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Radio-frequency Test Probes are mainly used for measuring high-frequency signals (up to 6 GHz.). These Test Probes are designed co-axially, i.e. the measurement signals flow via the inner conductor and the outer conductor is used for the shielding of the signals. For the connection to the Test System the applicable co-axial cables are available.



Application Examples:

- Sensitive measurement tasks with high measurement frequencies
- 4-pole measurements
- Contacting of common RF-Plugs and RF-Jacks
- Contacting of RF Test Points on PC-Boards
- Available in non-rotating version with a cut-out on the GND-Tip (i.e. for when the signal track on the PC-Board has been laid out accordingly)

Advantages

- Very good measurement reliability
- Compact and stable design
- Modular design for flexible exchange of individual components (Note: In the series HFS-810 the inner and outer conductors are interchangeable)
- Large variety of different tip-styles for various RF-Plugs and RF-Jacks

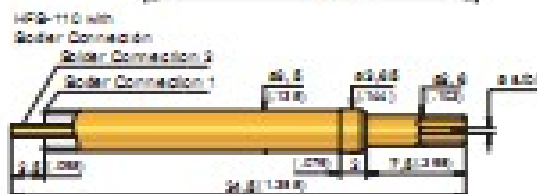
HFS-010	94
HFS-110	95
HFS-810	96
HFS-840	96
HFS-860	97
HFS-810/840 Special Solutions	97

Gold:
 ± 4,50 mm
 ± 177 (M1)
 Installation Height: 5,0 mm (.197)
 Recommended Stroke: 4,0 mm (.157)

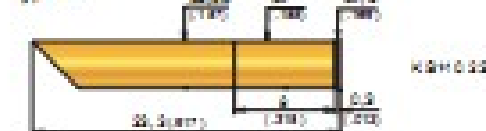
Mounting and Functional Dimensions



Type A



Type B



Available Tip Styles

Inner Conductor

Part No.	Tip Style	Ø (mm)	A	Receptacle	
				Ø	Ø (mm)
0 01		Ø 0.40 (.016)	A		
0 02		Ø 0.40 (.016)	A		
0 03		Ø 1.10 (.043)	A		
0 04		Ø 1.10 (.043)	A		
0 05		Ø 1.10 (.043)	A		
0 06		Ø 1.10 (.043)	A		
0 07		Ø 1.10 (.043)	A		

Available Tip Styles

Outer Plugger

02	
04	

Mechanical Data

Working Stroke: 4,0 mm (.157)
 Maximum Stroke: 5,0 mm (.197)
 Spring Force at Working Stroke
 - Outer Conductor: 3,0 N (0.685)
 - Inner Conductor: 1,5 N (0.335)

Materials

Plunger: BeCu, gold-plated
 Barrel: Brass, gold-plated
 Spring: Steel, gold-plated
 Receptacle: Brass, gold-plated
 Insulation: Teflon

Electrical Data

Frequency Range: up to 700 MHz
 Current Rating: 2 - 3 A
 R_f typical: < 20 mΩ
 Impedance Test Probe: 50 - 60 Ω
 Impedance Cable: 50 Ω/200 MHz
 98 pF/m

Mounting Hole Size

with Receptacle: Ø 3,98 - 3,99 mm
 (.1567 - .1571)
 without Receptacle: Ø 3,50 mm (.1378)

Operating Temperature

Standard: -40 up to +80 °C

Note:
 The inner Conductor has a fixed connection with the Probe and therefore cannot be changed.

Ordering Example

Series	Tip Material (Be, Se, Cu)	Tip Style	Tip Diameter (700 MHz)	Plating A = Gold	Spring Force (2N) Outer Conductor	Outer Plugger (alternative 04)	Type (alternative 0)
HFS	110	0	04	115	A	00	02
SE	110	V	Cable Type: RG 178 B/U				
K5	110	23					

Test Probe:

Plug with RF-Cable/Cable pre-wired,
 Length 0,75 m (Special Length on request):

Receptacle:

HFS 810 / 840

Coaxial RF-Test Probe, 50 Ω, 2 or 4 GHz

Grid:

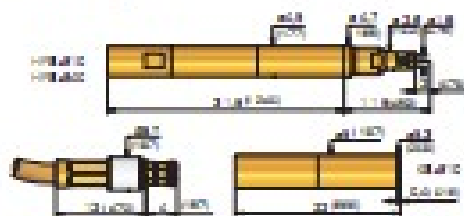
± 0,08 mm

± 200 μm

Installation Height: 11,5 mm (-453)

Recommended Stroke: 4,0 mm (-157)

Mounting and Functional Dimensions

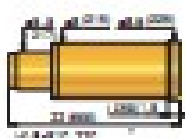


810 C (V) (Material: 50 mm (insulated))
840 C (U) (Material: 50 mm (insulated))

Interface/Contact



Flexible Receptacle



Spring Force

The Spring-loaded Inner- and Outer Conductors are available with different Spring Forces (see „Mechanical Data“). To create the Ordering No., the individual values must be added together (see also „Ordering Example“ below).

