

Pogo[®] Contacts



Loaded PCB Test

Bare PCB Test

Wire Harness

Test System Interface

High Current/High Frequency

Semiconductor Pogos

Battery/Portable Application

General Purpose



A DOVER COMPANY

Probe Quick Reference

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How to Order

1. For each probe, specify the probe model, tip style and spring force as shown in the example.

POGO-25UN-8-S

probe model	tip style	spring force	steel
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2. Place your order via phone or fax.

Phone 909-625-9390

Fax 909-624-9746

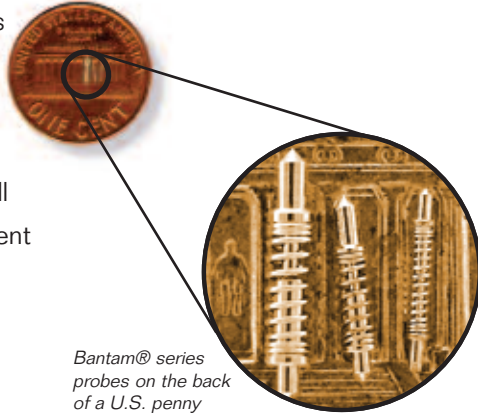
Testing the Limits

The year is 1965. An upstart newcomer, Everett Charles Technologies, invents the first snap-out spring probe that becomes the industry standard.



Now fast-forward to 2007. After more than 100 patented innovations, ECT continues to test the limits of test technology with innovative Pogo contacts that deliver more quality, more durability, more precision and — in short — more performance.

The two newest examples of our continuing commitment to innovation are the PogoPlus® and Semiconductor probes. Both deliver unique performance capabilities far beyond those of ordinary probes. With our continuing leadership in technical innovation, it's no wonder that after 42 years, ECT remains the first choice of test engineers and test technicians worldwide. In the future, ECT's continuing tradition of testing the limits will drive the development of tomorrow's ATE technology.

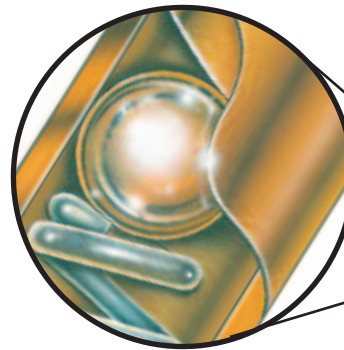


Bantam® series probes on the back of a U.S. penny

Semiconductor Pogos

ECT offers a new line of semiconductor Pogo products, including the Double-Ended product, the new Mini-Mite™ series, and the Bantam® series. ECT's semiconductor probes deliver high performance in compliance, with very low and consistent DC resistance. For more information, see pages 51-54 or contact your ECT representative.

Jam-proof plunger



Ball forces plunger into continuous contact with barrel wall.

PogoPlus probe shown at 3.5x magnification









PogoPlus® — The Ultimate in Consistently Low Resistance

The PogoPlus Series delivers repeatably low resistance for loaded board, vacuum-fixture applications. Exclusive benefits include an enhanced bias-ball design that virtually eliminates false opens, MicroSharp™ tips and cutting edges, and proprietary precious metal plating processes. For details, see pages 9-13 or contact your ECT representative.

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An Industry First — Organized by Application




For the fastest and most convenient access to the probe information you need, ECT is the first probe manufacturer to organize its catalog by application. Instead of hunting through the entire catalog for the information you need, all of the products and technical data for your application are in one place for easier reference and comparison. The catalog is divided into eight applications sections, each with a corresponding graphic for easy identification:

-  Loaded PCB Test Probes
-  Bare PCB Test Probes
-  Wire Harness Probes
-  Test System Interface Products
-  High Current/High Frequency Probes
-  Semiconductor Pogos
-  Battery/Portable Application Probes
-  General Purpose Probes

Simply find your application in the index. Then turn to that section for a full listing of all suitable probes, arranged from smallest to largest test center. Probe technical notes that are specific to each application are located on the back of the section divider page. In cases where one probe is used for multiple applications, you may be referred to another section for product information.

Plating Legend

Plunger plating is color coded for easy reference.

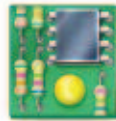
-  Gold plated
-  Rhodium or Nickel plated
-  Gold plated steel

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Bare PCB Test Probes

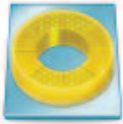
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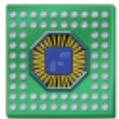


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General Information

The ECT Difference

ECT invented the snap-out probe in 1965. It was the first replaceable spring probe available to test engineers when ATE was in its infancy. The hand-assembled probe was simple and rugged.

Modern spring probes retain some fundamental attributes of the original design, but they are far more sophisticated. Mechanical design evolves on CAE/CAD systems, enabling our engineers to program manufacturing equipment to optimize their designs. Custom designed machining equipment, plating processes and automatic assembly systems produce precision probes with ultra-smooth surfaces. Plunger-to-barrel tolerances are tighter. Probe tips are sharper. Springs fabricated from specially-formulated alloys maximize probe life.

Quality checks are made throughout the manufacturing process using computerized statistical process controls (SPC). Final inspection ensures that the probes we ship are defect-free.

Electrical Current Path and Probe Resistance

Figure 1 shows that the primary current path in a probe is through the contact junction of the plunger with the barrel and the barrel with the receptacle. Secondary paths include the contact junction between the spring and plunger and the spring and barrel.

Figure 2 illustrates sources of electrical resistance that must be considered. Resistance is dependent on several factors: conductivity of base metals and plating material, resistance at points of contact between components (which is affected by surface condition), area of contact, force applied at contact junctions, and probe design.

For applications requiring very low, very consistent resistance, such as loaded-board test, ECT's PogoPlus probes employ an enhanced bias ball design that maintains electrical contact between the plunger and the sidewall at all times.

ECT probes are self-biasing, resulting in maximum metal-to-metal contact force between components at critical contact junctions.

Resistance can also be caused by such factors as: receptacle wire terminations, fixture wiring, test interface, incorrect probe selection (wrong tip, inadequate spring force), PCB surface contamination, or high-resistance contacts in the test system.

Electrical resistance is included among probe specifications on each data page.

Figure 1
Typical Spring Probe and Receptacle

Primary electrical current path is via contact junction of plunger with barrel (1), and barrel with receptacle (2). Secondary paths include junctions between plunger, ball and spring (3) and barrel and spring (4).

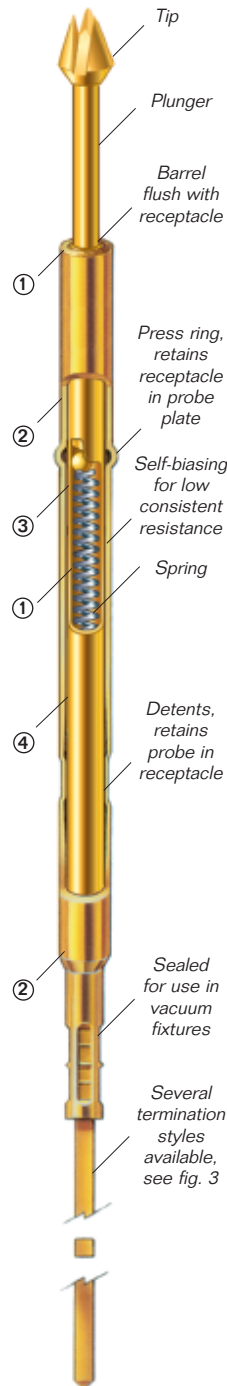


Figure 2
Influence on Contact Resistance

There are several sources of electrical resistance within the test circuit. Management of these is a prerequisite for optimizing test performance.

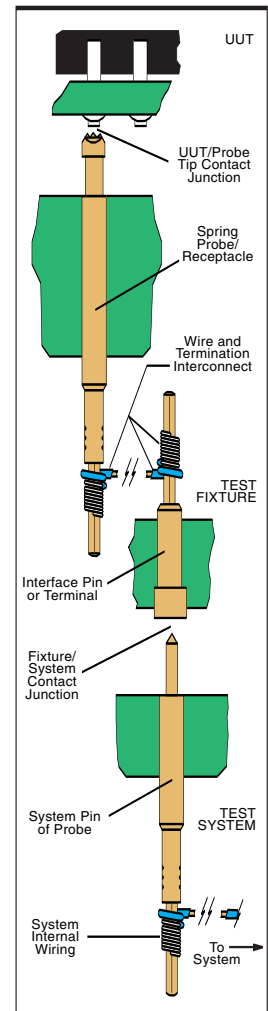


Figure 3
Receptacle Styles

Receptacles also available pre-terminated for easier installation.

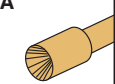
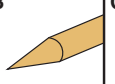
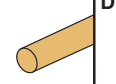
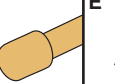
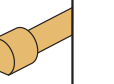
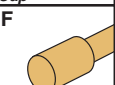
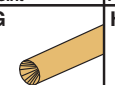
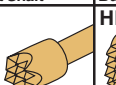

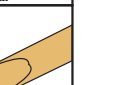

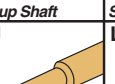


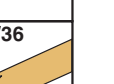




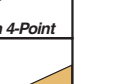
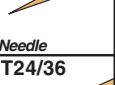







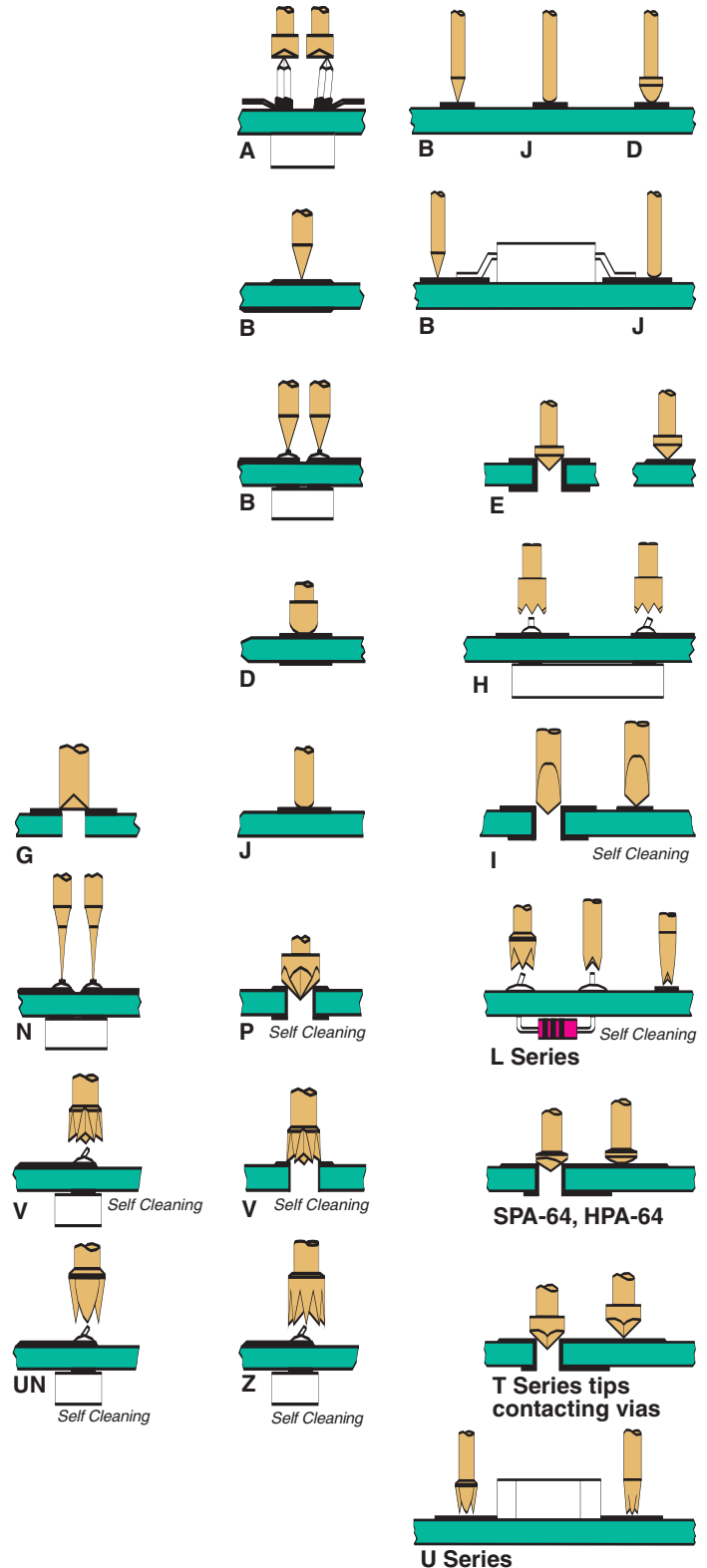
Tip Selection

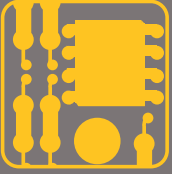
Most tip styles can be used for a variety of different applications. Use the following chart to select appropriate tips for the feature type (pad, via, etc.) you are testing. Several tip styles will probably work for a given application, so experiment with several until you find one that provides the best performance.

For testing loaded boards, tip selection factors to consider are lead length (bent or straight), surface cleanliness and pad size. In general, tips with sharp points and internal cutting edges which trap leads (such as the Trident or crown tip) are excellent choices for most loaded board requirements.

In bare board applications, tips with sharp external cutting edges (such as fluted and pyramid tips) are usually best for penetrating through contamination, but these may leave marks on the contact surface. For applications where marking is undesirable, bullet nose or conical tips may be used on clean boards.

A  <i>Cup</i>	B  <i>Point</i>	C  <i>Flat Shaft</i>	D  <i>Bullet Nose</i>	E  <i>Conical</i>
F  <i>Flat Head</i>	G  <i>Cup Shaft</i>	H  <i>Serrated</i>	HM  <i>Serrated</i>	I  <i>Blade</i>
IB  <i>Blade</i>	J  <i>Radius</i>	L  <i>Crown 4-Point</i>	L18  <i>Crown 4-Point</i>	L24/36  <i>Crown 4-Point</i>
N  <i>Needle</i>	P  <i>Fluted</i>	T  <i>Pyramid 3-Sided</i>	T1  <i>3-Sided</i>	T20  <i>3-Sided</i>
T24/36  <i>Pyramid 3-Sided</i>	TJ  <i>Test Jet</i>	U  <i>Tri-point</i>	UN  <i>Trident</i>	V  <i>Tulip 7-Point</i>
Z  <i>Crown 8-Point</i>				





Loaded PCB Test

These probes, which include the PogoPlus® Series, address the unique demands of loaded board, vacuum fixture applications. Most feature an enhanced version of the legendary bias-ball design to virtually eliminate “false opens”; proprietary metal plating processes for higher conductivity; and precision MicroSharp™ steel tips for long-lasting durability. A full range of sizes accommodates products with mixed test center requirements.

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How to Order

For each probe, specify the probe model and tip style as shown in the example below. If required, specify the optional non-standard spring force.

Example:

POGO-25UN - 2 - S

probe model	tip style	spring force	steel
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Call 909-625-9390 to order, or fax to 909-624-9746.



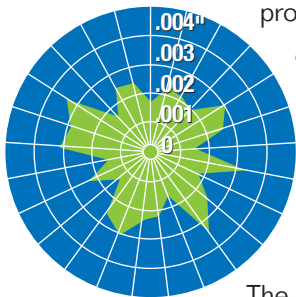
Technical Notes Loaded PCB Test Probes

Mixed Test Centers

In loaded board applications, probes designed for use on 0.050, 0.075 and 0.100 inch test centers can be mixed in single or dual-stage fixtures, even though there may be minor variations in plunger travel. When mounted correctly, probe plunger tips should align when plungers are at recommended working travel — generally 2/3. This will ensure contact integrity between the tip and test pad. Minor adjustments may be required to compensate for variations in accessing component leads, flat test pads or through-holes.

New PogoPlus® Series probes

Conventional bias-type probes are susceptible to false opens — that is, transient electrical discontinuities that cause good products to “fail” during test. Revolutionary PogoPlus probes eliminate probe-induced false opens, saving you the time, money and trouble of needless product retesting.

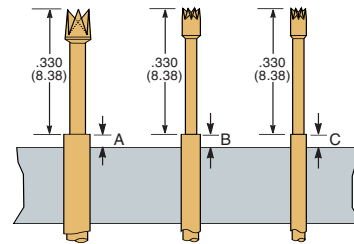


ECT Pogo® contacts deliver superior pointing accuracy demonstrated by test results measuring sideload TIR.

The unrivaled electrical performance of the PogoPlus is due to the interaction between the spring, captured ball and plunger, which forces the plunger into continuous contact with the barrel wall at all times. The result is uninterrupted electrical continuity and low overall resistance that can't be equaled by any other “high performance” probe.

The PogoPlus® is also designed to be the world's most durable probe with features like optional stainless-steel MicroSharp™ tips, a larger spring volume and enhanced pointing precision. For complete specifications and ordering information, please turn to pages 9-13.

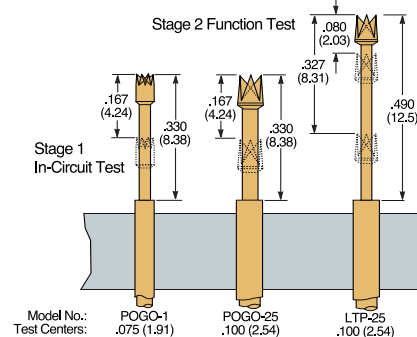
SMT and Loaded Board



Model No.: POGO-25 POGO-1 POGO-72
Test Centers: .100 (2.54) .075 (1.91) .050 (1.27)
Mounting Height: A=B=C A=B=C C MAX .220 (5.59)

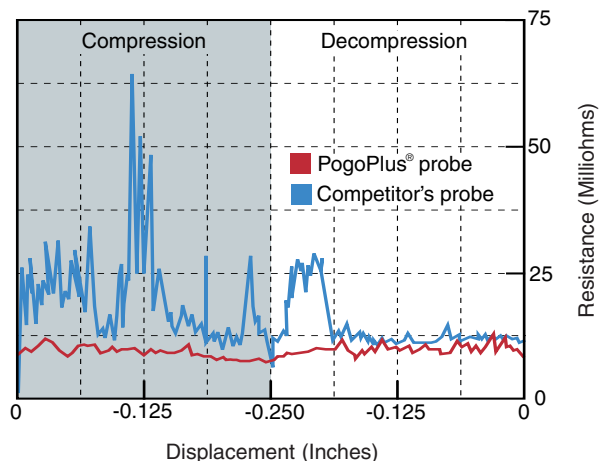
Illustration above shows 50, 75 and 100 mil probes installed in the same fixture. This is accomplished by determining the mounting height of the 100 mil probe and using the appropriate mounting height formula to establish the mounting height of the other probes. In the example, the 100 mil probe is mounted .220 inches above the probe plate. CAUTION: These are reference guidelines only. Actual mounting heights may vary among fixture designs.

Loaded Board Testing Dual-Stage Application



For dual-stage testing, component lead length should not exceed .050 inch.

How Much Better is the PogoPlus®? Here's the Proof



Resistance vs. displacement tests show the PogoPlus probe's more consistent resistivity performance resulting in significantly fewer probe false opens and tighter control of the test process.

