307 100 A xx02 V2-36S (4M) |     | 177/178 | HFS-836 288 120 A 4588 A51F50L        | NEW | 173     |
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| Nomenclature  |                                                                |
|---------------|----------------------------------------------------------------|
| f             | female = Signal Conductor Jack                                 |
| m             | male = Signal Conductor Plug                                   |
| S             | Signal                                                         |
| G             | Ground                                                         |
| Beispiel: GSG | 2 Ground Pins, 1 Signal Pin                                    |
| xx            | 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-...(M)    | Part No. additionally available as screw-in version            |
| HFS-...(4M)   | Part No. additionally available as adjustable screw-in version |

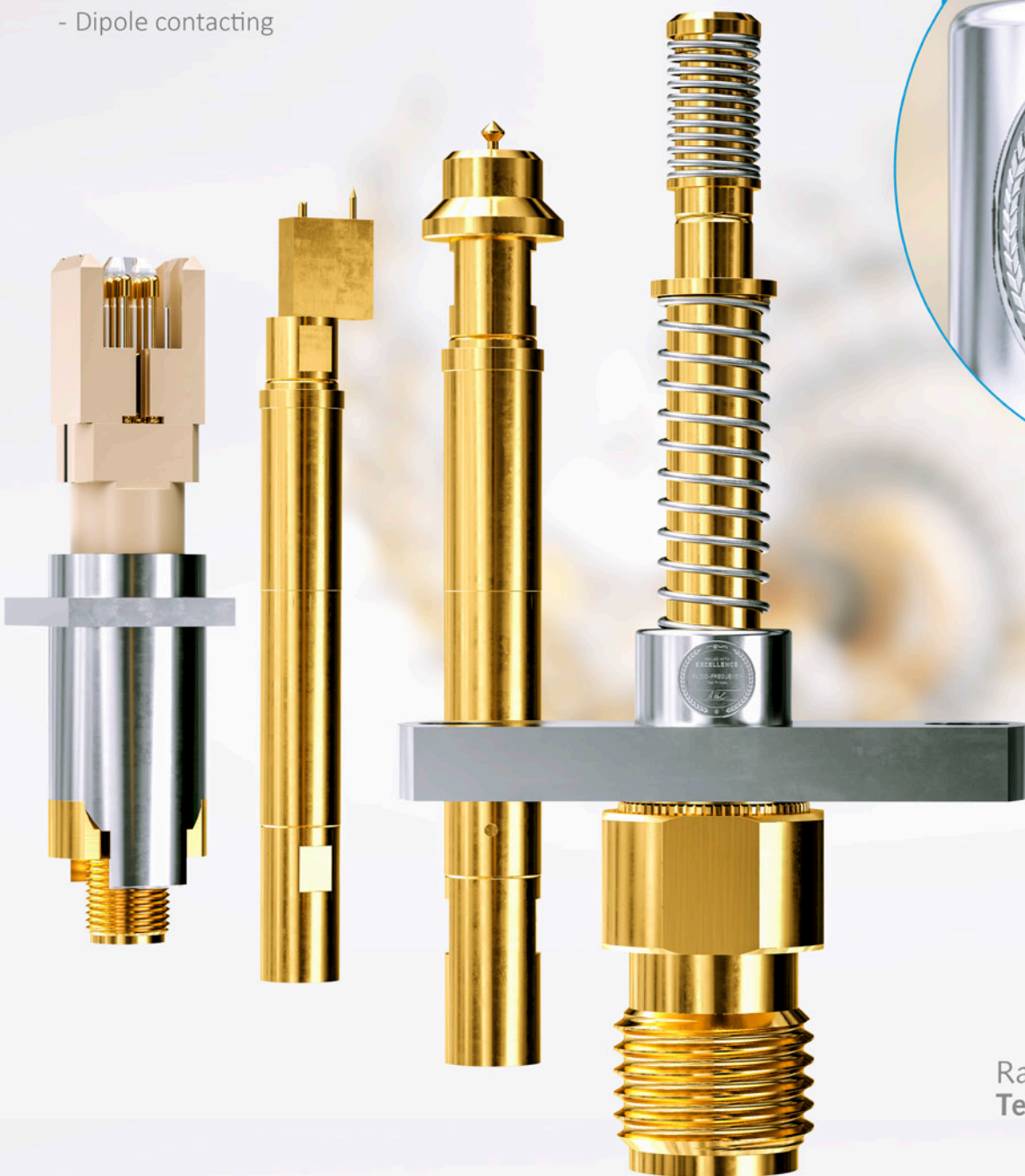


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