Spring Force of Inner Conductor (N)	Spring Force of Outer Conductor (N)	Character for ordering
1,3	4,0	53
2,0	4,0	60
1,3	8,0	93
2,0	8,0	99



HFS 810 (C) /
840 (U)
HAG 810 (20)

Mechanical Data

Working Stroke: 4,0 mm (-157)
Maximum Stroke: 5,0 mm (-197)
Spring Force at Working Stroke
Outer Cond.: 4,0 N (14,4oz); 8,0 N (28,3oz)
Inner Cond.: 1,3 N (4,7oz); 2,0 N (7,2oz)

Material/Outer Conductor

Plunger: BeCu or Brass, gold-plated
Barrel: Brass, gold-plated
Spring: Stainless Steel
Receptacle: Brass, gold-plated
Insulation: Teflon

Electrical Data

Frequency Range with HFS-810: bi 2 GHz
Frequency Range with HFS-840: bi 4 GHz
Frequency Range with HFS-860: bi 6 GHz
Current Rating:
- Outer Conductor: 5 - 10 A
- Inner Conductor: 2 - 3 A
R_{typical}, Inner Conductor: ≥ 10 mΩ
Impedance Test Probe: 50 Ω
Impedance Cable: 50 Ω

Material/Inner Conductor

Plunger: BeCu or Steel, gold-plated
Barrel: Bronze, gold-plated
Spring: Steel, gold-plated

Operating Temperature

Standard: -40 up to +80 °C

Available Tip Styles

for not accessible Inner Conductor

Series	Tip Style	Tip Style	Plunger location	
			A	Other
2 D1		Ø 0,4 / 1,000	A	
2 D2		Ø 1,60 / 1,000	A	
3 D3		Ø 0,4 / 1,000	A	
3 D4		Ø 0,60 / 1,000	A	

Iron Contact or insulation

Ordering Example: 810D1 201D1 A 1002

Available Tip Styles

Outer Plunger (secured against rotation)

03		
04		
05		
06		

Layout Suggestions

for conventional Standard Outer Plunger



Outer Plunger (gold-plated)

Outer Plunger with IR

Mounting Hole Size

with Receptacle HFS 810: Ø 4,98 - 4,99 mm
(1961 - 1965)

with HAG-810 220: Ø 7,98 - 7,99 mm
(3142 - 3145)

without Receptacle: Ø 4,5 mm (-1.772)

Ordering Example

Series	Tip Material 1 = Steel 2 = BeCu	Tip Style	Tip Diameter (Ø 100 mm)	Plating A = Gold	Spring Force (N)	Outer Plunger (N)	Outer Plunger Ø (mm)
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TestProbe with flat Outer Plunger:

HFS 810 2 01 051 A 53 03

TestProbe with embedded Outer Plunger:

HFS 810 2 01 051 A 60 06

MCX-Connector with RF-Coaxial Cable RG 316/
Upturn-lead, Length 0,7m (Special length on request)

SE-810 V-U (Ø 1,5-Ø 0,6 mm) SE-810 V (Ø 1,5-Ø 0,6 mm)

Receptacle:

KS-810

Grid:
 ± 0,50 mm
 ± 0,17 Mil
 Installation Height: see below
 Recommended Stroke: 4,0 mm (.157")

HFS 860 203 80 A 50Ω Y80



HFS 860 203 80 A 50Ω Y80



Contacting of Switch Connectors* with HFS-860 203 051 A 50Ω Y 80 and HFS-860 203 051 A 50-Ω Y 82	Mechanical Data, Spring Force, Materials, Mounting Hole Size: see HFS-810
	Electrical Data, Frequency Range: up to 5 GHz Other values: see HFS-810

Other solutions for 5 GHz-
applications (W-LAN) on request.