Pogo Plus®

A variety of innovative tip styles give you the flexibility to match the PogoPlus® to your specific test application

Available steel tips, manufactured with ECT's MicroSharp™ technology, offer the ultimate in long-lasting tip sharpness and contact integrity

A double-roll close offers the industry's best pointing accuracy that helps you hit the smallest test targets with high repeatability

Interaction of the captured ball, bias-cut plunger end and applied spring force guarantees uninterrupted electrical contact with the probe barrel sidewall, virtually eliminating probe related false opens

A shorter plunger permits more spring volume, higher spring force and longer spring life

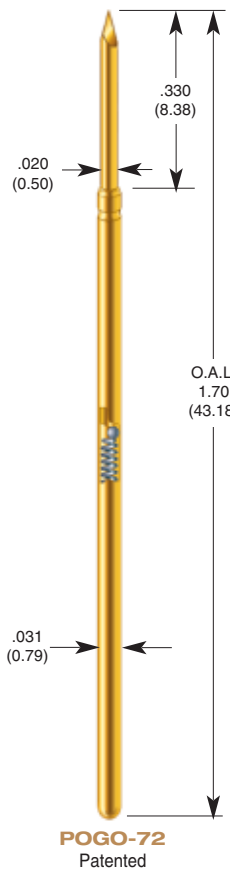
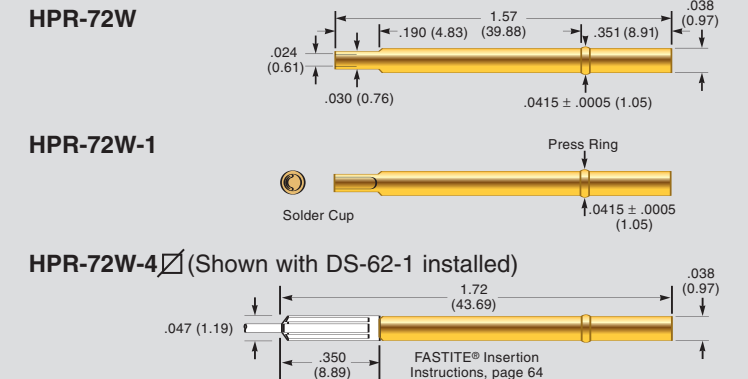
ECT's precious metal plating process, together with enhanced bias contact, provides highly repeatable conductivity

TO ORDER, CALL 909-625-9390

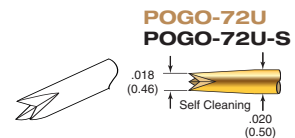
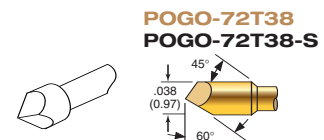
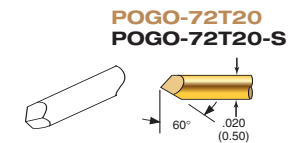
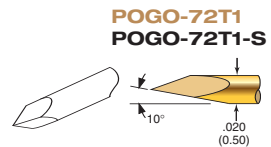
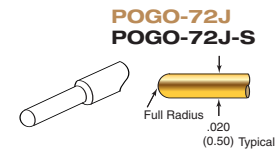
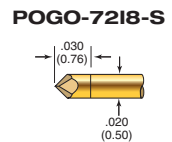
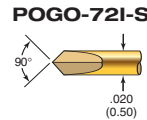
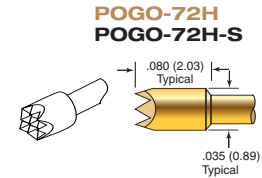
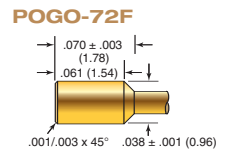
Probe Specifications	POGO-72	POGO-72 Steel
Mechanical		
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles	1 x 10 ⁶ cycles
Operating Temperature	-55°C to +105°C	-55°C to +105°C
Consult factory for other temperature requirements, 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	15 mΩ	15 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold-plated over hard nickel	Heat-treated tool steel, gold-plated over hard nickel
Barrel:	Work-hardened beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Work-hardened beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

Receptacle Specifications		
Mounting Hole Size:	.039 (0.99)	.039 (0.99)
A #61 drill is most commonly used.		
Recommended Wire Gauge:	28-30 AWG	28-30 AWG
Connections:	<p>HPR-72W Crimp (To order with 30 inches of 28 or 30 AWG wire attached, add -28 or -30 to model number).</p> <p>HPR-72W-1 Solder cup</p> <p>HPR-72W-4 FASTITE® wire termination (30 AWG only), max. insulation diameter = .019 (0.48), wire strip length = .125 (3.2)</p> <p>DS-62-1 Insulation sleeve for HPR-72W-4. One sleeve is provided with each FASTITE® receptacle at no charge. Consult factory for price/delivery on additional quantities.</p>	<p>HPR-72W Crimp (To order with 30 inches of 28 or 30 AWG wire attached, add -28 or -30 to model number).</p> <p>HPR-72W-1 Solder cup</p> <p>HPR-72W-4 FASTITE® wire termination (30 AWG only), max. insulation diameter = .019 (0.48), wire strip length = .125 (3.2)</p> <p>DS-62-1 Insulation sleeve for HPR-72W-4. One sleeve is provided with each FASTITE® receptacle at no charge. Consult factory for price/delivery on additional quantities.</p>
Materials and Finishes	Work-hardened beryllium copper, HPA-Gold™ plated (I.D. and O.D.) over hard nickel.	Work-hardened beryllium copper, HPA-Gold™ plated (I.D. and O.D.) over hard nickel.

Spring Force in oz. (grams)		
Spring Type	Preload	2/3 Travel
To order, add dash number to Model Number.		
Light	-2 0.35 (10)	2.0 (57)
Standard	-4 1.05 (30)	4.0 (113)
Alternate	-6 2.63 (75)	6.0 (170)
Elevated	-7 2.05 (58)	7.0 (198)
High	-8 1.48 (42)	8.0 (227)
Ultra High	-10 3.32 (94)	10.0 (283)
Optional spring forces and materials are available.		



NOTE: To order in steel, include a -S after model #, i.e. POGO-72H-2-S

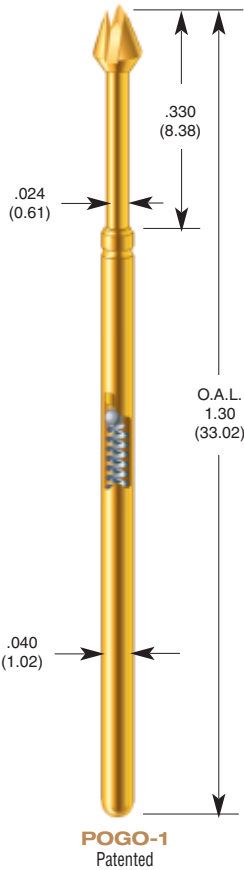
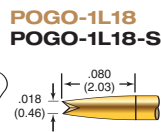
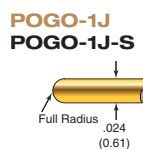
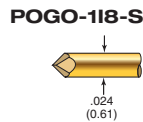
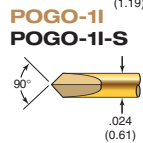
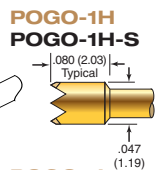
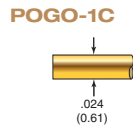
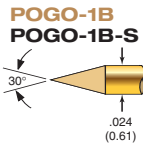
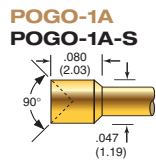


Loaded PCB Test Probes



Actual Size

TO ORDER, CALL 909-625-9390



NOTE: To order in steel, include a -S after model #, i.e. POGO-1H-2-S

Probe Specifications POGO-1 POGO-1 Steel

Probe Specifications	POGO-1	POGO-1 Steel
Mechanical		
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	-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:	6 amps	6 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	10 mΩ	10 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold-plated over hard nickel	Heat-treated tool steel, gold-plated over hard nickel
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

Receptacle Specifications

Mounting Hole Size:	.053/.055 (1.35/1.40)	.053/.055 (1.35/1.40)
Recommended Wire Gauge:	24-28 AWG	24-28 AWG
Connections:	LTR-1W Crimp LTR-1W-1 Solder cup LTR-1W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 ⁻⁴ CFM @ 15 psi	LTR-1W Crimp LTR-1W-1 Solder cup LTR-1W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 ⁻⁴ CFM @ 15 psi
Materials and Finishes		
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Square Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated

Loaded PCB Test Probes

Actual Size



Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390

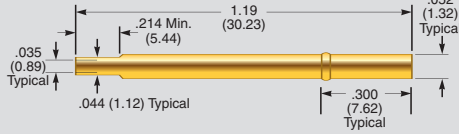
Spring Force in oz. (grams)
 Spring Type Preload 2/3 Travel

To order, add dash number to Model Number.

Light	-2	0.94 (27)	2.0 (57)
Standard	-4	0.33 (9)	4.0 (113)
Alternate	-6	2.88 (82)	6.0 (170)
Elevated	-7	2.48 (70)	7.0 (198)
High	-8	2.04 (58)	8.0 (227)
Ultra High	-10	3.65 (103)	10.0 (283)

Optional spring forces and materials are available.

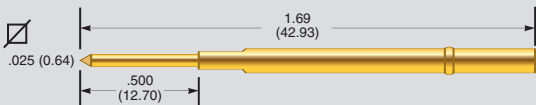
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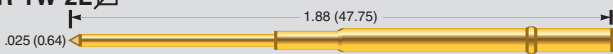
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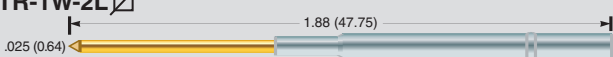
LTR-1W-2



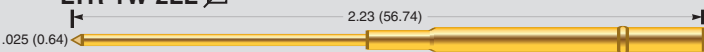
LTR-1W-2L



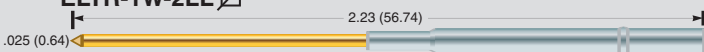
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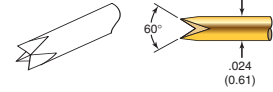
LTR-1W-2LL



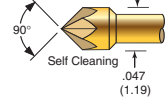
ELTR-1W-2LL



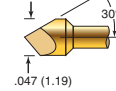
POGO-1L24
POGO-1L24-S



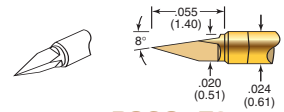
POGO-1P
POGO-1P-S



POGO-1T
POGO-1T-S



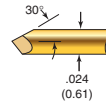
POGO-1T1
POGO-1T1-S



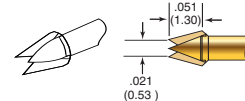
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POGO-1T24-S



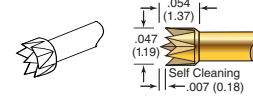
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POGO-1T30-S



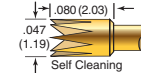
POGO-1UN
POGO-1UN-S



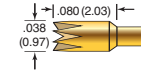
POGO-1V
POGO-1V-S



POGO-1Z
POGO-1Z-S



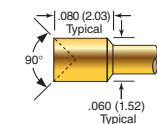
POGO-1Z1
POGO-1Z1-S



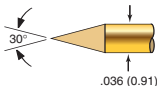
Loaded PCB Test Probes

TO ORDER, CALL 909-625-9390

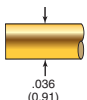
POGO-25A POGO-25A-S



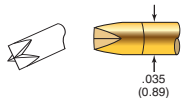
POGO-25B POGO-25B-S



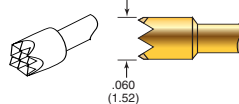
POGO-25C



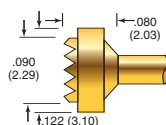
POGO-25FL-S



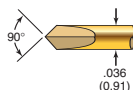
POGO-25H POGO-25H-S



POGO-25HM



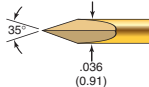
POGO-25I POGO-25I-S



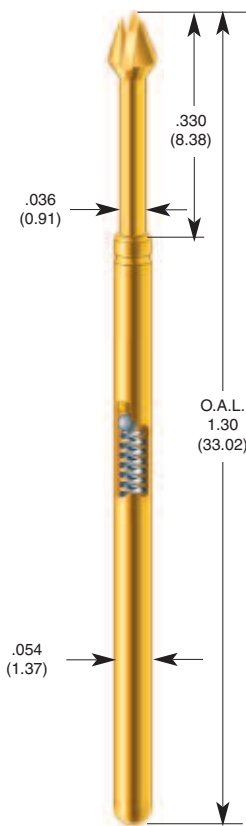
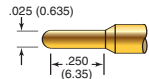
POGO-25I8-S



POGO-25I35-S



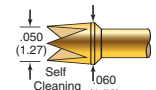
POGO-25J POGO-25J-S



POGO-25
Patented

NOTE: To order in steel, include a -S after model #, i.e. POGO-25H-2-S

POGO-25L POGO-25L-S



Probe Specifications POGO-25 POGO-25 Steel

Probe Specifications	POGO-25	POGO-25 Steel
Mechanical		
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	-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:	8 amps	8 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	8 mΩ	8 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold-plated over hard nickel	Heat-treated tool steel, gold-plated over hard nickel
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

Receptacle Specifications

Mounting Hole Size:	.067/.069 (1.7/1.75)	.067/.069 (1.7/1.75)
A #51 or 1.75 mm drill is most commonly used.		
Recommended Wire Gauge:	22-26 AWG	22-26 AWG
Connections:	SPR-25W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-25W-1 Solder cup SPR-25W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 ⁻⁴ CFM @ 15 psi SPR-25W-3 Connector pin/round post	SPR-25W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-25W-1 Solder cup SPR-25W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 ⁻⁴ CFM @ 15 psi SPR-25W-3 Connector pin/round post

Materials and Finishes	POGO-25	POGO-25 Steel
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Round Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated
Square Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated

Loaded PCB Test Probes



Actual Size

TO ORDER, CALL 909-625-9390

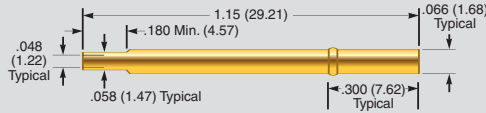
Spring Force in oz. (grams)		
Spring Type	Preload	2/3 Travel

To order, add dash number to Model Number.

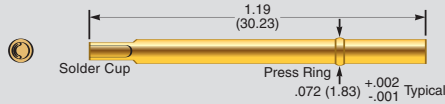
Light	-2	0.99 (20)	2.0 (57)
Standard	-4	1.46 (41)	4.0 (114)
Alternate	-6	3.39 (96)	6.0 (170)
Elevated	-6.5	2.42 (69)	6.5 (184)
High	-8	2.98 (84)	8.0 (227)
Ultra High	-10	2.60 (74)	10.0 (283)
Super	-16	4.49 (127)	16.0 (455)

Optional spring forces and materials are available.

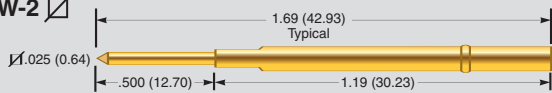
SPR-25W



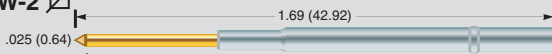
SPR-25W-1



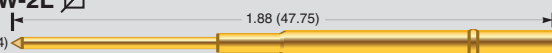
SPR-25W-2



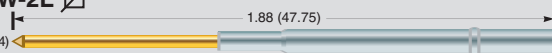
EPR-25W-2



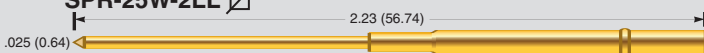
SPR-25W-2L



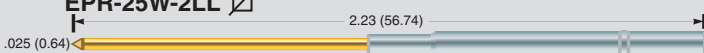
EPR-25W-2L



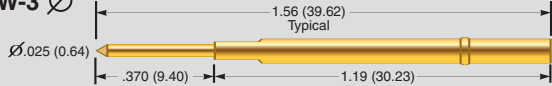
SPR-25W-2LL



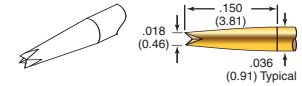
EPR-25W-2LL



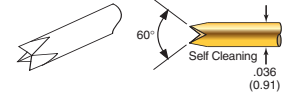
SPR-25W-3



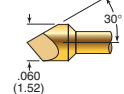
POGO-25L18 POGO-25L18-S



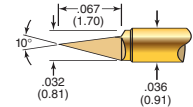
POGO-25L36 POGO-25L36-S



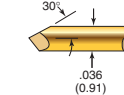
POGO-25T POGO-25T-S



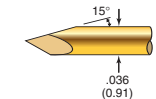
POGO-25T1-S



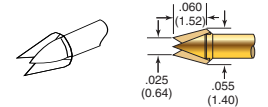
POGO-25T30 POGO-25T30-S



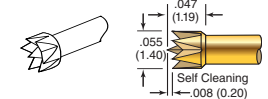
POGO-25T36 POGO-25T36-S



POGO-25UN POGO-25UN-S



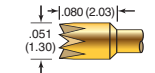
POGO-25V POGO-25V-S



POGO-25Z POGO-25Z-S

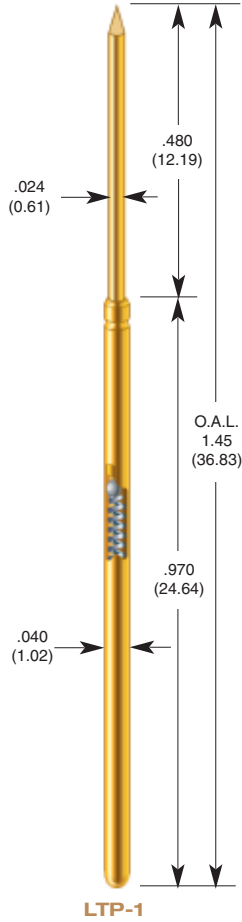
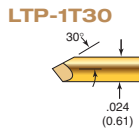
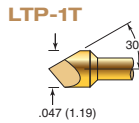
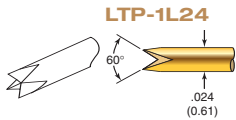
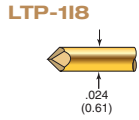
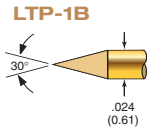


POGO-25Z1 POGO-25Z1-S



Loaded PCB Test Probes

TO ORDER, CALL 909-625-9390



Probe Specifications LTP-1

Mechanical

Full Travel: .400 (10.16)
Recommended Working Travel: .317 (8.05)

Operating Temperature

-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 6 amps
Maximum continuous current, non-inductive at working travel

Average Probe Resistance

10 mΩ

Materials and Finishes

Plunger: 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
Spring: Music wire
Ball: Stainless steel

Receptacle Specifications

Mounting Hole Size: .053/.055 (1.35/1.40)

Recommended Wire Gauge: 24-28 AWG

Connections:

LTR-1W Crimp
LTR-1W-1 Solder cup
LTR-1W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10⁻⁴ CFM @ 15 psi

Materials and Finishes

Housing: Work-hardened nickel silver, gold plated over hard nickel
Square Post: Phosphor bronze, gold plated

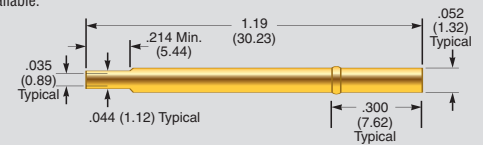
Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
Standard	-4.5	1.29 (36.6)
Alternate	-9.6	1.50 (42.5)
		4.5 (128)
		9.6 (272)

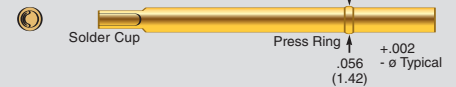
To order, add dash number to Model Number.

Optional spring forces and materials are available.

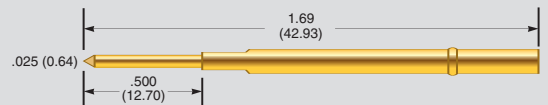
LTR-1W



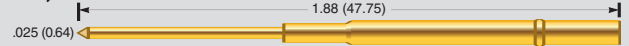
LTR-1W-1



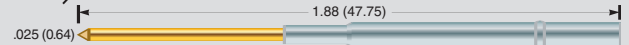
LTR-1W-2



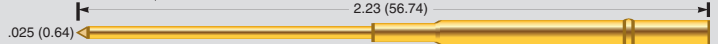
LTR-1W-2L



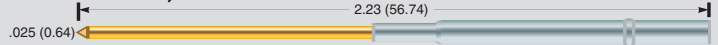
ELTR-1W-2L



LTR-1W-2LL



ELTR-1W-2LL



Loaded PCB Test Probes



Actual
Size

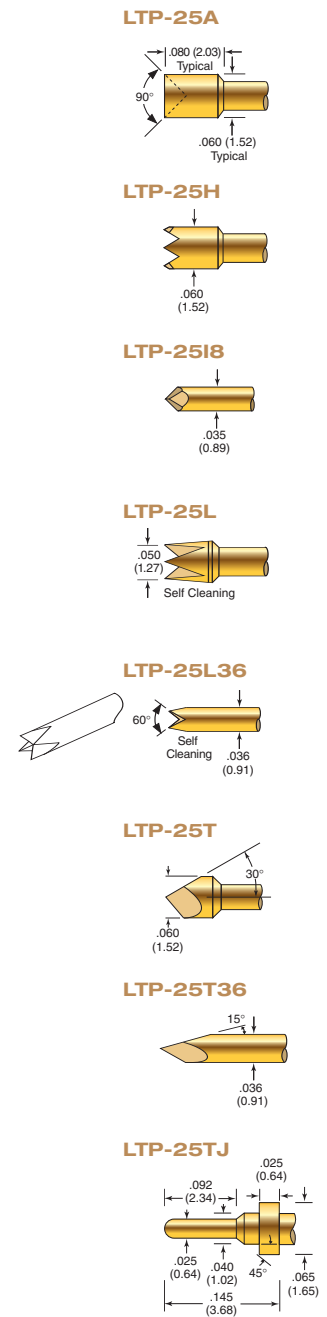
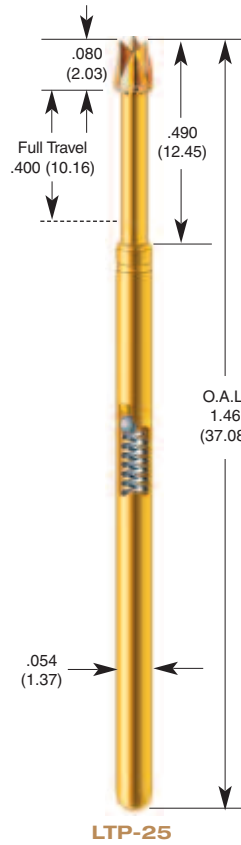
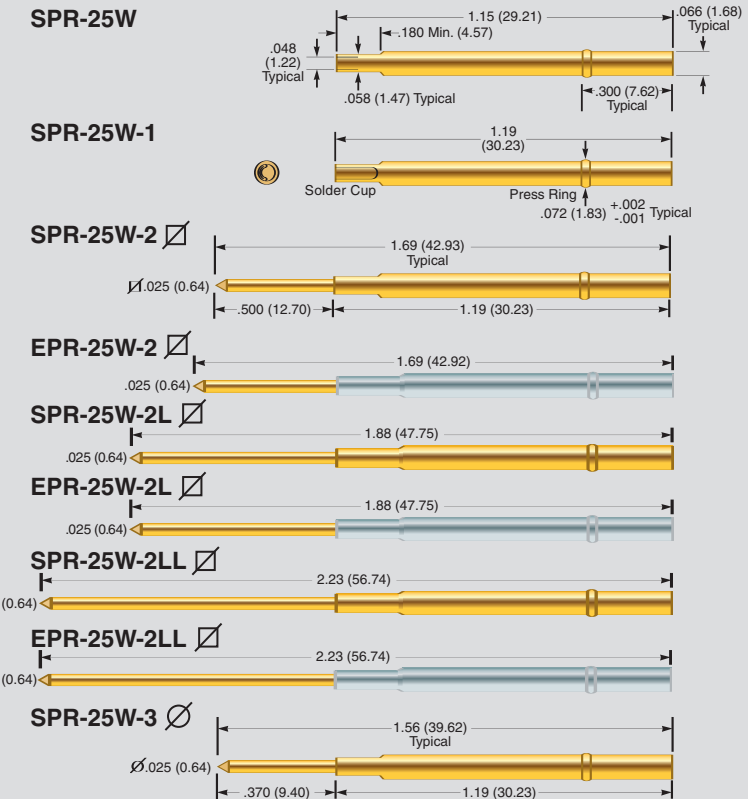
TO ORDER, CALL 909-625-9390

Probe Specifications	LTP-25	LTP-25 TJ
Mechanical		
Full Travel:	.400 (10.16)	.340 (8.6)
Recommended Working Travel:	.315 (8.0)	.315 (8.00)
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:	8 amps	8 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	8 mΩ	8 mΩ
Materials and Finishes		
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 phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

Receptacle Specifications		
Mounting Hole Size:	.067/.069 (1.70/1.75)	.067/.069 (1.70/1.75)
A #51 or 1.75 mm drill is most commonly used.		
Recommended Wire Gauge:	22-26 AWG	22-26 AWG
Connections:	SPR-25W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-25W-1 Solder cup SPR-25W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1×10^{-4} CFM @ 15 psi SPR-25W-3 Connector pin/round post	SPR-25W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-25W-1 Solder cup SPR-25W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1×10^{-4} CFM @ 15 psi SPR-25W-3 Connector pin/round post

Materials and Finishes		
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Round Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated
Square Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated

Spring Force in oz. (grams)			
Spring Type	Preload	.315 Travel	
Standard	-4	1.28 (36)	4.0 (113)
Alternate	-6	1.19 (34)	6.0 (170)
High	-8	0.90 (26)	8.0 (227)
Ultra High	-9.7	2.30 (65)	9.7 (275) (Full travel max. .350)

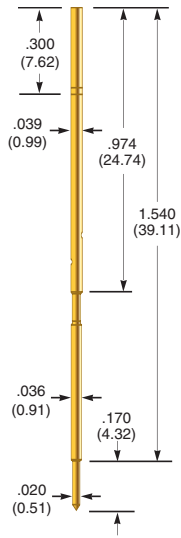


Loaded PCB Test Probes

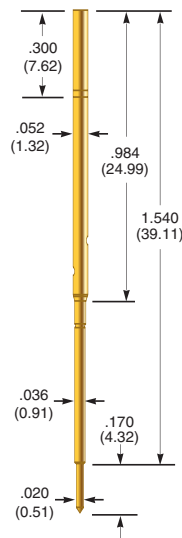


Actual Size

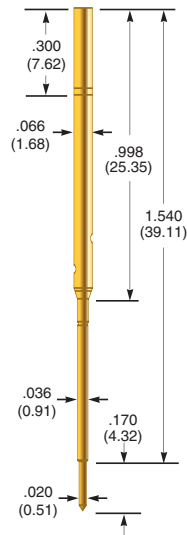
TO ORDER, CALL 909-625-9390



DER-050



DER-075



DER-100

B TIP STYLE

Order DER-xxxB-3.5



J TIP STYLE

Order DER-xxxJ-3.5



T TIP STYLE

Order DER-xxxT-3.5



Receptacle Specifications	DER-050	DER-075	DER-100
Mechanical			
Recommended Mounting Centers:	.050 (1.27)	.075 (1.91)	.100 (2.54)
Full Travel:	.160 (4.06)	.160 (4.06)	.160 (4.06)
Recommended Travel:	.130 (3.30)	.130 (3.30)	.130 (3.30)
Test Height:	1.586 (40.28)	1.586 (40.28)	1.586 (40.28)
Spring Force in oz. (grams):	3.5 (99)	3.5 (99)	3.5 (99)
Overall Length:	1.710 (43.43)	1.710 (43.43)	1.710 (43.43)
Recommended Mounting Hole Size:	.037/.038 (.94/.97)	.053/.055 (1.35/1.40)	.067/.069 (1.70/1.75)

Materials and Finishes	DER-050	DER-075	DER-100
Plunger:	Beryllium copper alloy, hard gold over nickel	Beryllium copper alloy, hard gold over nickel	Beryllium copper alloy, hard gold over nickel
Barrel:	Beryllium copper alloy, hard gold over nickel	Beryllium copper alloy, hard gold over nickel	Beryllium copper alloy, hard gold over nickel
Spring:	Steel alloy, hard gold over nickel	Steel alloy, hard gold over nickel	Steel alloy, hard gold over nickel
Receptacle:	Beryllium copper alloy, hard gold over nickel	Nickel silver alloy, hard gold over nickel	Nickel silver alloy, hard gold over nickel

Fixture Probes (Ordered Separately)	Pogo-62 (see below)	Pogo-1 (see page 10-11)	Pogo-25/LTP-25 (see pages 12, 13, 15)
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Probe Specifications	POGO-62	POGO-62 Steel
Mechanical		
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life:	500,000 cycles	500,000 cycles

Operating Temperature	-55°C to +105°C	-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.		

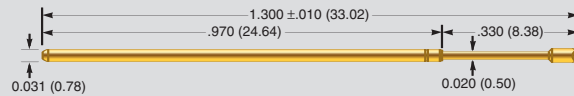
Electrical (Static Conditions)	Pogo-62	Pogo-62 Steel
Current Rating:	3 amps	3 amps
Maximum continuous current, non-inductive at working travel		

Average Probe Resistance	15 mΩ	15 mΩ
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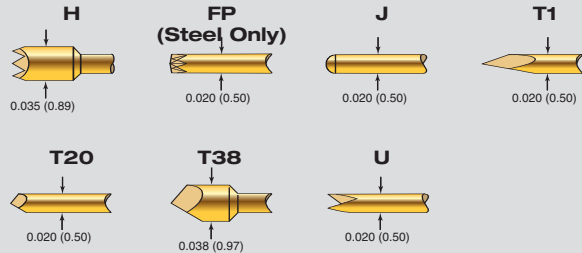
Materials and Finishes	Pogo-62	Pogo-62 Steel
Plunger:	Heat-treated beryllium copper, hard gold over nickel	Heat-treated tool steel, hard gold over nickel
Barrel:	Work-hardened beryllium copper, hard gold over nickel	Work-hardened beryllium copper, hard gold over nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

Spring Force in oz. (grams)	POGO-62	
	Preload	2/3 Travel
Light	-2	48 (14)
Standard	-4	1.02 (29)
Alternate	-6	.66 (19)
		2.0 (57)
		4.0 (113)
		6.0 (170)

POGO-62



Tip Styles



TO ORDER, CALL 909-625-9390

Board Marker Probe

The BMP-1 Board Marker Probe patented design is for installation on bare board or loaded board test fixtures. When your tester is equipped with the appropriate electronics and software, the BMP-1 scribes a permanent .050" circle on every "passed" PCB tested. Boards that fail the test are not marked. The risk of human error is eliminated in PCB testing and sorting.

The unit requires less than .500" of fixture area. It is designed to mark board areas of bare glass (FR4), solder mask over glass or copper, or bare tinned copper.

The BMP-1 includes a mounting receptacle with press ring, and a motor/transmission assembly. It can be easily removed from the receptacle for use in other fixtures. Spare receptacles and tip replacement assemblies are available. The thread between receptacle and housing is 7/16-20 UNF.

Consult factory for information on electronic and software requirements, and replacement receptacles and tip assemblies.

Probe Specifications BMP-1 BMP-2

Mechanical

Full Marker Tip Travel:	.062 (1.57)	.062 (1.57)
Recommended Working Travel:	.050 (1.27)	.050 (1.27)
Direction of Rotation:	CCW	CCW
Scribed Diameter:	.050 (1.27)	.050 (1.27)

Electrical (Operating Conditions)

Current Rating:	50 mA	50 mA
Voltage Rating:	15VDC	15VDC
Recommended Duty Cycle:	1 sec. On (min.), 5 sec. Off	1 sec. On (min.), 5 sec. Off

Materials and Finishes

Plunger Tip:	Carbide	Carbide
Receptacle:	Stainless steel	Stainless steel

Mounting Hole Size:	.468/.469 (11.89/11.91)	.468/.469 (11.89/11.91)
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To Order

Specify model number of components or tools you require:

BMP-1, -2: Probe and receptacle, wires and connector attached, mating connector supplied, (-red, + black).

BMR-1, -2: Receptacle only.

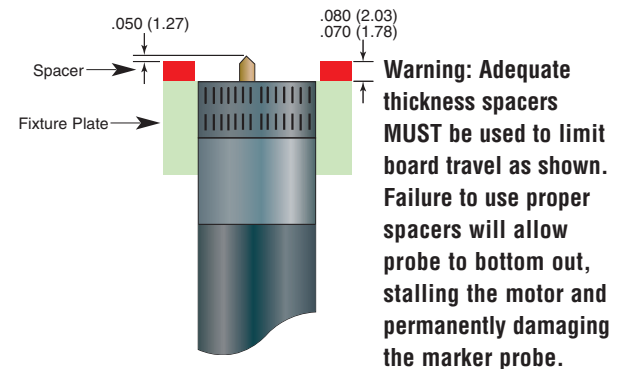
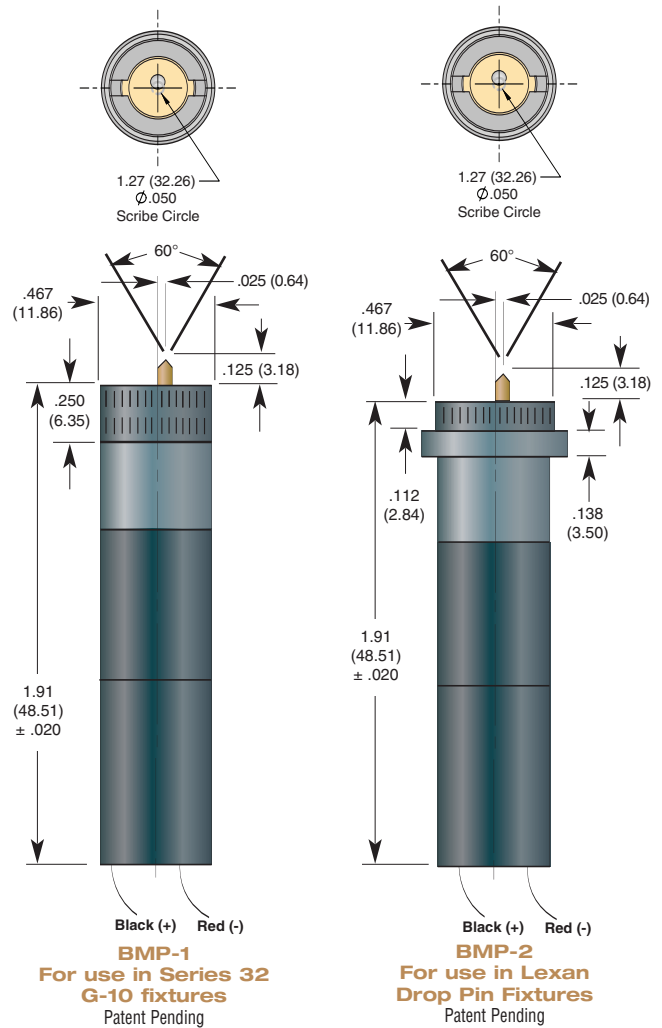
BMT-1: Tip replacement assembly for both BMP-1 and BMP-2.

RIT-BMP: Receptacle insertion tool for BMR-1.

EXT-BMP: Receptacle extraction tool for BMR-1.



BMP-1 marker probe with receptacle.



Loaded PCB Test Probes



ECT LFRE: Cleaner Probes, Cleaner Environment.

The Lead Free Challenge

Lead free solder can cause many problems in Circuit Testing. Lead Free Solder has a higher reflow temperature, which can result in harder and stickier solder flux resin and a thicker, harder oxide layer. This thicker layer of resin and oxide is more difficult to penetrate and increases wear on the pogo pin. Lead free solder resin and oxides can also increase debris transfer to spring probes. These are many of the issues found in OSP and No-Clean applications. ECT has developed a new test probe, specifically designed to solve these problems.

ECT New Lead Free POGO® Series

ECT's new Lead Free probe line incorporates a number of features that will significantly reduce the issues that arise when switching to lead free solder as well as those contact issues that arise with OSP and No-Clean solder flux.

- **New Proprietary Plating**

Our new Lead Free probe incorporates a new Harder and Slicker plating that not only resists wear but also reduces solder and debris transfer.

- **Higher Preload**

All of our new Lead Free probes incorporate higher preloads. Higher preload reduces spring force variation with board flex and increases the initial impact penetration, resulting in higher first pass yields.

- **PogoPlus Bias Ball Design**

The PogoPlus internal bias ball design guarantees uninterrupted electrical contact with the probe sidewall virtually eliminating probe related false opens.

- **Range of Spring Force Choices:**

Compared to competitors' products, which offer limited spring force options, ECT's LFRE Pogos are available in a variety of spring force choices in 100 mil, 75 mil and 50 mil centers.

- **Spring Life**

All of ECT's Lead Free (LFRE) probes have a spring fatigue life that surpasses 500,000 cycles. Competitors' lead free products may increase preload but dramatically lower cycle life, in some cases, at or below 50,000 cycles.

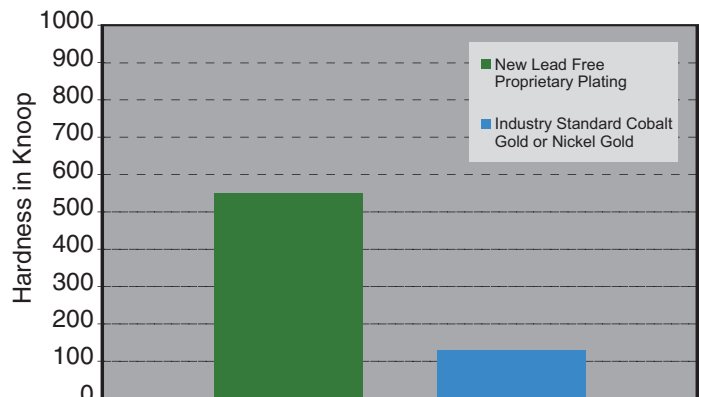
- **Pointing Accuracy**

ECT's new Lead Free probe incorporates a double roll close, which offers the industries best pointing accuracy. Increased pointing accuracy is of benefit when using Lead Free solder and/or No-Clean as the probe is less likely to touch the edge of the pad where the solder flux accumulates.

New Proprietary Lead Free Plating vs. the Industry Standard

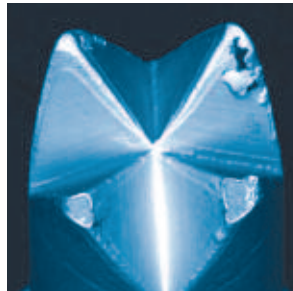
The industry standard for plated POGO pins is Gold electroplate alloyed either with cobalt of nickel to enhance its hardness. Hardness is increased from 90 Knoop for 99.7% pure electroplated gold to 130 to 200 Knoop when alloyed with nickel or cobalt. ECT's new Proprietary Lead Free plating is significantly harder than the industry's standard gold plating. Our new proprietary plating has a hardness range of 550 to 650 Knoop. This makes the probe tips more durable and less susceptible to solder and material transfer.

Hardness Comparison of Lead Free Proprietary Plating to the Industry Standard

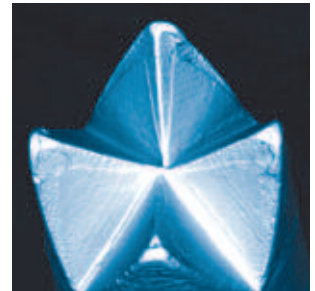


Minimum Hardness

Plating Wear

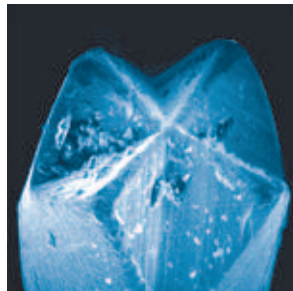


Industry Standard Gold



New Proprietary Plating

Contaminant Transfer



Industry Standard Gold



New Proprietary Plating

In House Testing

ECT has performed numerous in house tests on our new Lead Free probe in order to determine its wear properties and its life against lead free solder and no clean solder flux. The following is a resistance graph of the average resistance of a group of Lead Free probes and Equivalent PogoPlus Steel probes cycled and dragged .010" across pads covered with lead free (SAC) solder with no clean solder flux.

TO ORDER, CALL 909-625-9390

Probe Specifications LFRE-72

Mechanical

Full Travel: 250 (6.35)
 Recommended Working Travel: .167 (4.24)
 Mechanical Life Exceeds: 5×10^5 cycles

Operating Temperature

-55°C to +105°C
 Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 3 amps
 maximum continuous current, non-inductive at working travel

Average Probe Resistance

15 mΩ

Materials and Finishes

Plunger: High performance alloy, LFRE proprietary plating
 Barrel: Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
 Spring: Music wire, nickel plated
 Ball: Stainless steel

Receptacle Specifications

Mounting Hole Size:

.039 (0.99)
 A #61 drill is most commonly used.

Recommended Wire Gauge:

28-30 AWG

Connections:

HPR-72W Crimp (To order with 30 inches of 28 or 30 AWG wire attached, add -28 or -30 to model number).
HPR-72W-1 Solder cup
HPR-72W-4 FASTITE™ wire termination (30 AWG only), max. insulation diameter = .019 (0.48), wire strip length = .125 (3.2)
DS-62-1 Insulation sleeve for HPR-72W-4. One sleeve is provided with each FASTITE™ receptacle at no charge. Consult factory for price/delivery on additional quantities.

Materials and Finishes

Work-hardened beryllium copper, HPA-Gold™ plated (I.D. and O.D.) over hard nickel.

Spring Force in oz. (grams)

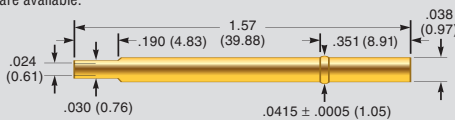
Spring Type	Preload	2/3 Travel
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To order, add dash number to Model Number.

Alternate -6	2.63 (75)	6.0 (170)
Elevated -7	2.05 (58)	7.0 (198)
High -8	3.18 (90)	8.0 (227)
Ultra High* -10	3.99 (113)	10.0 (283)

* May observe slight decrease in cycle life
 Optional spring forces and materials are available.