Connector pre-wired with RF-Coaxial-Cable Multiflex for 5 GHz:

	SE-860 V-80	SE-860 V-MCX-W-80
Probe Side	MCX-Plug, straight	MCX-an-gular
Interface Side	SMA-Plug, straight	SMA-Plug, straight
Cable length	0,8 m	0,8 m

HFS 810 / 840 Special Solutions

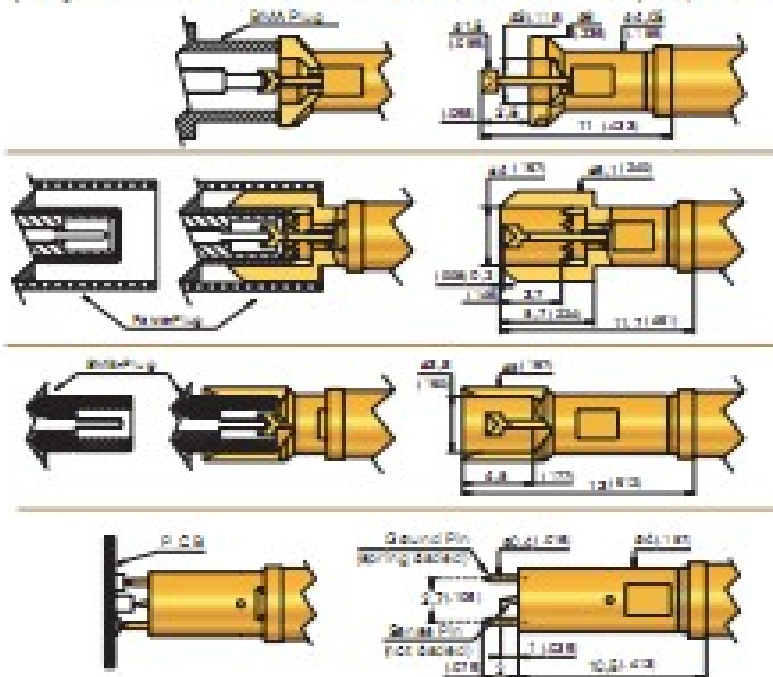
Application examples with various Special Plungers

The following overview of designs shows a small selection of the most common and already manufactured special solutions. The geometry of the individual components has been adjusted to those components which must be tested.

Note: In this case, it cannot be guaranteed that the upper frequency range can be reached without loss. Please note that in some

cases special shapes and different dimensions are hidden behind the various Coax-Plug and Jack names such as „Palma“ or „MCX“.

For detailed information or further consulting in regard to the choice of tip-styles or regarding carrying out special developments for your specific demands, please contact our Design Department.



Contacting of SMA-Plugs, e.g.:

- HFS-810 203 150 A 50Ω D

The protruding Inner Plunger for contacting the lower section of the inner pin of a connector.

Contacting of Palma-Plugs, e.g.:

- HFS-810 203 150 A 50Ω F

The protruding Outer Plunger reaches the connector first. The outer bevel sinks into the plastic housing of the connector and centres the Outer Plunger.

Contacting of SMA-Plugs, e.g.:

- HFS-810 203 150 A 50Ω Y

The protruding Outer Plunger engages the connector and centres it. After this the inner conductor is contacted with the Inner Probe of the HFS.

Contacting of PCBs:

- HFS-810 201 051 A 50Ω V2-18 S

Both Outer Conductors (Plungers (Ground)) are spring loaded and have a stroke of max. 2,0 mm (.079"). Because both Plungers can travel individually this allows test pads with different heights to be contacted. Other positions for the spring-loaded Outer Plunger are available on request. The Inner Conductor (Sense) is designed as a rigid pin, which, however, is fixed to the base unit and therefore pressed in when the complete unit is activated.

Model Number: CSP-03G-003, Replacement Probe: SPL-03G-043, SPL-03B-121
Target Connector: CPT-03-50-2

Applications:

Designed for use in interconnect applications where signal integrity is required, such as accessing high frequency targets on circuit boards. Can also be used as R.F. mating connector. Consult factory for detailed connector target information.

Specifications CSP-03G-003

Test Centers: .300 (7.62)
Ground Shield Travel: .250 (6.35)
Mounting Hole Size: .252/.254 (6.40/6.45) dia.
Mates with Amphenol SMB 27-1 or equivalent.