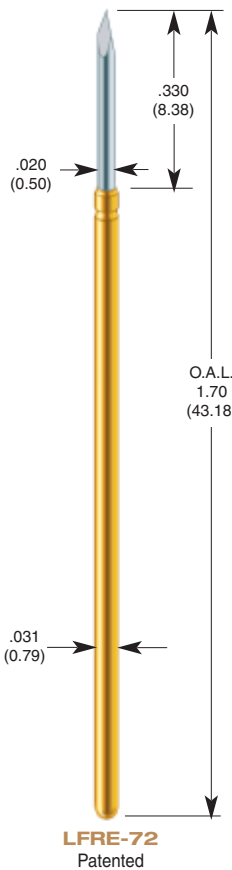
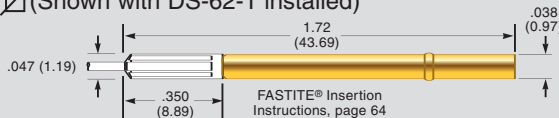
HPR-72W



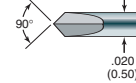
HPR-72W-1



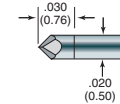
HPR-72W-4 (Shown with DS-62-1 installed)



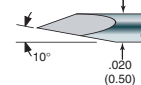
LFRE-721



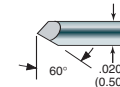
LFRE-7218



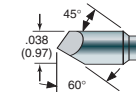
LFRE-72T1



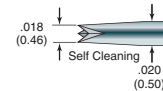
LFRE-72T20



LFRE-72T38



LFRE-72U



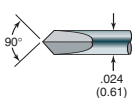
Loaded PCB Test Probes



Actual Size

TO ORDER, CALL 909-625-9390

LFRE-11



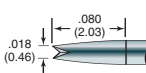
LFRE-118



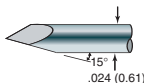
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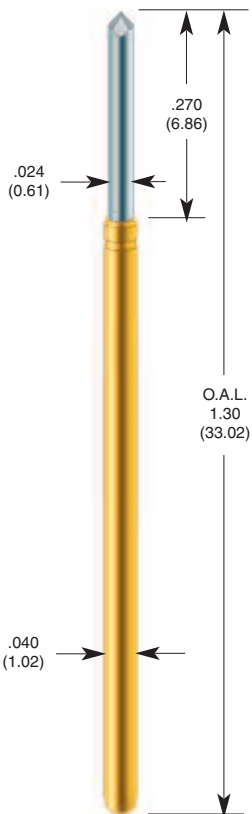
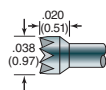
LFRE-1L18



LFRE-1T24



LFRE-1Z1



LFRE-1
Patented

Probe Specifications LFRE-1

Mechanical

Full Travel: .250 (6.35)
Recommended Working Travel: .167 (4.24)
Mechanical Life Exceeds: 5×10^6 cycles

Operating Temperature

-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 6 amps
Maximum continuous current, non-inductive at working travel

Average Probe Resistance

10 mΩ

Materials and Finishes

Plunger: High performance alloy,
LFRE proprietary plating
Barrel: Work-hardened phosphor bronze,
HPA-GOLD™ plated (I.D. and
O.D.) over hard nickel
Spring: Music wire, nickel plated
Ball: Stainless steel

Receptacle Specifications

Mounting Hole Size: .053/.055 (1.35/1.40)

Recommended Wire Gauge: 24-28 AWG

Connections:

LTR-1W Crimp
LTR-1W-1 Solder cup
LTR-1W-2 Wire wrap/square
post. Vacuum leak rate not to
exceed 1×10^{-4} CFM @ 15 psi

Materials and Finishes

Housing: Work-hardened nickel silver,
gold plated over hard nickel
Square Post: Phosphor bronze, gold plated

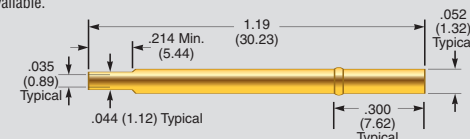
Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
To order, add dash number to Model Number.		
Alternate -6	2.88 (82)	6.0 (170)
Elevated -7	2.59 (73)	7.0 (198)
High -8	3.24 (92)	8.0 (227)
Ultra High* -10	4.04 (115)	10.0 (283)

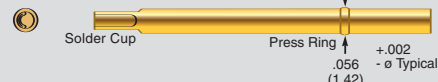
* May observe slight decrease in cycle life

Optional spring forces and materials are available.

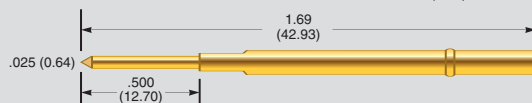
LTR-1W



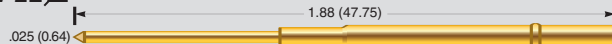
LTR-1W-1



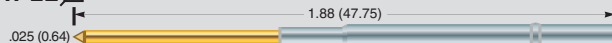
LTR-1W-2



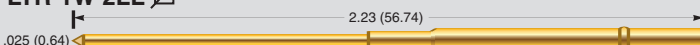
LTR-1W-2L



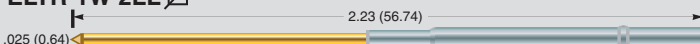
ELTR-1W-2L



LTR-1W-2LL



ELTR-1W-2LL



Loaded PCB Test Probes



Actual Size



Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390

Probe Specifications LFRE-25

Mechanical

Full Travel: 250 (6.35)
 Recommended Working Travel: .167 (4.24)
 Mechanical Life Exceeds: 1×10^6 cycles

Operating Temperature

-55°C to +105°C
 Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 8 amps
 maximum continuous current, non-inductive at working travel

Average Probe Resistance

8 mΩ

Materials and Finishes

Plunger: High performance alloy,
 LFRE proprietary plating
 Barrel: Work-hardened phosphor bronze,
 HPA-GOLD™ plated (I.D. and
 O.D.) over hard nickel
 Spring: Music wire, nickel plated
 Ball: Stainless steel

Receptacle Specifications

Mounting Hole Size:

.067/.069 (1.7/1.75)

Recommended Wire Gauge:

22-26 AWG

Connections:

SPR-25W Crimp or push-on
 termination (AMP terminal
 60983-1 or equivalent)
SPR-25W-1 Solder cup
SPR-25W-2 Wire wrap/square
 post. Vacuum leak rate not
 to exceed 1×10^{-4} CFM @
 15 psi
SPR-25W-3 Connector
 pin/round post

Materials and Finishes

Housing: Work-hardened nickel silver,
 gold plated over hard nickel
 Round Post: Phosphor bronze, gold plated
 Square Post: Phosphor bronze, gold plated

Spring Force in oz. (grams)

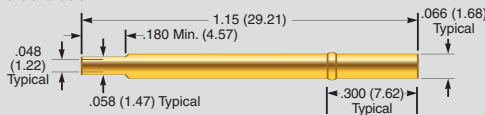
Spring type	Preload	2/3 Travel
-------------	---------	------------

To order, add dash number to Model Number.

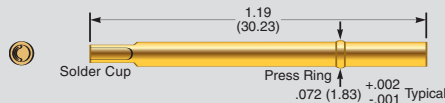
Elevated	-6.5	2.65 (75)	6.5 (184)
High	-8	3.49 (99)	8.0 (227)
Ultra High	-10	4.42 (125)	10.0 (283)
Premium	-12	5.08 (144)	12.0 (340)

Optional spring forces and materials are available.

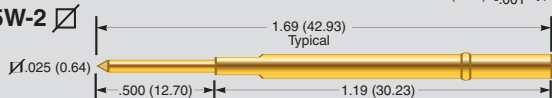
SPR-25W



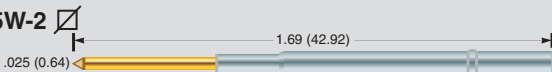
SPR-25W-1



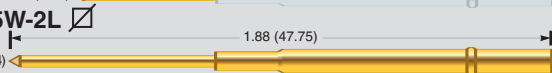
SPR-25W-2



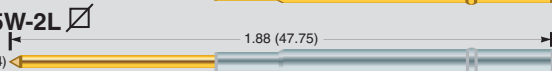
EPR-25W-2



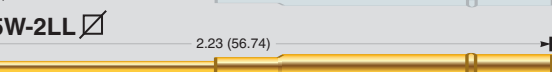
SPR-25W-2L



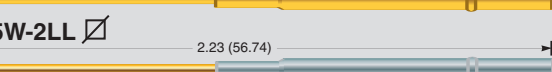
EPR-25W-2L



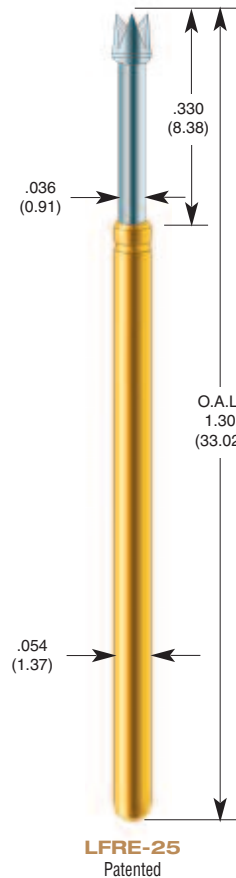
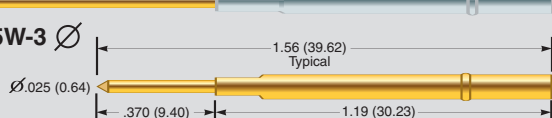
SPR-25W-2LL



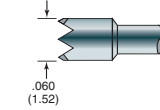
EPR-25W-2LL



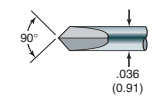
SPR-25W-3



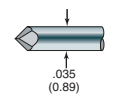
LFRE-25H



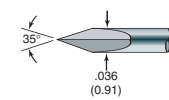
LFRE-25I



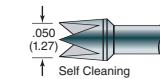
LFRE-25I8



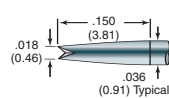
LFRE-25I35



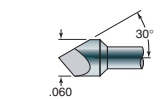
LFRE-25L



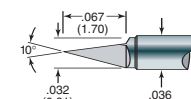
LFRE-25L18



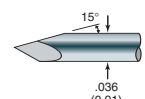
LFRE-25T



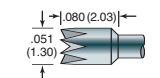
LFRE-25T1



LFRE-25T36



LFRE-25Z1



Loaded PCB Test Probes



Actual Size

Dimensions in inches (millimeters)






Bare PCB Test

Drawing on more than two decades of experience in bare board electrical test, ECT offers the world's largest selection of off-the-shelf and custom probes for this application. These products have been proven in years of high-volume production, and have been continuously refined to provide the best possible performance with today's smaller feature sizes. The proven performance of these probes continues to set the industry standard for performance, reliability and value.

Contents

Other applications: icons

RMP-22/MEP-22/MEPJ-22BD		24
MEP-20		25
HPA-40/MEP-30		26
HPA-50		27
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HPA-52		29
HPA-1/SPA-1		30
HPA-64/SPA-64		31
EPA-2/SPA-2		32
HPA-74		33

How to Order

For each probe, specify the probe model and tip style as shown in the example below. If required, specify the optional non-standard spring force.

Example:

EPA-2L-2

probe model	tip style	spring force
----------------	--------------	-----------------

Call 909-625-9390 to order, or fax to 909-624-9746.



Technical Notes

Bare PCB Test Probes

Replaceable probes for dedicated test fixturing for Bare PCBs such as Everett Charles Technologies' series 32 Fixtures.

Figures 1 and 2 show how probes designed for varying test center dimensions can be "mixed" in the same test fixture without costly machining of the probe plate. Probes designed for 0.050 or 0.100 inch travel and 0.050, 0.075, and 0.100 inch test centers can be mixed for bare board testing.

Mixed Test Centers

Figure 1 Bare Board – .050" Plunger Travel

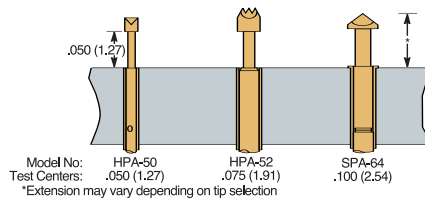
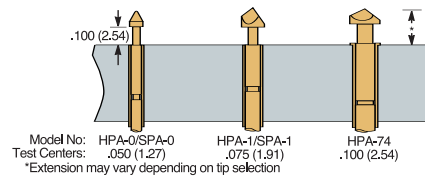
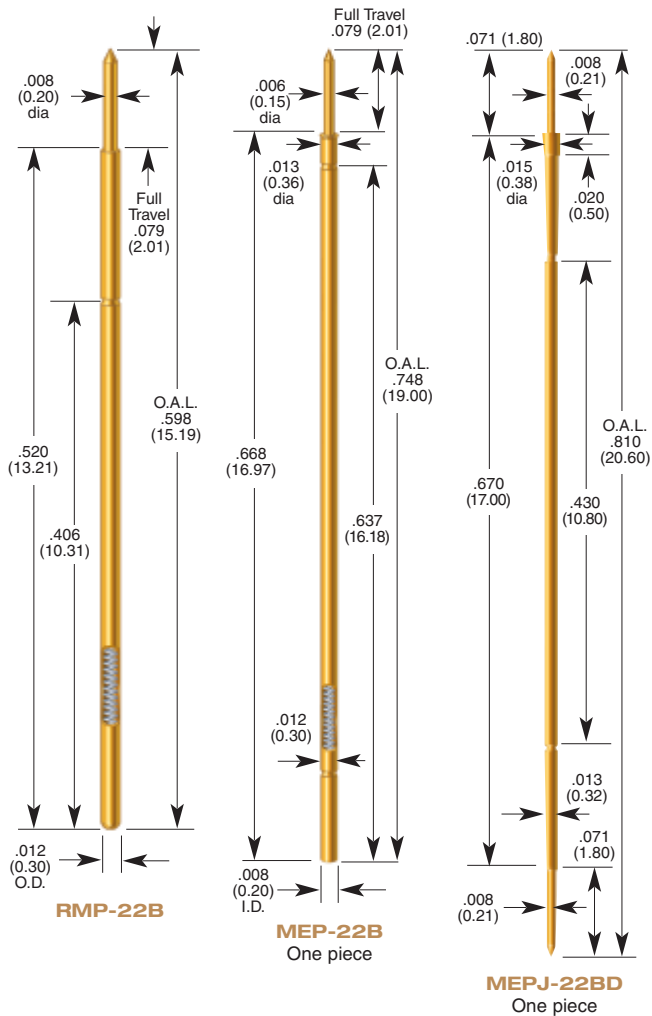


Figure 2 Bare Board – .100" Plunger Travel



TO ORDER, CALL 909-625-9390



Bare PCB Test Probes

Probe Specifications

	RMP-22	MEP-22	MEPJ-22BD
Mechanical			
Full Travel:	.079 (2.01)	.079 (2.01)	.079 (2.01)
Recommended Working Travel:	.050 (1.27)	.050 (1.27)	.052 (1.33)
Mechanical Life Exceeds:	50,000	50,000	50,000
Operating Temperature	-55°C to +105°C	-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:	2 amps	2 amps	2 amps
Maximum continuous current, non-inductive at working travel			
Average Probe Resistance	125 mΩ	125 mΩ	125 mΩ
Materials and Finishes			
Plunger:	Heat-treated steel, nickel boron plated	Heat-treated steel, nickel boron plated	Heat-treated steel, nickel boron plated
Barrel:	Beryllium copper alloy, gold plated	Beryllium copper alloy, gold plated	Phosphor bronze, gold plated
Spring:	Music wire, gold plated	Music wire, gold plated	Music wire, gold plated

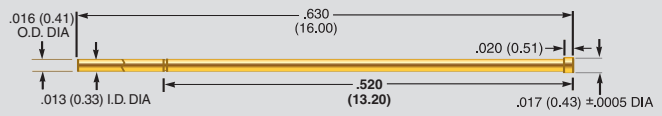
Receptacle Specifications

Mounting Hole Size:	.016/.017 (0.41/0.43) .020 (0.51) Test Centers A #77 drill is most commonly used.	.0135/.014 (0.34/0.36) .020 (0.51) Test Centers	.0135/.014 (0.34/0.36) .020 (0.51) Test Centers
Recommended Wire Gauge:	33 AWG	33 AWG	
Connections:	RMR-22W Crimp RMR-22W-30 Crimp with 30" of 33 AWG wire attached RMR-22W-32 Crimp with 32" of 33 AWG wire attached RMR-22F Crimp, flush mounted	Crimp	Double-ended probe
Materials and Finishes	Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Gold plated, Phosphor bronze	Gold plated, Phosphor bronze

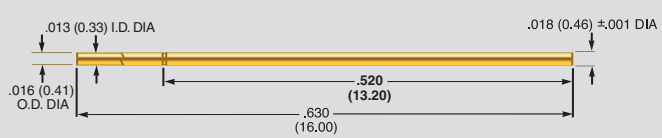
Spring Force in oz. (grams)

Spring Type	Preload	Recommended Travel in. (mm.)	Force oz. (grams)
RMP-22	.51 (14)	.05 (1.27)	1.50 (43)
MEP-22	.51 (14)	.05 (1.27)	1.50 (43)
MEPJ-22BD	.38 (11)	.052 (1.27)	1.69 (48)

RMR-22W



RMR-22F



Actual Size

TO ORDER, CALL 909-625-9390

Probe Specifications MEP-20

Mechanical

Full Travel:	.075 (1.91)
Recommended	
Working Travel:	.050 (1.27)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles

Operating Temperature

-55°C to +105°C
 Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 2 amps
 Maximum continuous current, non-inductive at working travel

Average Probe Resistance

50 mΩ

Materials and Finishes

Plunger:	Heat-treated beryllium copper, gold plated over hard nickel
Barrel:	Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Music wire, silver plated

Receptacle Specifications

Mounting Hole Size:

.0205/.0215 (0.52/0.55)
 .025 (0.635) Test Centers
 A #75 or 0.52 mm drill is most commonly used.

Recommended Wire Gauge:

30 AWG

Connections:

Crimp (To order with 30 inches of 30 AWG wire attached, add -30 to model number)
 Shrink tubing is recommended on alternating receptacles. Order Model No. ST-20

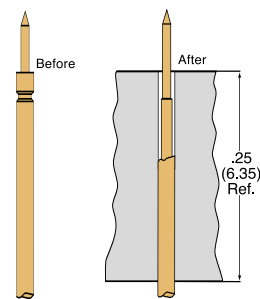
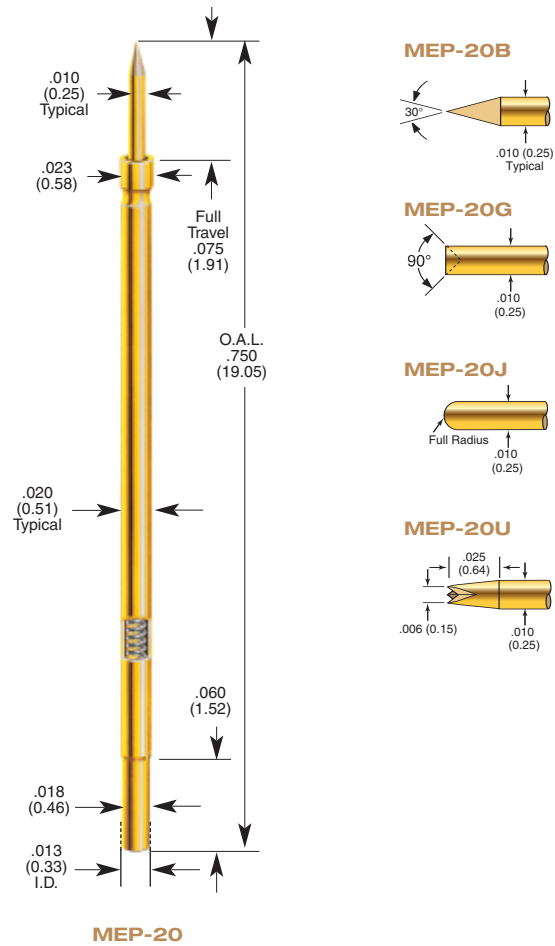
NOTE: The top of the MEP-20 barrel is flared, enabling it to be "press-fit" directly into the probe plate, eliminating the need for a receptacle or epoxy. This "press fit" feature also permits the MEP-20 to be installed in a variety of probe plate thicknesses and to be replaced easily. Recommended Probe plate materials are G-10 and G-11. The MEP-20 is terminated with the use of a crimp tool, which attaches a wire directly to the probe in the same fashion that a wire is attached to a crimp style receptacle.

Materials and Finishes

Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel

Spring Force in oz. (grams)

Spring Type	Preload	Recommended Travel in. (mm.)	Force oz. (grams)
MEP-20	.39 (11)	.05 (1.27)	1.39 (39)



MEP-20
 Typical
 Installation

Application Notes for MEP-20

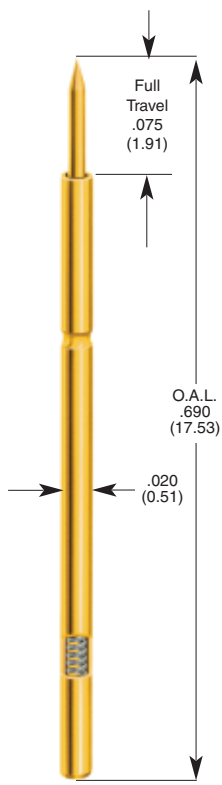
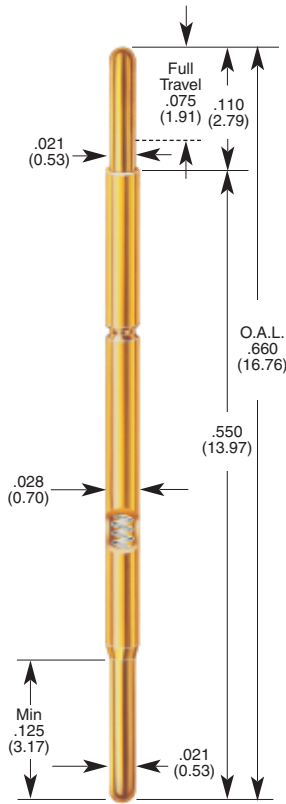
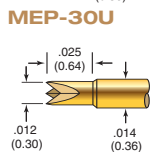
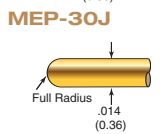
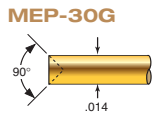
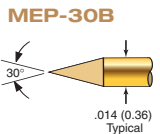
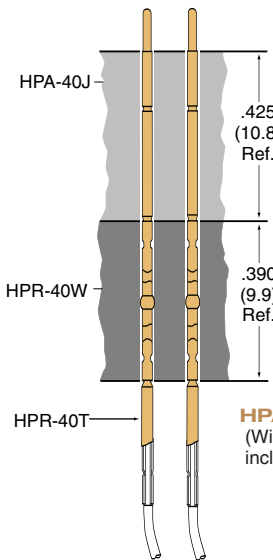
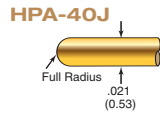
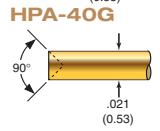
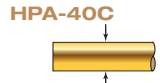
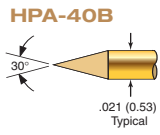
1. The MEP-20 can also be mounted in a staggered pattern to access test pads on centers less than .025".
2. Recommended wire gauge 30 AWG, maximum insulation dia. .019 (0.48).
3. Shrink tubing is recommended for use on alternating receptacles to reduce the possibility of electrical shorting. Order Model No. ST-20.
4. A probe insertion tool is available, see PIT-20, page 63.