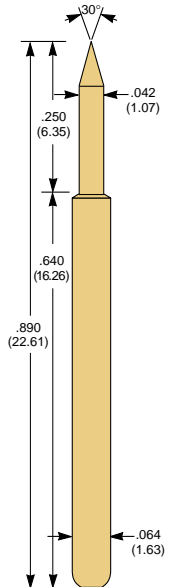
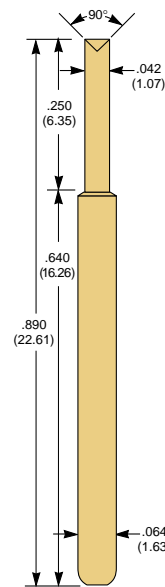
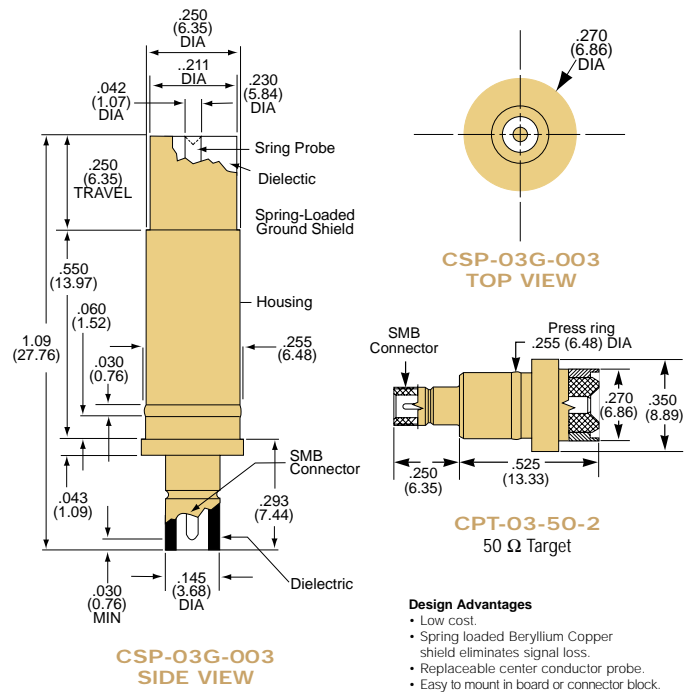
Electrical

Nominal Impedance: 50 Ohms
Probe Resistance: 50 mΩ maximum
Dielectric Withstanding Voltage: 1K VAC
VSWR: 1.15:1 @ 1 GHz (Tested with Target)
Insertion Loss: 0.13 db @ 1 GHz (Tested with Target)

Materials and Finishes

Housing: Gold plated copper zinc alloy
Ground Shield: Gold plated beryllium copper
Dielectric: Teflon per MIL-P-18468
Connector Pin: Gold plated beryllium copper
Spring Probe: Gold plated beryllium copper
Plunger: Gold plated beryllium copper
Barrel: Gold plated brass
Spring: Music wire, silver plated

Consult factory for more information.



Probe Specifications SPL-03G-043 SPL-03B-121

Mechanical	SPL-03G-043	SPL-03B-121
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles	1 x 10 ⁶ cycles
Operating Temperature	-35°C to +105°C	-35°C to +105°C
Consult factory for other temperature requirements.		
Electrical (Static Conditions)		
Current Rating:	6 amps	6 amps
Maximum continuous current, non-inductive at working travel		
Probe Resistance	50 mΩ	50 mΩ
Materials and Finishes		
Plunger:	Gold plated beryllium copper	Gold plated beryllium copper
Barrel:	Gold plated brass	Gold plated brass
Spring:	Music wire, silver plated	Music wire, silver plated

Spring Force in oz. (grams) Spring Type Preload 2/3 Travel

SPL-03G-043:	.80 (22)	4.0 (114)
SPL-03B-121:	.80 (22)	4.0 (114)

CSP-30J-008 :

High Frequency Probe

To Order Call 909-625-9390

Model Number: CSP-30J-008, Replacement Probe: SPL-30J-022

The CSP-30J-008 coaxial probe provides an instrumentation-quality interface for broadband R.F. measurements up to 2 GHz

Specifications (@90% Compression):

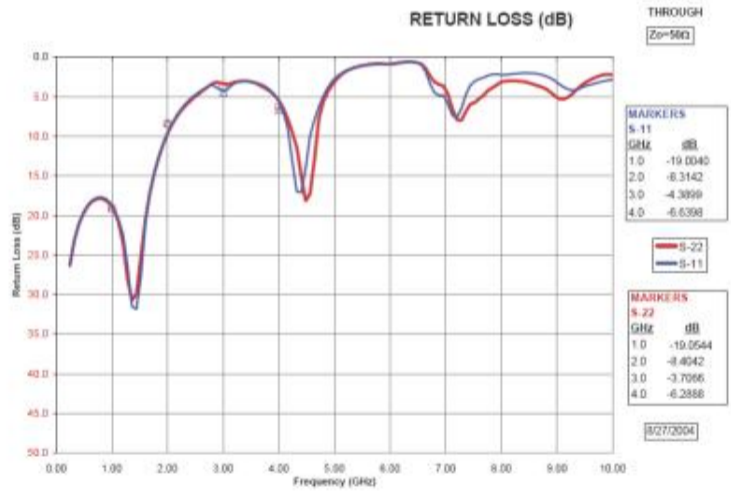
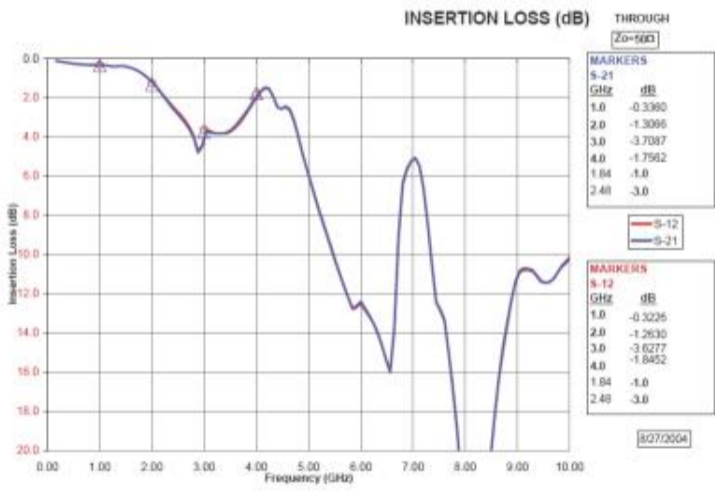
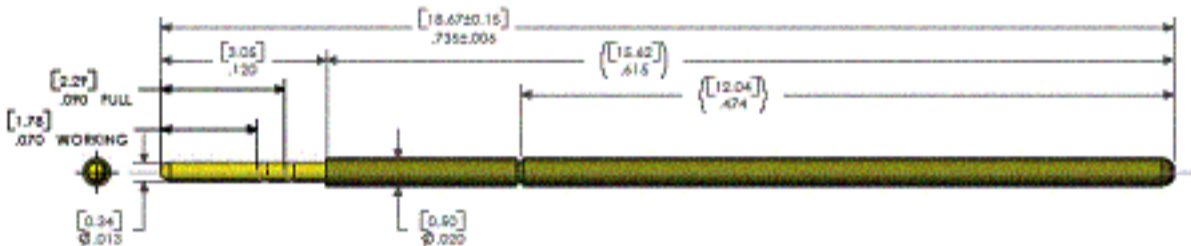
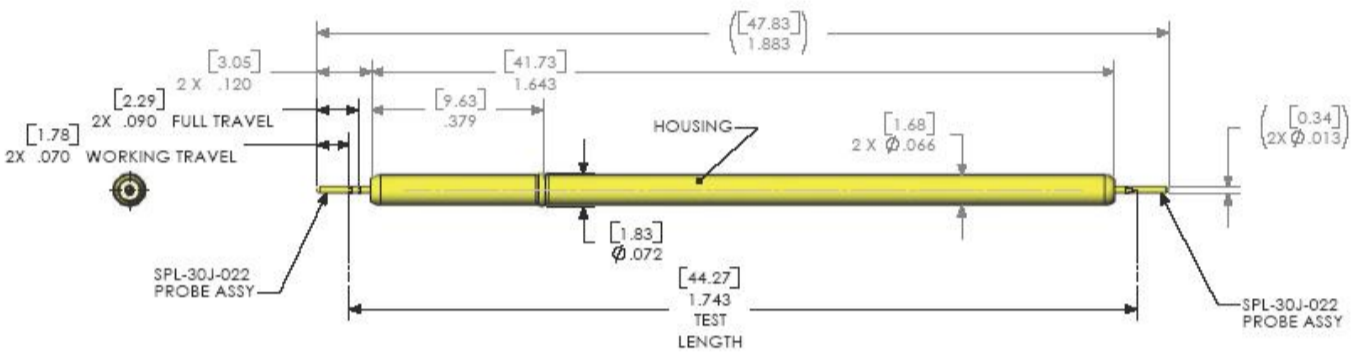
Resistance: 150 milliohms Max though both probes and center receptacle.