Bare PCB Test Probes

Actual
 Size

TO ORDER, CALL 909-625-9390

Bare PCB Test Probes



Probe Specifications HPA-40 MEP-30

Mechanical		
Full Travel:	.075 (1.91)	.075 (1.91)
Recommended Working Travel:	.050 (1.27)	.050 (1.27)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles	1 x 10 ⁶ cycles
Operating Temperature	-55°C to +150°C	-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.		
Electrical (Static Conditions)		
Current Rating:	2 amps	2 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	35 mΩ	50 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, gold plated over hard nickel
Barrel:	Work-hardened nickel silver, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Stainless steel, silver plated	Music wire, silver plated

Receptacle Specifications

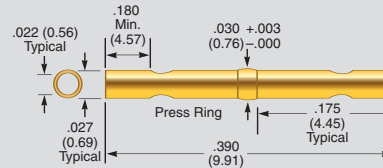
Mounting Hole Size:	.0285/.0295 (0.72/0.75) A #69 or 0.75 mm drill is most commonly used.	.0265/.0276 (0.67/0.70) A 0.70 mm drill is most commonly used.
Recommended Wire Gauge:	28-30 AWG	30 AWG
Connections:	HPR-40W Crimp HPR-40T for plug-in connection	HPR-30W Crimp (To order with 30 inches of 30 AWG wire attached, add -30 to model number.)
Materials and Finishes	Work-hardened nickel silver, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel

Spring Force in oz. (grams)

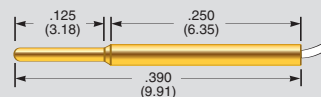
Spring Type	Preload	2/3 Travel
HPA-40 as shown	.79 (22)	1.75 (49)
MEP-30 as shown	.39 (11)	1.39 (39)

Optional spring forces and materials are available.

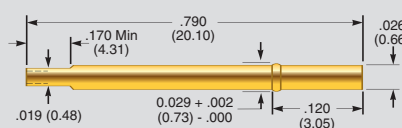
HPR-40W



HPR-40T



HPR-30W



Actual Size

TO ORDER, CALL 909-625-9390

Probe Specifications HPA-50

Mechanical

Full Travel: .050 (1.27)
 Recommended Working Travel: .050 (1.27)
 Mechanical Life Exceeds: 1 x 10⁶ cycles

Operating Temperature

-55°C to +105°C
 Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 3 amps
 Maximum continuous current, non-inductive at working travel

Average Probe Resistance

35 mΩ

Materials and Finishes

Plunger: 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
 Spring: Music wire, gold plated

Receptacle Specifications

Mounting Hole Size: .035/.0365 (0.89/0.93)
 A #64 or 0.92 mm drill is most commonly used.

Recommended Wire Gauge: 28-30 AWG

Connections:

SPR-0W Crimp (To order with 30 inches of 28 AWG wire attached, add -28 to model number. For 30 AWG wire, add -30 to model number.)
SPR-0W-1 Solder cup
SPR-0W-4 FASTITE® wire termination (30 AWG only), maximum insulation diameter = .019 (0.48), wire strip length = .125 (3.2)
DS-62-1 Insulation sleeve (use with SPR-0W-4)
FWA-1-30 30 AWG wire with DS-62-1 insulation sleeve attached

Materials and Finishes

Work-hardened nickel silver, gold plated over hard nickel

One DS-62-1 sleeve is provided with each SPR-0W-4 receptacle at no charge. If additional quantities are required, please contact the factory for pricing and delivery.

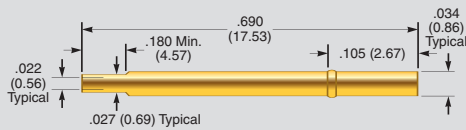
The HPA-50 may be used to test bare PCBs on mixed test centers with the SPA-64 and HPA-52 probes, see pages 31 and 29.

Spring Force in oz. (grams)

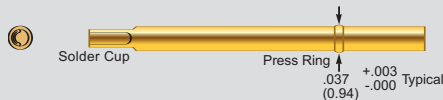
Spring Type	Preload		Full Travel
Standard	1.55 (44)	as shown	3.2 (91)

Optional spring forces and materials are available.

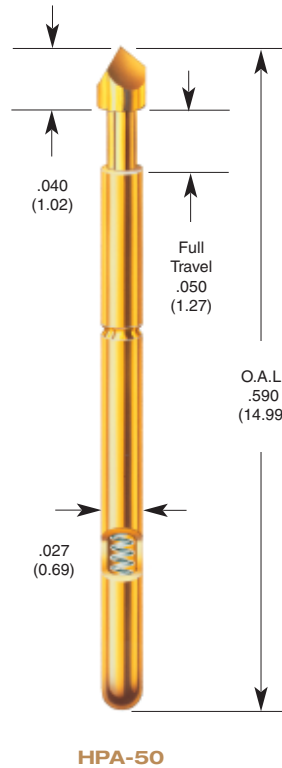
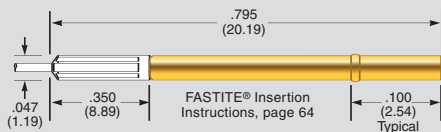
SPR-0W



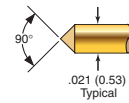
SPR-0W-1



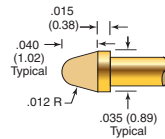
SPR-0W-4 (Shown with DS-62-1 installed)



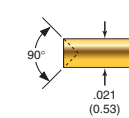
HPA-50B



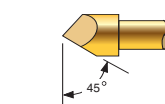
HPA-50D



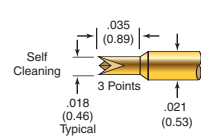
HPA-50G



HPA-50T



HPA-50U

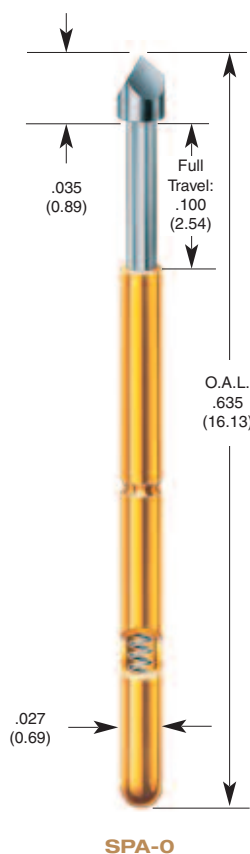
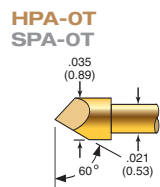
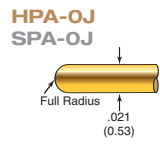
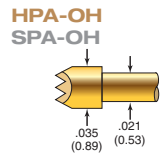
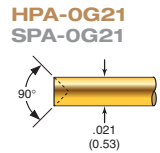
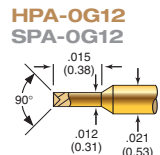
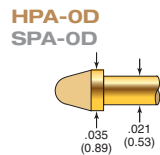
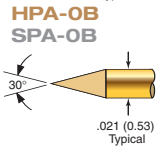
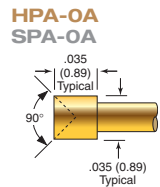


Bare PCB Test Probes



Actual Size

TO ORDER, CALL 909-625-9390



Probe Specifications HPA-O SPA-O

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		
Standard spring:	-55°C to +150°C	-55°C to +150°C
Alternate spring:	-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	50 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, rhodium plated over hard nickel
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:		
Standard:	Stainless steel, silver plated	Stainless steel, silver plated
Alternate:	Music wire, silver plated	Music wire, silver plated

Receptacle Specifications

Mounting Hole Size:	.035/.0365 (0.89/0.93) A #64 or 0.92 mm drill is most commonly used.	.035/.0365 (0.89/0.93)
Recommended Wire Gauge:	28-30 AWG	28-30 AWG
Connections:	<p>SPR-0W Crimp (To order with 30 inches of 28 AWG wire attached, add -28 to model number. For 30 AWG wire, add -30 to model number.)</p> <p>SPR-0W-1 Solder cup</p> <p>SPR-0W-4 FASTITE® wire termination (30 AWG only), maximum insulation diameter .019 (0.48), wire strip length = .125 (3.2)</p> <p>DS-62-1 Insulation sleeve (use with SPR-0W-4)</p> <p>FWA-1-30 30 AWG wire with DS-62-1 insulation sleeve attached</p>	<p>SPR-0W Crimp (To order with 30 inches of 28 AWG wire attached, add -28 to model number. For 30 AWG wire, add -30 to model number.)</p> <p>SPR-0W-1 Solder cup</p> <p>SPR-0W-4 FASTITE® wire termination (30 AWG only), maximum insulation diameter .019 (0.48), wire strip length = .125 (3.2)</p> <p>DS-62-1 Insulation sleeve (use with SPR-0W-4)</p> <p>FWA-1-30 30 AWG wire with DS-62-1 insulation sleeve attached</p>

Materials and Finishes	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
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One DS-62-1 sleeve is provided with each SPR-0W-4 receptacle at no charge. If additional quantities are required, please contact the factory for pricing and delivery.

The HPA-O and SPA-O may be used to test bare PCBs on mixed test centers with the HPA-1 and HPA-74 probes, see pages 30 and 33.

Spring Force in oz. (grams)

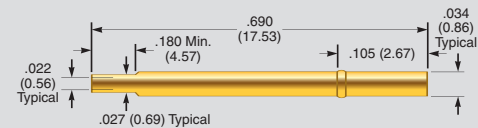
Spring Type	Preload	2/3 Travel
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To order, add dash number to Model Number.

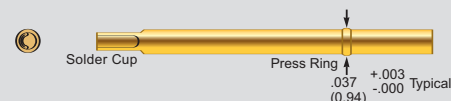
Standard	as shown	.61 (17)	2.8 (79)
Alternate	-1	.78 (22)	3.7 (105)

Optional spring forces and materials are available.

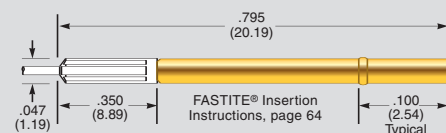
SPR-0W



SPR-0W-1



SPR-0W-4 (Shown with DS-62-1 installed)



Bare PCB Test Probes

Actual Size

TO ORDER, CALL 909-625-9390

Probe Specifications HPA-52

Mechanical

Full Travel: .075 (1.91)
 Recommended Working Travel: .075 (1.91)
 Mechanical Life Exceeds: $.250 \times 10^6$ cycles

Operating Temperature

-55°C to +150°C
 Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 3 amps
 Maximum continuous current, non-inductive at working travel

Average Probe Resistance

15 mΩ

Materials and Finishes

Plunger: 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
 Spring: Stainless steel, silver plated

Receptacle Specifications

Mounting Hole Size:

.053/.055 (1.35/1.40)
 A #54 or 1.44 mm drill is most commonly used.

Recommended Wire Gauge:

24-28 AWG

Connections:

SPR-1W Crimp
 SPR-1W-1 Solder cup
 SPR-1W-2/SPR-1W-2M Wire wrap/square post. Vacuum leak rate not to exceed 1×10^{-4} CFM @ 15 psi

Materials and Finishes

Housing: Work-hardened nickel silver, gold plated over hard nickel
 Square Post: Phosphorous bronze, gold plated

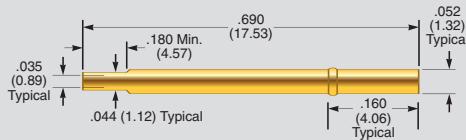
Spring Force in oz. (grams)

Spring Type	Preload	3/4 Travel
Standard as shown	1.68 (48)	3.22 (91)
Alternate -1	2.54 (72)	6.2 (176)

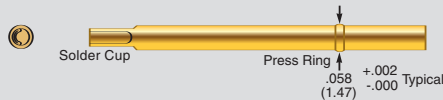
To order, add dash number to Model Number.

Optional spring forces and materials are available.

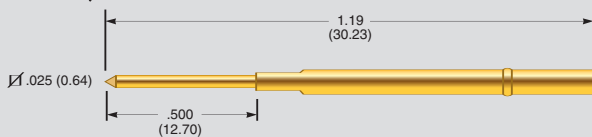
SPR-1W



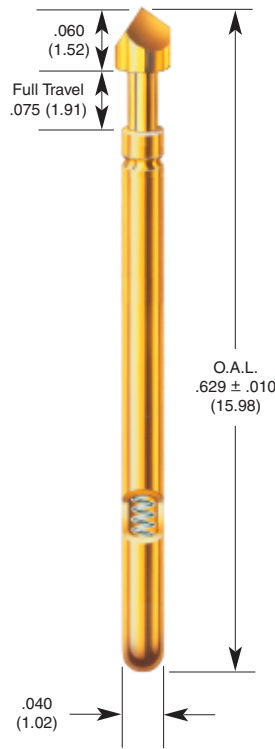
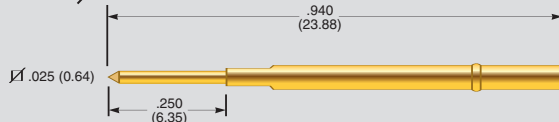
SPR-1W-1



SPR-1W-2

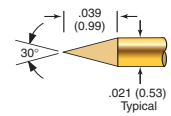


SPR-1W-2M

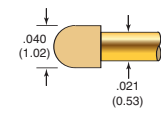


HPA-52

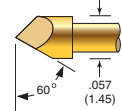
HPA-52B



HPA-52D



HPA-52T



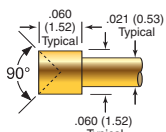
Bare PCB Test Probes



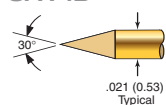
Actual Size

TO ORDER, CALL 909-625-9390

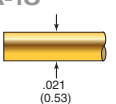
HPA-1A SPA-1A



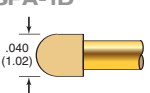
HPA-1B SPA-1B



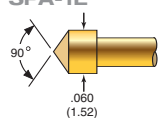
HPA-1C SPA-1C



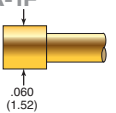
HPA-1D SPA-1D



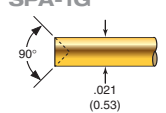
HPA-1E SPA-1E



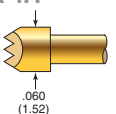
HPA-1F SPA-1F



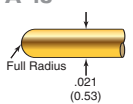
HPA-1G SPA-1G



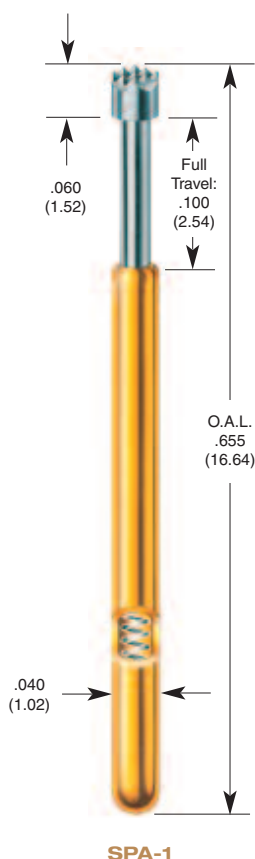
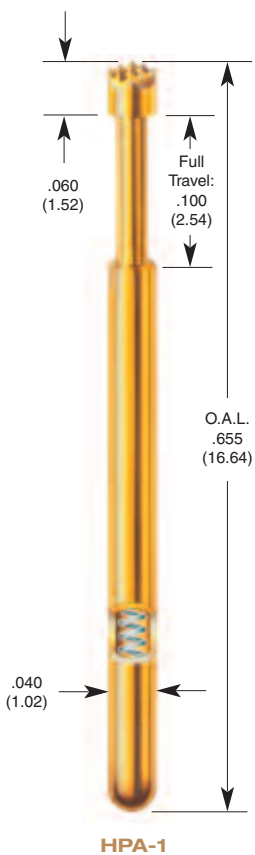
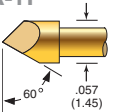
HPA-1H SPA-1H



HPA-1J SPA-1J



HPA-1T SPA-1T



HPA-1

SPA-1

Probe Specifications HPA-1 SPA-1

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 +150°C	-55°C to +150°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	50 mΩ
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Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, rhodium plated over hard nickel
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Stainless steel, silver plated	Stainless steel, silver plated

Receptacle Specifications

Mounting Hole Size:	.053/.055 (1.35/1.40)	.053/.055 (1.35/1.40)
A #54 or 1.4 mm drill is most commonly used.		

Recommended Wire Gauge:	24-28 AWG	24-28 AWG
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Connections:	SPR-1W Crimp SPR-1W-1 Solder cup SPR-1W-2/SPR-1W-2M Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10⁻⁴ CFM @ 15 psi	SPR-1W Crimp SPR-1W-1 Solder cup SPR-1W-2/SPR-1W-2M Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10⁻⁴ CFM @ 15 psi
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Materials and Finishes		
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Square Post:	Phosphorous bronze, gold plated	Phosphorous bronze, gold plated

The HPA-1 and SPA-1 may be used to test bare PCBs on mixed test centers with the HPA-0 and HPA-74 probes, see pages 28 and 33.

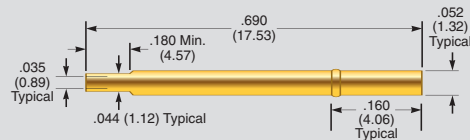
Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
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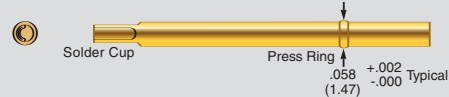
To order, add dash number to Model Number.		
Standard as shown	1.1 (31)	2.5 (71)
Alternate -1	1.3 (37)	4.5 (128)

Optional spring forces and materials are available.

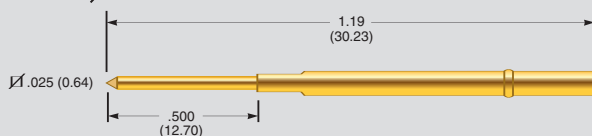
SPR-1W



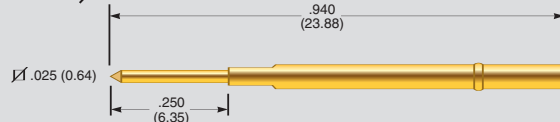
SPR-1W-1



SPR-1W-2



SPR-1W-2M



Bare PCB Test Probes



Actual Size

Test Center
.100 (2.54)
.125 (3.18)
.156 (3.96)
.187 (4.75)

HPA-64 SPA-64

Standard-Performance Probes

TO ORDER, CALL 909-625-9390

Probe Specifications	HPA-64	SPA-64
Mechanical		
Full Travel:	.050 (1.27)	.050 (1.27)
Recommended Working Travel:	.050 (1.27)	.050 (1.27)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles	1 x 10 ⁶ cycles
Operating Temperature	-55°C to +150°C	-55°C to +150°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	50 mΩ	50 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, gold plated over hard nickel
Barrel:	Work-hardened nickel silver gold plated over hard nickel	Work-hardened nickel silver
Spring:	Stainless steel, silver plated	Stainless steel, silver plated

Receptacle Specifications		
Mounting Hole Size:	.067/.069 (1.7/1.75)	.067/.069 (1.7/1.75)
A #51 or 1.75 mm drill is most commonly used.		
Recommended Wire Gauge:	26-30 AWG	26-30 AWG
Connections:	SPR-64W-2 Wire wrap/square post, 100% vacuum sealed	SPR-64W-2 Wire wrap/square post, 100% vacuum sealed
Materials and Finishes	Nickel silver alloy	Nickel silver alloy
Hole Diameters to be Contacted		
HPA/SPA-64-1	up to .073 (1.85) lands and pads	up to .073 (1.85) lands and pads
HPA/SPA-64-2	lands and pads	lands and pads
HPA/SPA-64-3	lands and pads	lands and pads
HPA/SPA-64-4	up to .058 (1.47)	up to .058 (1.47)
HPA/SPA-64-7	up to .150 (3.81)	up to .150 (3.81)
HPA/SPA-64-8	up to .070 (1.78)	up to .070 (1.78)
HPA/SPA-64-9	lands and pads	lands and pads
HPA/SPA-64-10	lands and pads	lands and pads

The SPA-64W-2 can be used to test bare PCBs on Mixed test centers with the HPA-50 and HPA-52, see pages 27 and 29.

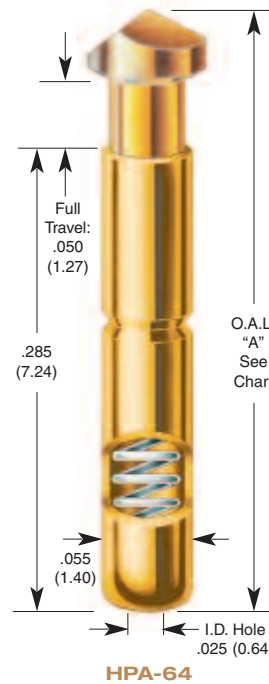
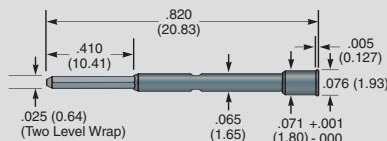
Spring Force in oz. (grams)			
Spring Type	Preload	Full Travel	
Standard	as shown 1.1 (31)	3.85 (109)	

Optional spring forces and materials are available.