Impedance: 50 Ohms

Maximum Insertion Loss @ 1GHz: 0.5 dB

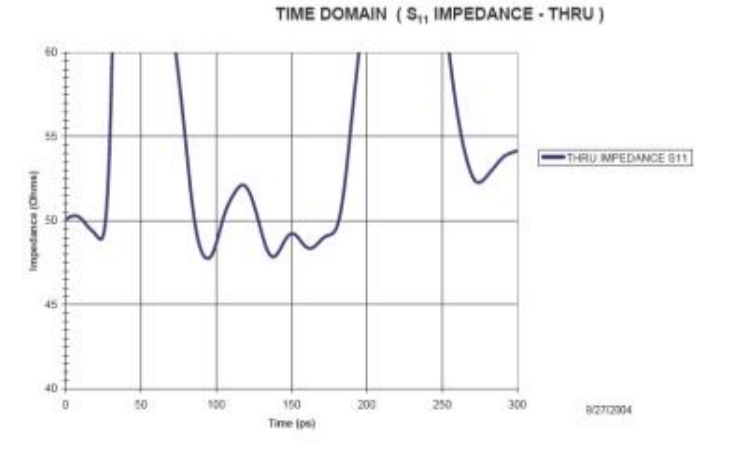
Minimum Return Loss @ 1GHz: 19.0 dB

Maximum VSWR @ 1GHz: 1.25:1



8/27/2004 Confidential PrimeYield Systems, Inc.

8/27/2004 Confidential PrimeYield Systems, Inc.

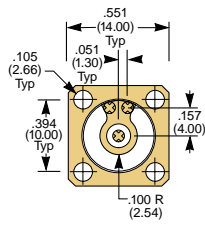


8/27/2004 Confidential ECT-PrimeYield Systems

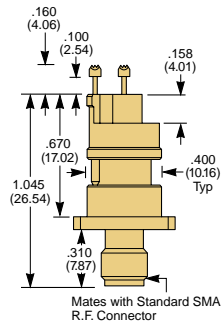
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High-Frequency Coaxial Test & Measurement Probe

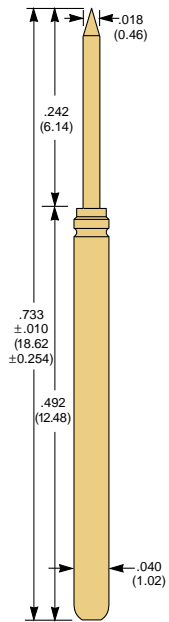
K-50H-S



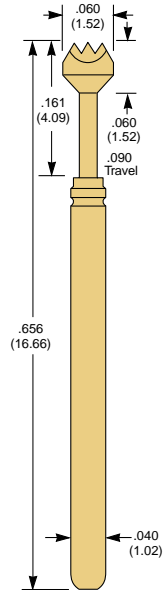
**K-50H-S
TOP VIEW**



**K-50H-S
SIDE VIEW**



**REPLACEMENT
PROBE
SPL-01B-119**



**REPLACEMENT
PROBE
SPL-01H-116**

Model Number: K-50H-S, Replacement Probe: SPL-01H-116

Applications:

The K-50H-S coaxial probe is a shorter version of the K-50 series measurement probe with .100 full travel and a slightly larger mounting flange. Electrical characteristics and applications are similar to the K-50.

Specifications (at full compression) K-50H-S

Nominal Impedance: 50 Ohms

Materials and Finishes

Housing:	Gold plated copper zinc alloy
Dielectric:	Premium virgin teflon per MIL-P-18468
Replaceable Probes:	Gold plated beryllium copper alloy. Request SPL-01H-116.
SMA Connector Pin:	Gold plated beryllium copper

Consult factory for more information.

K-50L K-50L-QG

High-Frequency Coaxial Test & Measurement Probes

TO ORDER, CALL 909-625-9390

Model Number: K-50L, Replacement Probe: SPL-01L-039

Applications:

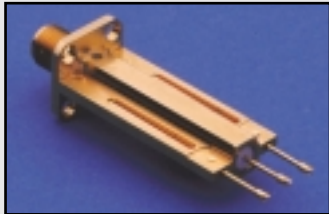
The K-50 coaxial probe provides an instrumentation-quality interface for broadband R.F. measurements up to 4 GHz. With the new K-50 R.F. Circuit Design, impedance characterization measurements can be performed using it as a Network Analyzer port-extending accessory. Accurate and repeatable small signal and R.F. power (50 Watts) measurements provide consistent and repeatable results. The K-50 was developed in cooperation with a leading manufacturer of advanced communications systems and is supported by a leading instrument equipment manufacturer.

Specifications (at full compression)	K-50L	K-50L-QG
Nominal Impedance:	50 Ohms	50 Ohms
Minimum Return Loss @ 1 Ghz:	23 db, 26 db Typical	23 db, 26 db Typical
Maximum Insertion Loss @ 1 Ghz:	0.12 db, 0.06 db Typical	0.12 db, 0.06 db Typical
Maximum VSWR @ 1 Ghz:	1.15:1, 1.11:1 Typical	1.15:1, 1.11:1 Typical

Materials and Finishes

Housing:	Gold plated copper zinc alloy	Gold plated copper zinc alloy
Dielectric:	Premium virgin teflon per MIL-P-18468	Premium virgin teflon per MIL-P-18468
Replaceable Probes:	Gold plated beryllium copper alloy. Request SPL-01L-039.	Gold plated beryllium copper alloy. Request SPL-01L-039.
SMA Connector Pin:	Gold plated beryllium copper	Gold plated beryllium copper

Consult factory for more information.



Design Patent D343,802

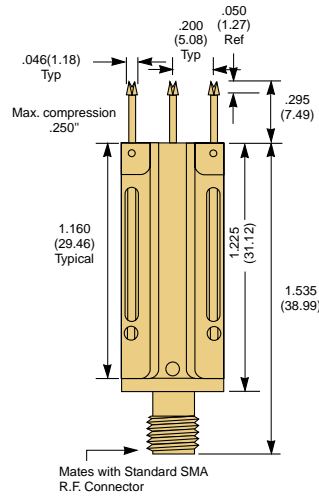
Design Advantages

- The precisely-controlled physical and electrical characteristics of the K-50 make it an ideal port-extending accessory for Network Analyzers and Time Domain Reflectometers. The R.F. center conductor system is captivated for maximum reliability.

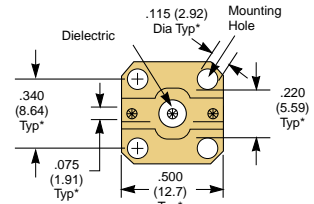
- The K-50 incorporates spring probes in an open architected format to accommodate a wide range of physical circuit topologies and to alleviate the need for special geometry contact pads on the circuit under test.

*Note:

Also available in .125 Centers. Length and Flange dimensions for K-50L-QG same as K-50.

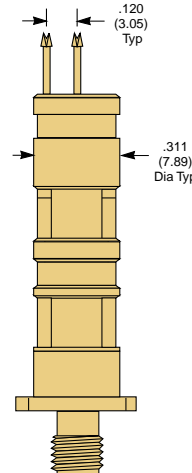


**K-50L
SIDE VIEW**
Patented

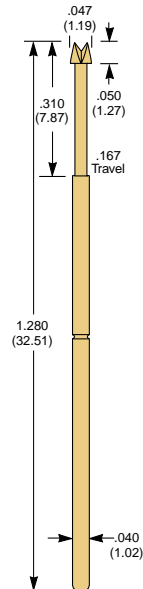


**K-50L
TOP VIEW**

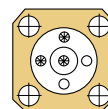
Gold plated replaceable SPL-01L-039 spring probes rated at 5.2 oz. (147.42g) @full compression



**K-50L-QG
SIDE VIEW**
Patented



**REPLACEMENT
PROBE
SPL-01L-039***



**K-50L-QG
TOP VIEW**
Shown in Quadrature ground configuration

* RF performance is optimized using SPL-01L-039 probes at 90% compression. This probe has limited cycle life (approx. 10K cycles). For high production applications, Pogo-1 probes may be used with minimal impact on performance.

TO ORDER, CALL 909-625-9390

Model Number: K-50L-QG-75, K-50L-QG-75R

Applications:

The K-50L-QG-75 series coaxial probe provides an instrumentation-quality interface for broadband R.F. measurements up to 12 GHz. With the new K-50L-QG-75 R.F. Circuit Design, impedance characterization measurements can be performed using it as a Network Analyzer port-extending accessory. Accurate and repeatable small signal and R.F. power (50 Watts) measurements provide consistent and repeatable results. The K-50 was developed in cooperation with a leading manufacturer of advanced communications systems and is supported by a leading instrument equipment manufacturer.