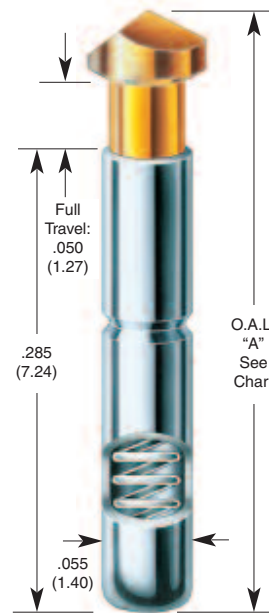
Recommended Test Centers		
HPA/SPA-64-1, -2, -3, -4, -8, -9, -10	.100 (2.54)	
HPA/SPA-64-7	.187 (4.75)	

Model No.	Overall Length (Dimension A)
HPA/SPA-64-1, -4, -7	.375 (9.53)
HPA/SPA-64-2, -3	.365 (9.27)
HPA/SPA-64-8	.385 (9.78)
SPA-64-9, -10	.363 (9.22)
HPA-64-9, -10	.365 (9.27)

SPR-64W-2

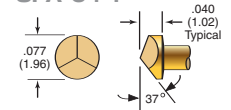


HPA-64

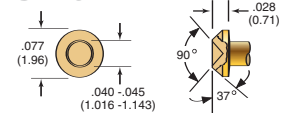


SPA-64

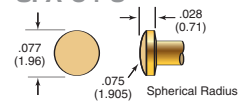
HPA-64-1 SPA-64-1



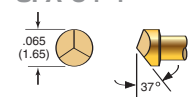
HPA-64-2 SPA-64-2



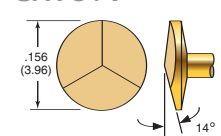
HPA-64-3 SPA-64-3



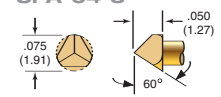
HPA-64-4 SPA-64-4



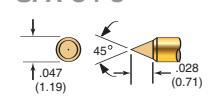
HPA-64-7 SPA-64-7



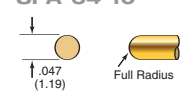
HPA-64-8 SPA-64-8



HPA-64-9 SPA-64-9



HPA-64-10 SPA-64-10



Bare PCB Test Probes

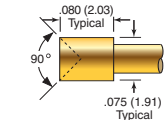
Actual Size

Other applications:

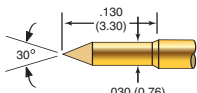
Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390

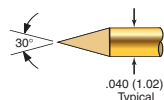
**EPA-2A
SPA-2A**



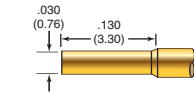
**EPA-2B30
SPA-2B30**



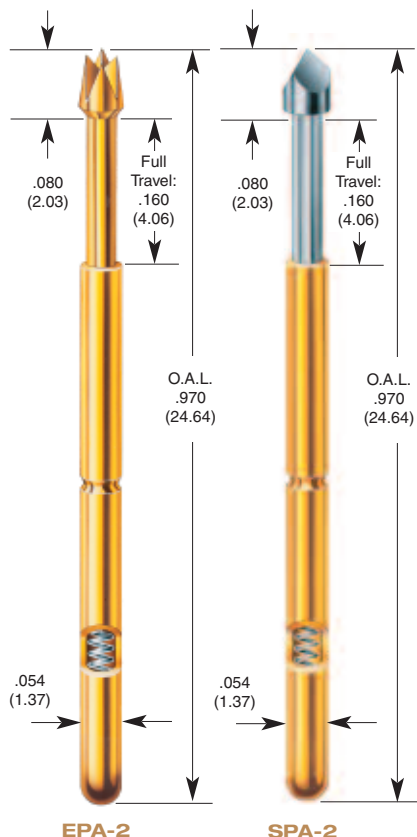
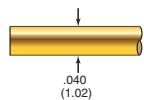
**EPA-2B40
SPA-2B40**



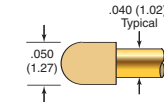
**EPA-2C30
SPA-2C30**



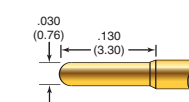
**EPA-2C40
SPA-2C40**



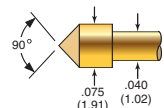
**EPA-2D
SPA-2D**



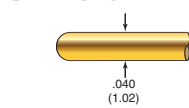
**EPA-2J30
SPA-2J30**



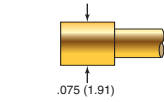
**EPA-2E
SPA-2E**



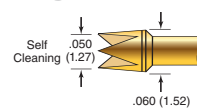
**EPA-2J40
SPA-2J40**



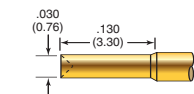
**EPA-2F
SPA-2F**



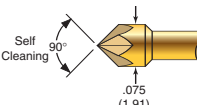
**EPA-2L
SPA-2L**



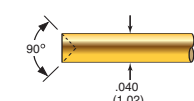
**EPA-2G30
SPA-2G30**



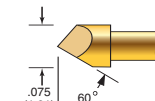
**EPA-2P
SPA-2P**



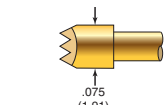
**EPA-2G40
SPA-2G40**



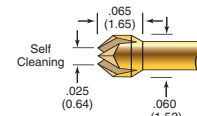
**EPA-2T
SPA-2T**



**EPA-2H
SPA-2H**



**EPA-2X
SPA-2X**



Probe Specifications EPA-2 SPA-2

Mechanical		
Full Travel:	.160 (4.06)	.160 (4.06)
Recommended Working Travel:	.107 (2.72)	.107 (2.72)
Mechanical Life Exceeds:	2 x 10 ⁶ cycles	2 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:	5 amps	5 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	35 mΩ	50 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, rhodium plated over hard nickel
Barrel:	Work-hardened nickel silver, gold plated (I.D. and O.D.) over hard nickel	Work-hardened nickel silver, gold plated (I.D. and O.D.) over hard nickel
Spring:	Music wire, silver plated	Music wire, silver plated

Receptacle Specifications

Mounting Hole Size:	.067/.069 (1.7/1.75) A #51 or 1.75 mm drill is most commonly used.	.067/.069 (1.7/1.75)
Recommended Wire Gauge:	22-26 AWG	22-26 AWG
Connections:	SPR-2W Crimp or push on termination (AMP terminal 60983-1 or equivalent) SPR-2W-1 Solder cup SPR-2W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 ⁻⁴ CFM @ 15 psi SPR-2W-3 Connector pin/round post SPR-2Y push on termination	SPR-2W Crimp or push on termination (AMP terminal 60983-1 or equivalent) SPR-2W-1 Solder cup SPR-2W-2 Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 ⁻⁴ CFM @ 15 psi SPR-2W-3 Connector pin/round post SPR-2Y push on termination

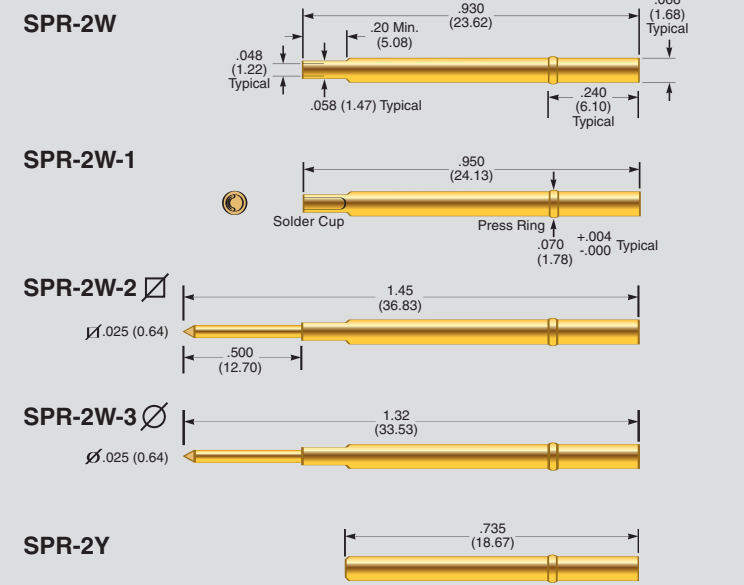
Materials and Finishes		
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Round Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated
Square Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated

PE Series: Dimensionally identical to EPA-2. The PE Series replaceable probe has a slight bulge at the end of the barrel and is designed for use in receptacles lacking detents. To order, write the letter "P" after the model number. Example: EPA-2P, EPA-2AP-1.

Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
To order, add dash number to Model Number.		
Standard as shown	1.08 (31)	3.5 (99)
Alternate -1	2.64 (75)	6.5 (184)
Ultra High -2	4.09 (116)	10.0 (283)

Optional spring forces and materials are available.



Bare PCB Test Probes



Actual Size

Test Center
.100 (2.54)
.156 (3.96)
.187 (4.75)

HPA-74

Standard Performance Probe

TO ORDER, CALL 909-625-9390

Probe Specifications HPA-74

Mechanical

Full Travel: .100 (2.54)
 Recommended Working Travel: .075 (1.91)
 Mechanical Life Exceeds: 2×10^6 cycles

Operating Temperature

Standard Spring: -55°C to +150°C
 Alternative Spring: -55°C to +105°C
 Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating: 3 amps
 Maximum continuous current, non-inductive at working travel

Average Probe Resistance 35 mΩ

Materials and Finishes

Plunger: Heat-treated beryllium copper, gold plated over hard nickel
 Barrel: Phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
 Spring: Stainless steel, silver plated
 Alt Spring: Music wire, silver plated

Receptacle Specifications

Mounting Hole Size: .067/.069 (1.7/1.75)
 A #51 or 1.75 mm drill is most commonly used.

Recommended Wire Gauge: 26-30 AWG

Connections: EPR-74W-2 Wire wrap/square post, 100% vacuum sealed

Materials and Finishes Nickel silver alloy

Hole Diameters to be Contacted

HPA-74A lands and pads
 HPA-74B lands and pads
 HPA-74C lands and pads
 HPA-74E up to .073 (1.85)
 HPA-74T65 up to .058 (1.47)
 HPA-74T75 up to .070 (1.78)
 HPA-74T80 up to .073 (1.85)
 HPA-74T135 up to .125 (3.18)
 HPA-74T156 up to .150 (3.81)

The HPA-74 can be used to test bare PCBs on Mixed test centers with the HPA-0 and HPA-1, see pages 28 and 30.

Spring Force in oz. (grams)

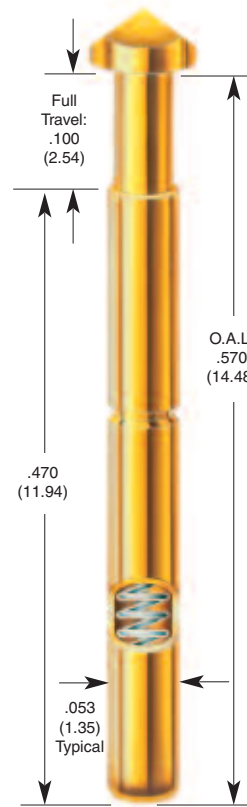
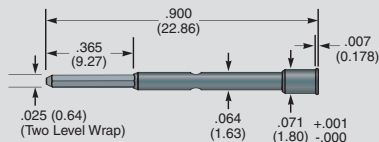
Spring Type	Preload	3/4 Travel
Standard	as shown	1.71 (48) 3.0 (85)
Alternate	-1	2.82 (80) 5.0 (141)

To order, add dash number to Model Number.
 Optional spring forces and materials are available.

Recommended Test Centers

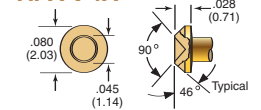
HPA-74A, B, C, E, T65, T75, T80	.100 (2.54)
HPA-74T135	.156 (3.96)
HPA-74T156	.187 (4.75)

EPR-74W-2

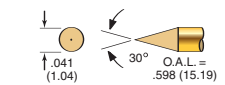


HPA-74

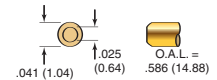
HPA-74A



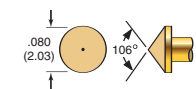
HPA-74B



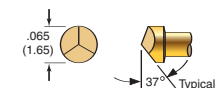
HPA-74C



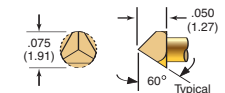
HPA-74E



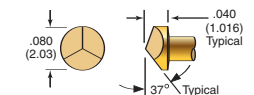
HPA-74T65



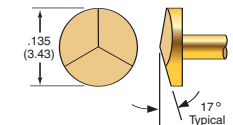
HPA-74T75



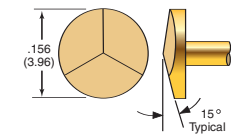
HPA-74T80



HPA-74T135

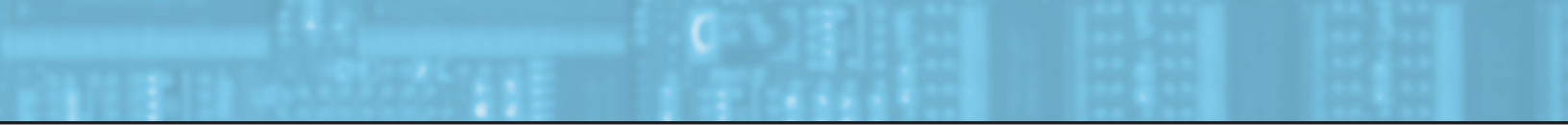


HPA-74T156



Bare PCB Test Probes

Actual Size





Wire Harness

A 15-year history of providing wire harness test probe solutions has made ECT the largest supplier of probes to North American automotive and major appliance manufacturers. Expert engineering support, from the early stages of design through high volume production, assures you'll get reliable test solutions for continuity testing, push testing, presence checking, terminal push-out and other wire harness test applications.

Contents

SPL-03C-090/SPL-25J-289	36
MSP 3C/5C, SSP-5C, MSP-25C	37

Other Probes that may be suited to Bare PCB applications

SPA-3	60
SPA-4	61
SPA-5	62

How to Order

To order from this section, specify actual part number.

Example:

SPL-03C-090

probe
model

Call 909-625-9390 to order, or fax to 909-624-9746.

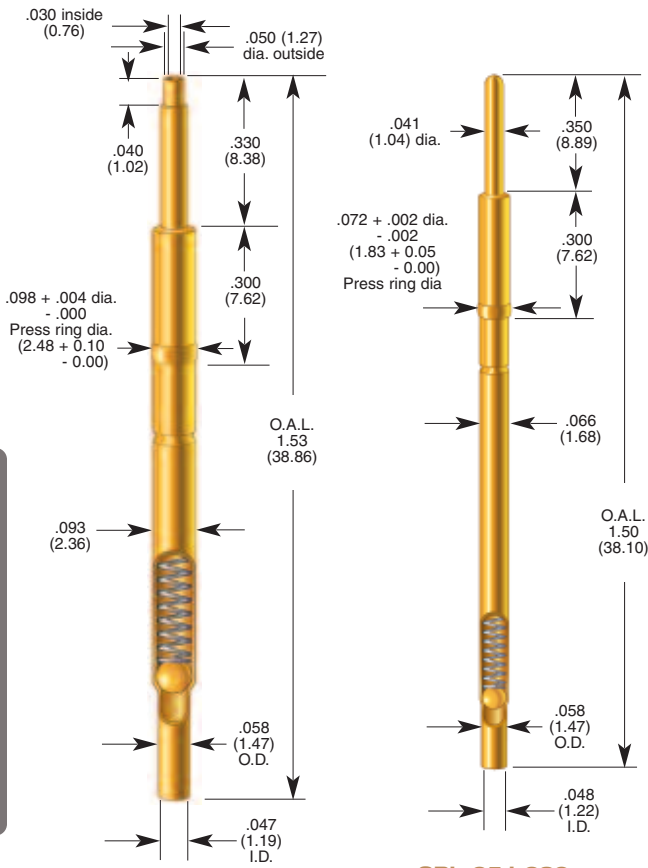
High-Performance Anti-Walkout Design Probes

SPL-03C-090 SPL-25J-289

Test Center
.125 (3.18)
.100 (2.54)

TO ORDER, CALL 909-625-9390

One-piece design, no receptacle required



SPL-03C-090

SPL-25J-289

Probe Specifications	SPL-03C-090	SPL-25J-289	
Mechanical			
Full Travel:	.220 (5.59)	.233 (5.92)	
Recommended Working Travel:	.220 (5.59)	.233 (5.92)	
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:	5 amps	5 amps	
Average Probe Resistance	50 mΩ	50 mΩ	
Materials and Finishes			
Plunger:	Beryllium copper, gold plated	Beryllium copper, gold plated	
Barrel:	Nickel silver, gold plated	Nickel silver, gold plated	
Spring:	Music wire, silver plated	Music wire, silver plated	
Ball:	Brass, gold plated	Stainless steel, gold plated	
Spring Force in oz. (grams)			
Spring Type	Preload	.220 Travel	.233 Travel
SPL-03C-090 as shown	.77 (22)	2.30 (65)	—
SPL-25J-289 as shown	.25 (7)	—	1.16 (33)

Wire Harness Probes



Actual Size

Note: SPL prefix represents non-standard probes. Please consult factory, lead times may vary.

Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390

Probe Specifications
MSP-3C MSP-5C MSP-25C SSP-5C

Mechanical				
Full Travel (+/- .010):	.140 (3.56)	.185 (4.70)	.125 (3.18)	.150 (3.81)
Recommended Travel:	.085 (2.16)	.132 (3.35)	.085 (2.16)	.100 (2.54)
Mechanical Life:	100K cycles	100K cycles	100K cycles	100K cycles

Switch Point: (+/- .012)	.030 (0.76)	.025 (0.64)	.030 (0.76)	.025 (0.64)
------------------------------------	-------------	-------------	-------------	-------------

Electrical				
Maximum Current Rating (Non-inductive DC)				
3 amps	5 amps	3 amps	5 amps	

Average Probe Resistance				
50 mΩ	20 mΩ	50 mΩ	50 mΩ	

Materials and Finishes				
Plunger:	Nickel plated Beryllium copper	Nickel plated Brass	Nickel plated Beryllium copper	Gold plated Beryllium copper
Barrel:	Silver plated Nickel silver	Silver plated Brass	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	Silver plated Nickel silver
Spring:	Silver plated Stainless steel	Silver plated Music wire	Silver plated Music wire	Silver plated Spring steel
Insulator:	KEL-F™	KEL-F™	DELRIN™	DELRIN™
Terminal:	Silver plated Beryllium copper	Silver plated Brass	Silver plated Beryllium copper	Gold plated Beryllium copper

Spring Force in oz. (grams)
Spring Type MSP-3C MSP-5C MSP-25C SSP-5C

Standard				
@ Switch Point:	3.2 (90)	2.5 (70)	6.51 (183)	2.36 (66)
@ Recommended Travel:	7.5 (213)	5.2 (146)	7.55 (212)	4.5 (128)

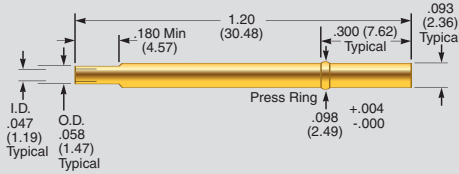
Alternate				
@ Switch Point:	24.8 (703)	26.9 (755)	—	—
@ Recommended Travel:	35.0 (992)	35.0 (992)	—	—

Tip Styles:	C	C	C	C
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Optional tip styles, spring forces and plating are available.

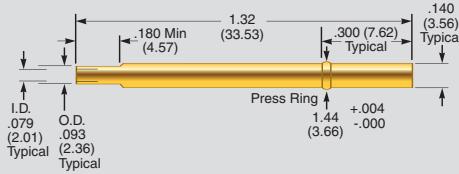
SPR-3W
For use with MSP-3C

Materials:
Gold plated nickel silver
Mounting Hole:
.094/.096 (2.39/2.44)
Quick disconnect for replacement ease:
Newark Part #871919-1



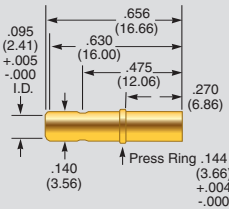
SPR-5W
For use with MSP-5C

Materials:
Gold plated nickel silver
Mounting Hole:
.141/.143 (3.58/3.63)
Quick disconnect for replacement ease:
Amp Part #42827-2



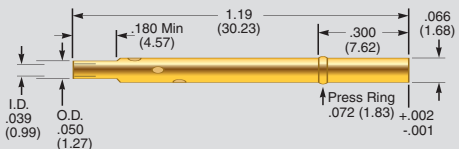
SSR-5Y
For use with SSP-5C

Materials:
Gold plated nickel silver
Mounting Hole:
.141/.143 (3.58/3.63)



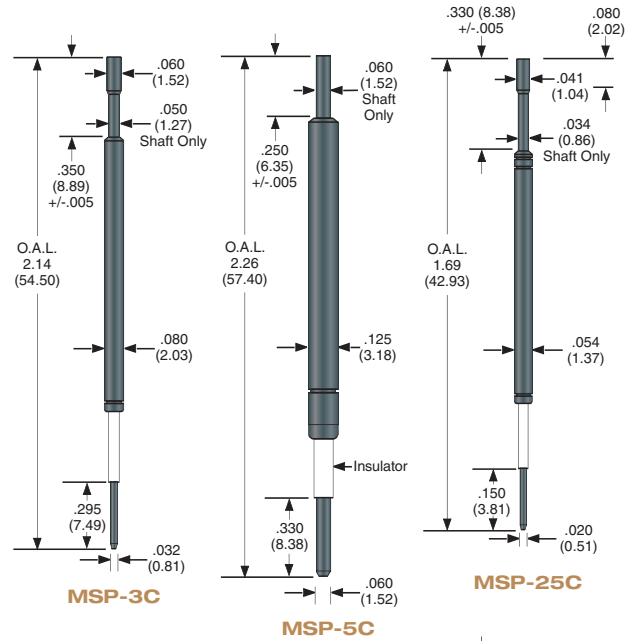
SPR-25W
For use with MSP-25C

Materials:
Gold plated nickel silver
Mounting Hole:
.067/.069 (1.70/1.75)
Quick disconnect for replacement ease:
Newark Part #87269

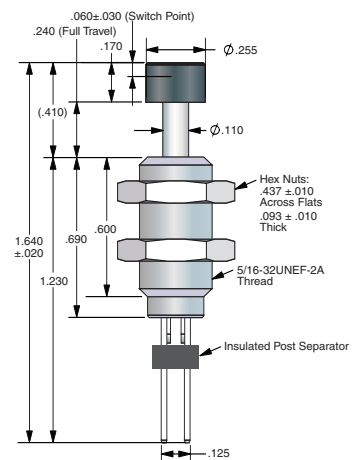
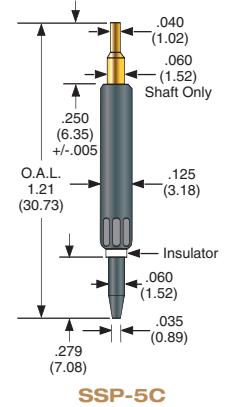
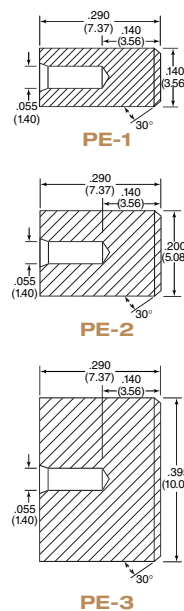


Applications

A switch probe is designed primarily for "presence/electrical" test applications such as detecting the absence or presence of contacts within a wire harness connector. In this case, the switch probe provides electrical interconnection and verifies the connector has been manufactured properly. If contacts are missing or out of place, the part is rejected. If all the contacts are in place, the part is accepted and an electrical test is performed, verifying electrical integrity of the connector and the wires within the harness.



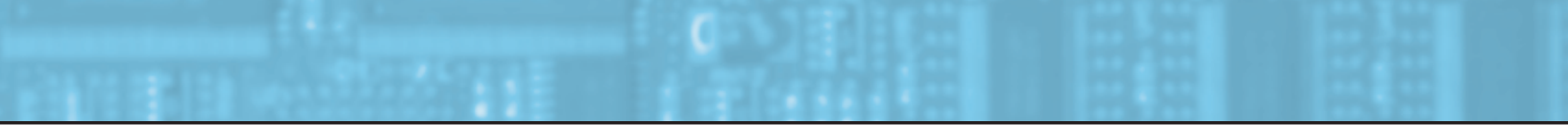
CAPS FOR MSP-3C



SSP-812023 PRESENCE DETECTION DEVICE

Replaceable mechanical switch easily and reliably detects part presence and/or orientation. Quick-Connect termination. Tip material: Black Phenolic

Wire Harness Probes





Test System Interface

ECT is your source for interface probes for all major brands of test systems, including Teradyne, GenRad and Hewlett-Packard. In fact, two of these companies specify ECT probes as original equipment. If our standard products don't meet your requirements, contact Everett Charles Technologies for expert assistance in designing and manufacturing your custom interface probe.

Contents

GSP-2B	40
POGO-25T/POGO-25HM	41
SIP-90/GPP-95-2	42

How to Order

To order from this section, specify actual part number.

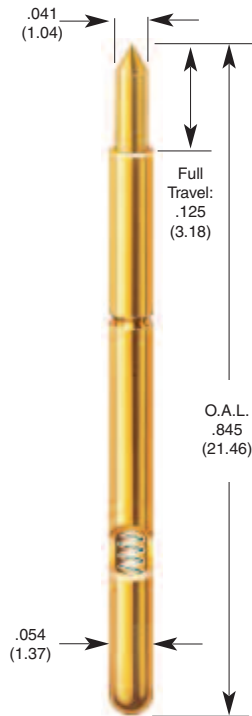
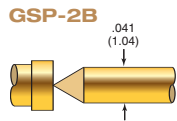
Example:

GSP-2B

probe
model

Call 909-625-9390 to order, or fax to 909-624-9746.

TO ORDER, CALL 909-625-9390



GSP-2B
For GenRad 227/82/73

Probe Specifications GSP-2B

Application:	The GSP-2B is designed for use in GenRad tester interfaces
Mechanical	
Full Travel:	.125 (3.18)
Operating Temperature:	-55°C to + 130°C Consult factory for other temperature requirements, and applications below -40° C.
Electrical (Static Conditions)	
Current Rating:	5 amps
Maximum continuous current, non-inductive at working travel	
Average Probe Resistance:	35 mΩ
Materials and Finishes	
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel
Barrel:	Work-hardened nickel silver, gold plated (I.D. and O.D.) over hard nickel
Spring:	Beryllium copper, silver plated

Receptacle Specifications

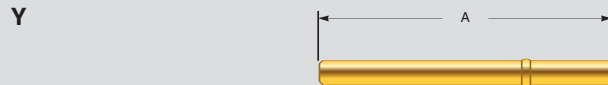
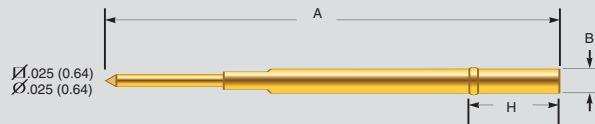
Materials and Finishes	See SPR-2 series specifications, page 32.
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Spring Force in oz. (grams)

Spring Type	Preload	3/4 Travel
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To order, add dash number to Model Number.		
GSP-2B as shown	2.0 (57)	4.5 (128)
Optional spring forces and materials are available.		

W-2 \square W-3 \circ



Receptacle Dimensions

	A	B	C	D	E
SPR-2W	.930(23.62)	.066(1.68)	.048(1.22)	.058(1.47)	.20(5.08)
SPR-2W-1	.950(24.13)	.066(1.68)	.048(1.22)	.058(1.47)	.20(5.08)
SPR-2W-2	1.45(36.83)	.066(1.68)	Square Post = .025(0.64)		
SPR-2W-3	1.32(33.53)	.066(1.68)	Round Post = .025(0.64) DIA.		
SPR-2Y	.735(18.67)	.066(1.68)			

SPR-2 Series press ring diameter is typically .070 (1.78)
H dimension SPR-2 Series = .240 (6.09)

Test System Interface Probes



Note: The GSP-2BP is designed for use in receptacles without detents.

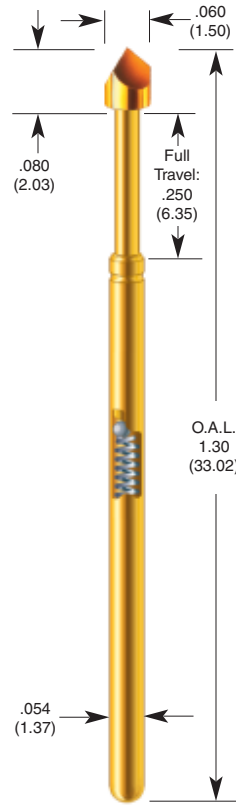
Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390

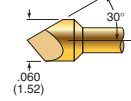
Probe Specifications	POGO-25T	POGO-25HM
Mechanical		
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	2 x 10 ⁸ cycles	2 x 10 ⁸ cycles
Operating Temperature		
	-55°C to +105°C	-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.		
Electrical (Static Conditions)		
Current Rating:	8 amps	8 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance		
	8 mΩ	8 mΩ
Materials and Finishes		
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 phosphor bronze, gold plated (I.D. and O.D.) over hard nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

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

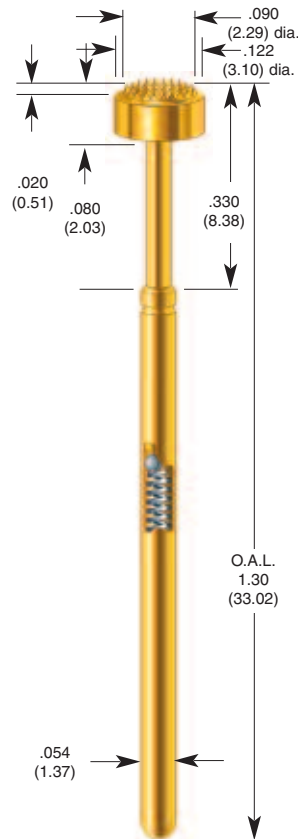
To order, add dash number to Model Number.
Standard -4 1.24 (35)
 Optional spring forces and materials are available.



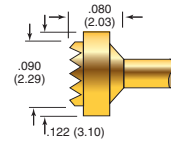
POGO-25T



POGO-25T
 For Teradyne 800/1800



POGO-25HM



POGO-25HM
 For Agilent/HP 3070


Test System Interface Probes

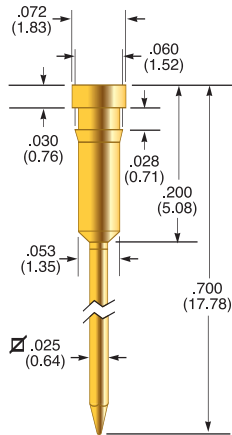


Actual Size

TO ORDER, CALL 909-625-9390

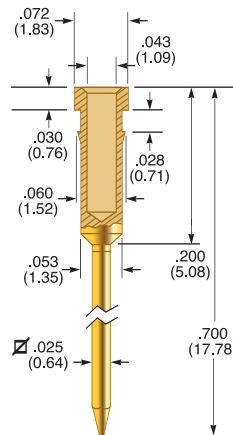
SIP-90-2

Materials: Brass, gold plated
Mounting Hole Size: .055 (1.40)
Applications: Designed for use in original GenRad interface blocks.



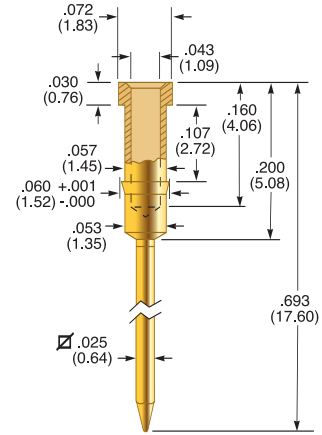
SIP-90-3

Materials: Brass, gold plated
Mounting Hole Size: .055 (1.40)
Applications: Designed for use in original Zehntel interface panels.



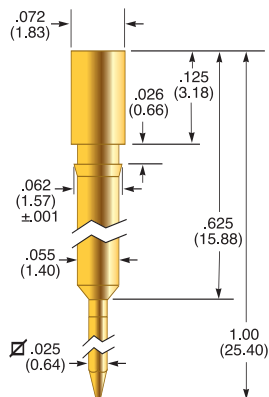
SIP-90-4

Materials: Brass, gold plated
Mounting Hole Size: .055 (1.40)
Applications: Designed for use in original Factron interface panels. SIP-90-4 replaces SIP-90-1.



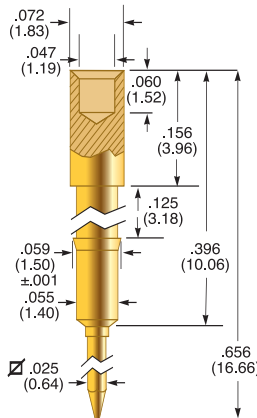
SIP-90-5

Materials: Brass, gold plated
Mounting Hole Size: .057 (1.45)
Applications: General interconnect.



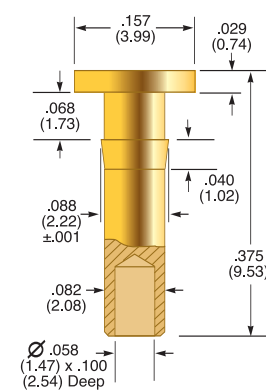
SIP-90-6

Materials: Brass, gold plated
Mounting Hole Size: .057 (1.45)
Applications: General interconnect.



GPP-95-2

Materials: Brass, gold plated
Mounting Hole Size: .085 (2.15)
Applications: Designed for use in original GenRad interface boards.





High Current • High Frequency

For powered functional testing of connectors, wire harnesses, modules and other devices drawing up to 45A, our high current probes feature low resistance plungers and multiple-point, high-current-capacity tips. Only Everett Charles Technologies offers a complete line of high current probes for .100, .125 and .187-inch test centers. And only Everett Charles Technologies provides direct technical support to help you make the most of them.

Contents

HCP-13/14/15/HCP-25	44
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How to Order

To order from this section, specify actual part number.

Example:

K-50L

probe
model

Call 909-625-9390 to order, or fax to 909-624-9746.



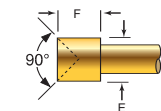
Technical Notes High Current/ High Frequency Probes

The maximum continuous current rating of a spring probe is determined by its design, size and construction. Typical probes are rated from 2 to 5 amps maximum current (non-inductive) at working travel. While this is sufficient for most board test applications, higher current probes are sometimes required.

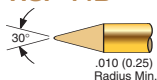
ECT High-Current Probes (HCP series) are capable of carrying electrical current up to 45 amps.

TO ORDER, CALL 909-625-9390

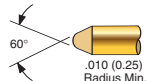
HCP-13A
HCP-14A
HCP-15A
HCP-25A



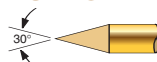
HCP-13B
HCP-14B



HCP-15B



HCP-25B



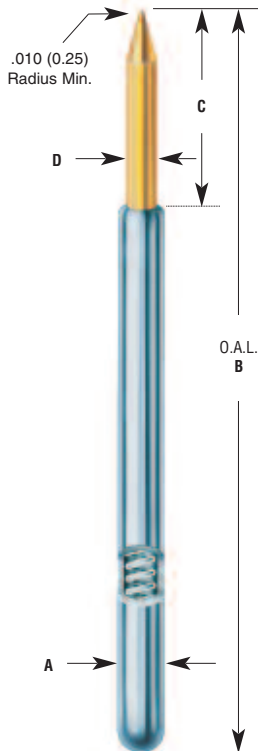
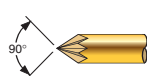
HCP-13H
HCP-14H
HCP-15H



HCP-25H



HCP-13P

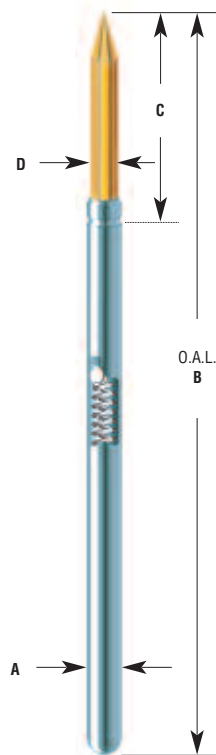


HCP-13
HCP-14
HCP-15

Probe Dimensions

	HCP-13	HCP-14
Test Centers	.125 (3.18)	.187 (4.75)
A	.080 (2.03) ∅	.093 (2.36)
B	1.30 (33.02)	1.32 (33.53)
C	.330 (8.38)	.350 (8.89)
D	.050 (1.27) ∅	.060 (1.52)
E	.100 (2.54) ∅	.156 (3.96)
F	.080 (2.03)	.100 (2.54)

	HCP-15	HCP-25
Test Centers	.187 (4.75)	.100 (2.54)
A	.125 (3.18) ∅	.054 (1.37)
B	1.42 (36.07)	1.30 (33.02)
C	.350 (8.89)	.330 (8.38)
D	.080 (2.03) ∅	.036 (0.91)
E	.156 (3.96) ∅	.060 (1.52)
F	.100 (2.54)	.080 (2.03)



HCP-25

High Current/High Frequency Probes



Actual Size

Probe Specifications

	HCP-13, 14, 15	HCP-25
Mechanical		
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	.25 x 10 ⁶ cycles	.5 x 10 ⁶ cycles

	-55°C to +150°C	-55°C to +150°C
Operating Temperature		
Consult factory for other temperature requirements, and applications below -40° C.		

		10 amps
Electrical (Static Conditions)		
Current Rating:		
HCP-13	15 amps	
HCP-14	25 amps	
HCP-15	35 amps	
HCP-25		10 amps
Maximum continuous current, non-inductive at working travel		

	25 mΩ	25 mΩ
Average Probe Resistance		

	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, gold plated over hard nickel
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, gold plated over hard nickel
Barrel:	Work-hardened nickel silver, silver plated (I.D. and O.D.) over hard nickel	Work-hardened phosphor bronze, silver plated (I.D. and O.D.) over hard nickel
Spring:	Stainless steel, silver plated	Stainless steel, silver plated
Ball:	Brass, gold plated	Stainless steel

Receptacle Specifications

Use SPR Series:		
HCP-13	SPR-3 series (page 60)	
HCP-14	SPR-4 series (page 61)	
HCP-15	SPR-5 series (page 62)	
HCP-25		SPR-25 series (page 13)

NOTE: The wire gauge listed on referenced pages is for typical ATE applications only. When using these receptacles in high current applications, larger wire size may be required. In cases where the required wire diameter exceeds the receptacle tail ID, solder cup versions are recommended.

Spring Force in oz. (grams)		
Spring Type	Preload	2/3 Travel
HCP-13	1.54 (44)	4.5 (128)
HCP-14	0.86 (24)	4.8 (136)
HCP-15	3.76 (107)	16.0 (456)
HCP-25	0.86 (24)	4.0 (113)

Optional spring forces and tip styles are available for the HCP-25.

TO ORDER, CALL 909-625-9390

Probe Specifications P4301-1F Brute

Mechanical

Full Travel: .250 (6.35)
 Recommended Working Travel: .167 (4.24)
 Mechanical Life Exceeds: 1 x 10⁸ cycles

Operating Temperature -40°C to +204°C
 Consult factory for other temperature requirements.

Electrical (Static Conditions)
 Current Rating: 50 amps
 maximum continuous current, non-inductive at working travel

Average Probe Resistance 5 mΩ

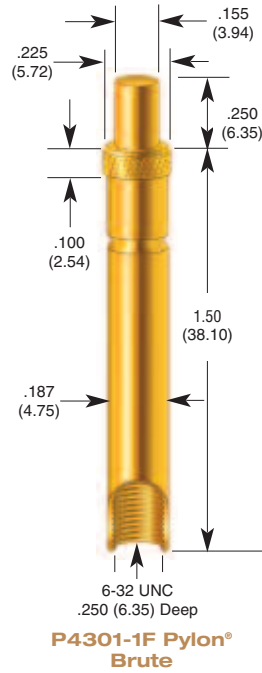
Materials and Finishes

Plunger: Gold-plated, tellurium copper
 Barrel: Gold-plated, tellurium copper
 Spring: Stainless steel
 Ball: Stainless steel

Spring Force in oz. (grams)

Spring Type	Preload	Working Travel
Standard	16.0 (454)	32.0 (909)

Note: Termination by tapped hole with wire attached



High Current/High Frequency Probes



Actual
 Size

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.

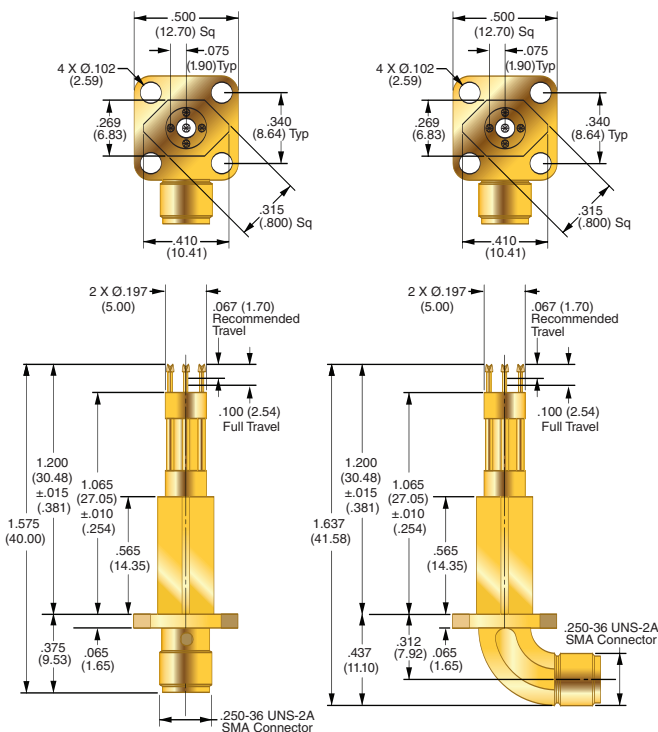
Specifications	K-50L-QG-75	K-50L-QG-75R
Nominal Impedance:	50 Ohms	50 Ohms
Minimum Return Loss		
@ 1 Ghz:	23.8 dB, 22.8 dB	25.1 dB, 25.2 dB
@ 5 Ghz:	18.3 dB, 16.4 dB	18.0 dB, 17.5 dB
@ 10 Ghz:	17.7 dB, 17.0 dB	27.0 dB, 35.3 dB
Maximum Insertion Loss		
@ 1 Ghz:	0.183 dB, 0.186 dB	0.160 dB, 0.159 dB
@ 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, silver plated	Stainless steel

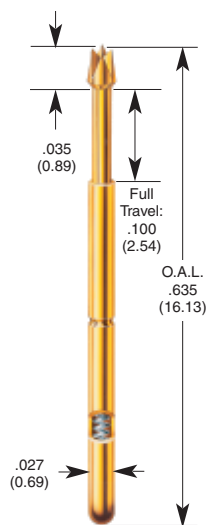
Spring Force in oz. (grams)	Preload	2/3 Travel
Spring Type		
HPA-0L	0.61 (17)	2.8 (79)
SPG-72L-005	1.30 (37)	2.8 (79)

To order, add dash number to Model Number.