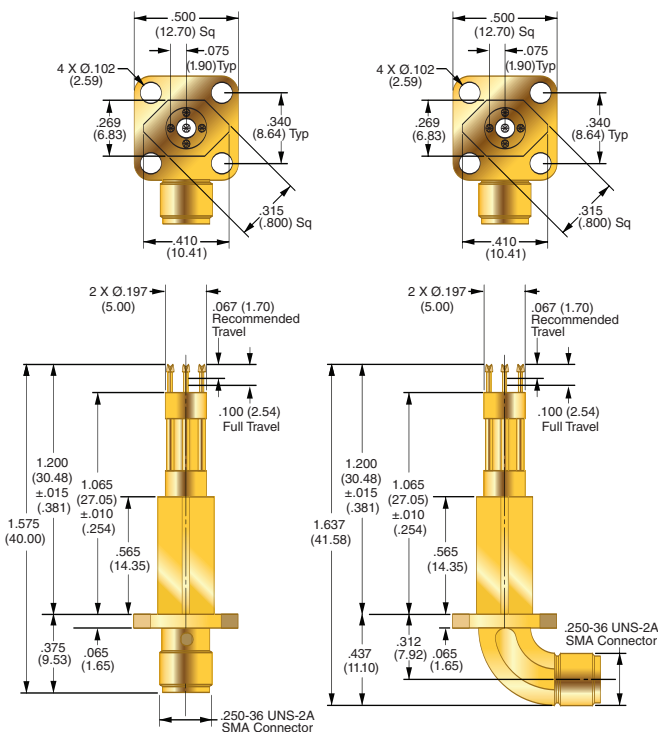
Specifications	K-50L-QG-75	K-50L-QG-75R
Nominal Impedance:	50 Ohms	50 Ohms
Minimum Return Loss		
@ 1 GHz:	23.8 dB, 22.8 dB	25.1 dB, 25.2 dB
@ 5 GHz:	18.3 dB, 16.4 dB	18.0 dB, 17.5 dB
@ 10 GHz:	17.7 dB, 17.0 dB	27.0 dB, 35.3 dB
Maximum Insertion Loss		
@ 1 GHz:	0.183 dB, 0.186 dB	0.160 dB, 0.159 dB
@ 5 GHz:	0.370 dB, 0.371 dB	0.421 dB, 0.405 dB
@ 10 GHz:	0.577 dB, 0.572 dB	0.489 dB, 0.429 dB
Maximum VSWR		
@ 1 GHz:	1.14:1, 1.16:1	1.12:1, 1.12:1
@ 5 GHz:	1.28:1, 1.36:1	1.29:1, 1.31:1
@ 10 GHz:	1.30:1, 1.33:1	1.09:1, 1.03:1

Probe Specifications	Ground Probe HPA-0L	Signal Probe SPG-72L-005
Mechanical		
Full Travel:	.100 (2.54)	.100 (2.54)
Recommended Working Travel:	.067 (1.70)	.067 (1.70)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles	1 x 10 ⁶ cycles
Operating Temperature	-55°C to +105°C	-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.		
Electrical (Static Conditions)		
Current Rating:	3 amps	3 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	35 mΩ	15 mΩ

Materials and Finishes	Ground Probe HPA-0L	Signal Probe SPG-72L-005
Plunger:	Heat-treated beryllium copper, gold-plated over hard nickel	Heat-treated beryllium copper, gold-plated over hard nickel
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Work-hardened beryllium copper, gold plated over hard nickel
Spring:	Stainless steel, silver plated	Stainless steel, silver plated
Ball:		Stainless steel

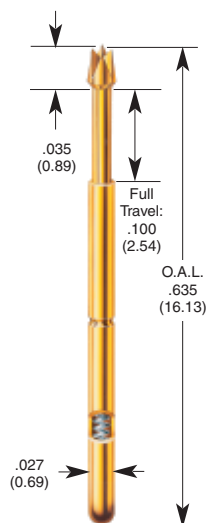
Spring Force in oz. (grams)	Preload	2/3 Travel
Spring Type		
HPA-0L	0.61 (17)	2.8 (79)
SPG-72L-005	1.30 (37)	2.8 (79)

To order, add dash number to Model Number.

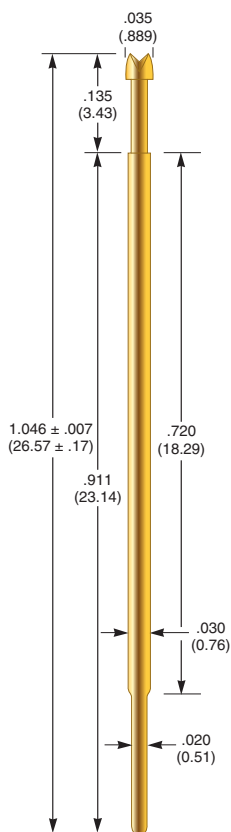


K-50L-QG-75

K-50L-QG-75R



GROUND PROBE
HPA-0L



SIGNAL PROBE
SPG-72L-005

Dimensions in inches (millimeters)