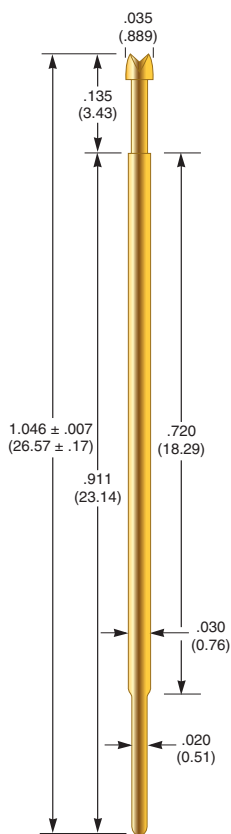


K-50L-QG-75

K-50L-QG-75R



GROUND PROBE
HPA-0L



SIGNAL PROBE
SPG-72L-005

Dimensions in inches (millimeters)

High Current/High Frequency Probes

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

Probe Specifications SPL-01L-039

Mechanical

Full Travel:	.250 (6.35)
Recommended Working Travel:	.225 (5.72)
Mechanical Life Exceeds:	1 x 10 ⁶ cycles

Operating Temperature

Operating Temperature	-55°C to +105°C
-----------------------	-----------------

Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating:	6 amps
-----------------	--------

Maximum continuous current, non-inductive at working travel

Average Probe Resistance

Average Probe Resistance	10 mΩ
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Materials and Finishes

Plunger:	Heat-treated beryllium copper, gold-plated over hard nickel
Barrel:	Work-hardened nickel silver, gold plated over hard nickel
Spring:	Music wire, silver plated
Ball:	Brass, gold plated

Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
To order, add dash number to Model Number.		
SPL-01L-039	1.09 (30.9)	2.71 (76.8)

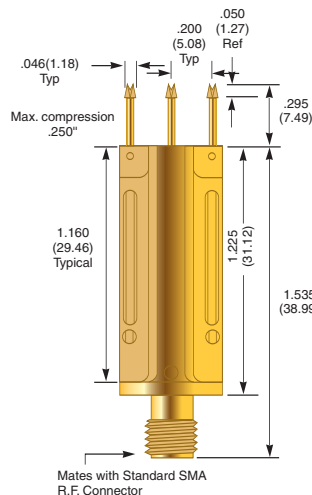
Design Advantages

- 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.

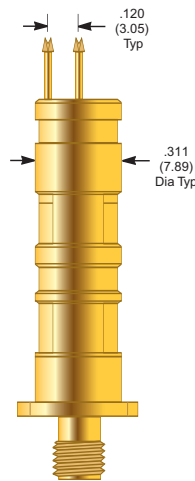
*Note:

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

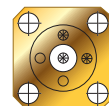


Mates with Standard SMA R.F. Connector

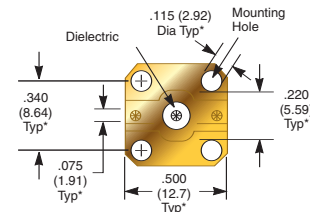
K-50L SIDE VIEW
Patented



K-50L-QG SIDE VIEW
Patented

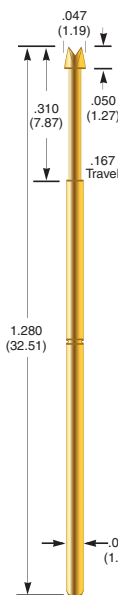


K-50L-QG TOP VIEW
Shown in Quadrature ground configuration



K-50L TOP VIEW

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

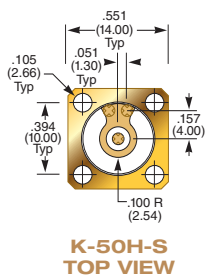


REPLACEMENT PROBE SPL-01L-039*

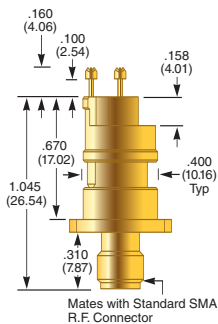
* RF performance is optimized using SPL-01L-039 probes at 90% compression. This probe has limited cycle life (approx. 10K cycles). For high production applications, Pogo-1 probes may be used with minimal impact on performance.

High Current/High Frequency Probes

TO ORDER, CALL 909-625-9390

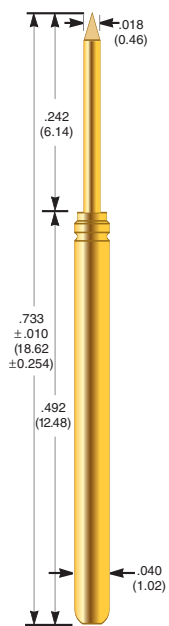


**K-50H-S
TOP VIEW**

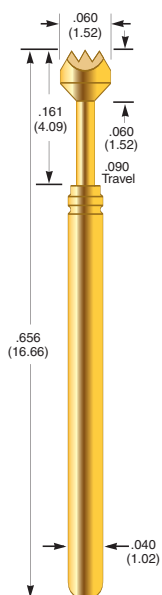


**K-50H-S
SIDE VIEW**

Mates with Standard SMA R.F. Connector



**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
Minimum Return Loss @ 1 Ghz:	23 db, 26 db Typical
Maximum Insertion Loss @ 1 Ghz:	0.12 db, 0.06 db Typical
Maximum VSWR @ 1 Ghz:	1.15:1, 1.11:1 Typical

Materials and Finishes

Housing:	Gold plated copper zinc alloy
Dielectric:	Premium virgin teflon per MIL-P-18468
SMA Connector Pin:	Gold plated beryllium copper

Consult factory for more information.

Probe Specifications SPL-01B-119 SPL-01H-116

Mechanical

Full Travel:	.100 (2.54)	.100 (2.54)
Recommended Working Travel:	.090 (2.29)	.090 (2.29)
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
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Consult factory for other temperature requirements, and applications below -40° C.

Electrical (Static Conditions)

Current Rating:	6 amps	6 amps
-----------------	--------	--------

Maximum continuous current, non-inductive at working travel

Average Probe Resistance

	10 mΩ	10 mΩ
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Materials and Finishes

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 phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel
Spring:	Music wire	Music wire
Ball:	Stainless steel	Stainless steel

Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
-------------	---------	------------

To order, add dash number to Model Number.

SPL-01B-119	1.49 (42.2)	4.0 (113)
SPL-01H-116	1.49 (42.2)	4.0 (113)

High Current/High Frequency Probes

TO ORDER, CALL 909-625-9390

**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.

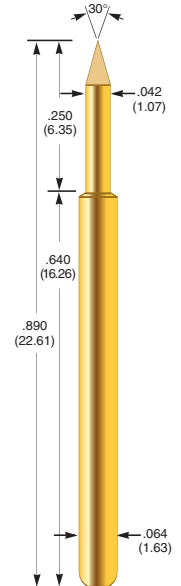
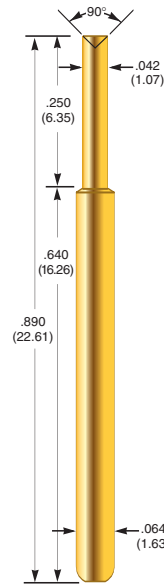
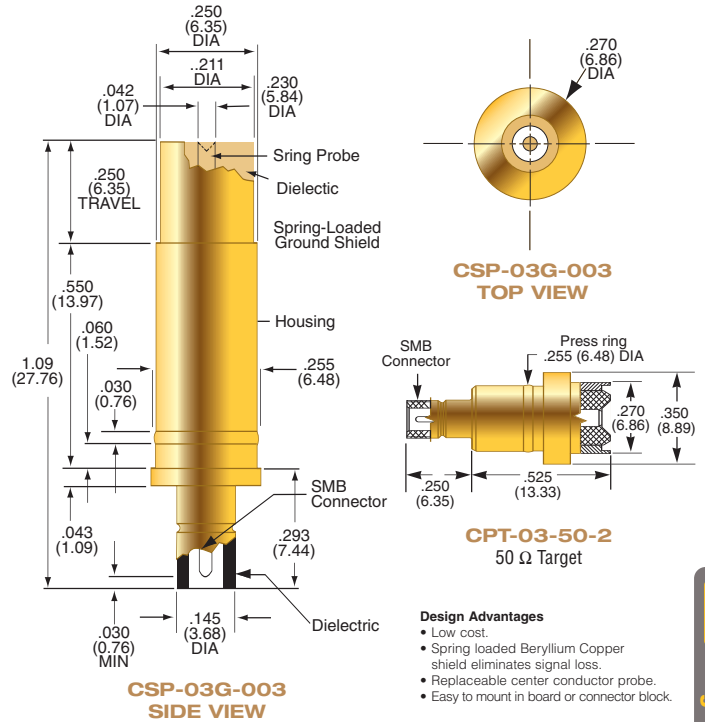
Electrical

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

Materials and Finishes

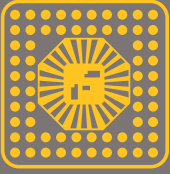
Housing: Gold plated copper zinc alloy
 Ground Shield: Gold plated beryllium copper
 Dielectric: Teflon per MIL-P-18468
 Connector Pin: Gold plated beryllium copper
 Spring Probe: Gold plated beryllium copper
 Plunger: Gold plated beryllium copper
 Barrel: Gold plated brass
 Spring: Music wire, silver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

Consult factory for more information.



Probe Specifications	SPL-03G-043	SPL-03B-121
Mechanical		
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		
Average 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)

High Current/High Frequency Probes

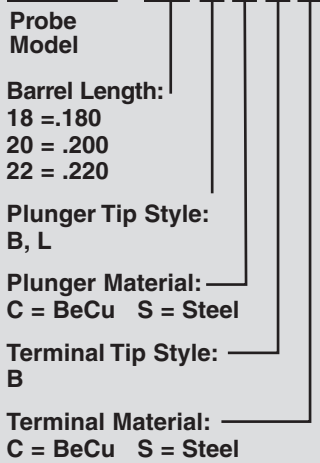


Semiconductor Pogos

How to Order

Double-Ended CSP Probes

CSP5-20LCBC



For technical data or to place an order, consult Ostby Barton; 401-739-7310, ext. 212

Single-Ended SCP Probes

1.27 mm: SCP-127ZB-001

1.00 mm: SCP-100ZB-004

0.80 mm: SCP-080ZB-001

For technical data or to place an order, consult Contact Products Group; 909-625-5551

Bantam

For ordering information, contact:

Semiconductor Test Group;
651-407-7777

Contact Products Group;
909-625-5551

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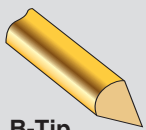
TO ORDER, CALL 909-625-9390

Probe Specifications	CSP4	CSP5-18
Mechanical		
Pitch:	.4mm	.5mm
Recommended Mounting Centers:	.016 (.40)	.020 (.50)
Full Travel:	.025 (.64)	.025 (.64)
Recommended Travel:	.020 (.51)	.020 (.51)
Test Height:	.217 (5.51)	.214 (5.44)
Spring Force:	.85 (24.1g)	.7oz (19.8g)
Overall Length:	.237 (6.02)	.234 (5.94)
Mechanical Life:	250,000 cycles	500,000 cycles
Materials and Finishes		
Plunger End (long extension)	BeCu or Steel	BeCu or Steel
Terminal End (short Extension)	BeCu or Steel	BeCu or Steel
Barrel:	Hard Gold over Nickel Phosphor Bronze	Hard Gold over Nickel Phosphor Bronze
Spring:	Hard Gold over Nickel Music Wire/Gold Plate	Hard Gold over Nickel Steel Alloy/Gold Plate
Environmental		
Maximum Operating Temperature:	105°C	155°C
Electrical		
Average DC Resistance:**	<100mΩ	<100mΩ
Current Capacity:	2A	2A
Self Inductance (Ls):	1.71nH	1.5nH*
Capacitance (Cc):	.58pF	.63pF*
Bandwidth @ -1dB:	6.8GHz	8.13GHz*

Probe Specifications	CSP5-20	CSP5-22
Mechanical		
Pitch:	.5mm	.5mm
Recommended Mounting Centers:	.020 (.50)	.020 (.50)
Full Travel:	.025 (.64)	.035 (.89)
Recommended Travel:	.020 (.51)	.020 (.51)
Test Height:	.234 (5.94)	.254 (6.45)
Spring Force:	.7oz (19.8g)	1.0oz (28.4g)
Overall Length:	.254 (6.45)	.274 (6.96)
Mechanical Life:	500,000 cycles	500,000 cycles
Materials and Finishes		
Plunger End (long extension)	BeCu or Steel	BeCu or Steel
Terminal End (short Extension)	BeCu or Steel	BeCu or Steel
Barrel:	Hard Gold over Nickel Phosphor Bronze	Hard Gold over Nickel Phosphor Bronze
Spring:	Hard Gold over Nickel Steel Alloy/Gold Plate	Hard Gold over Nickel Steel Alloy/Gold Plate
Environmental		
Maximum Operating Temperature:	155°C	155°C
Electrical		
Average DC Resistance:**	<100mΩ	<100mΩ
Current Capacity:	2A	2A
Self Inductance (Ls):	1.65nH*	1.79nH
Capacitance (Cc):	.69pF*	.75pF
Bandwidth @ -1dB:	7.4GHz*	6.8GHz

* Estimated ** DC Resistance measured contacting a clean gold plated surface on both probe tips.

PLUNGER-DUT or HIB



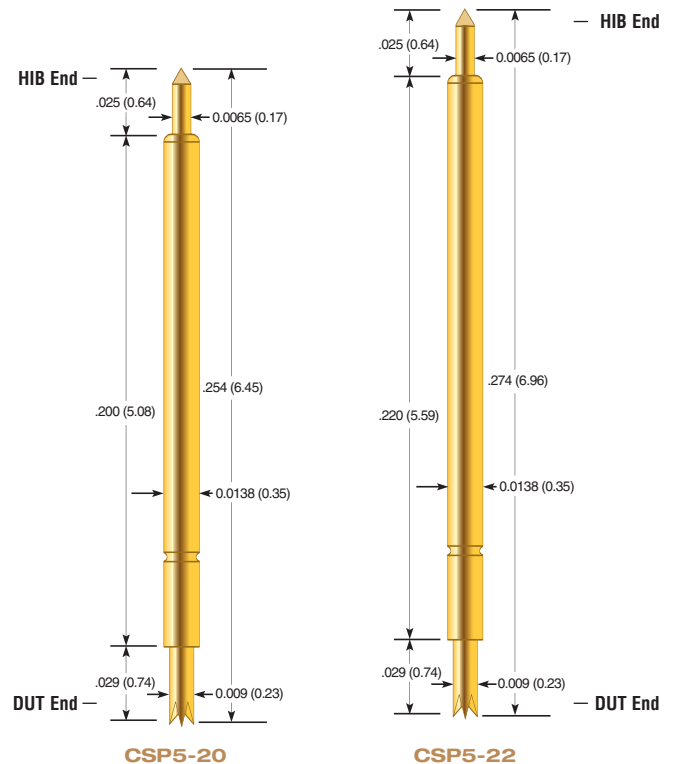
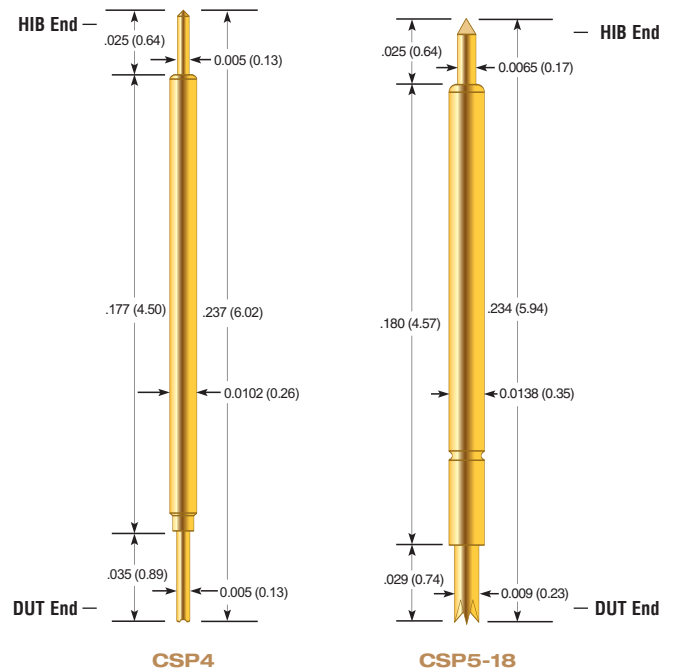
B-Tip
(All CSP Probes)



J-Tip
(CSP5)



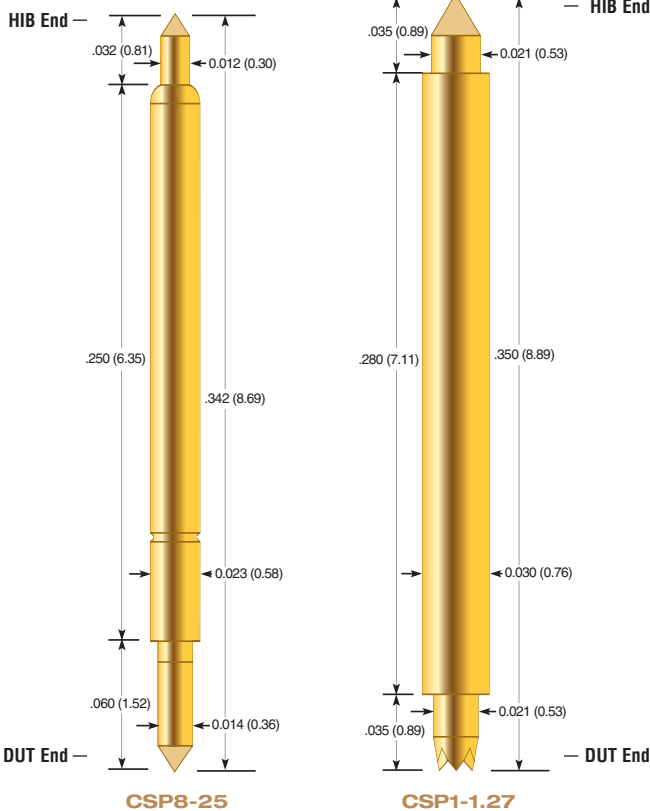
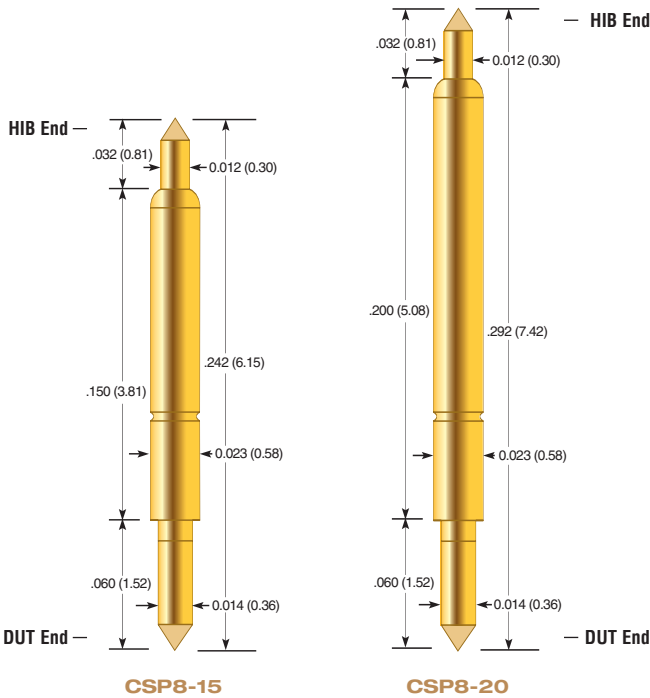
L-Tip
(All CSP Probes)



Actual
Size

Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390



Probe Specifications	CSP8-15	CSP8-20
Mechanical		
Pitch:	.8mm	.8mm
Recommended Mounting Centers:	.0315 (.80)	.0315 (.80)
Full Travel:	.040 (1.02)	.040 (1.02)
Recommended Travel:	.030 (.76)	.030 (.76)
Test Height:	.212 (5.38)	.262 (6.65)
Spring Force:	1.1oz (31.2g)	1.1oz (31.2g)
Overall Length:	.242 (6.15)	.292 (7.42)
Mechanical Life:	500,000 cycles	500,000 cycles

Materials and Finishes	CSP8-15	CSP8-20
Plunger End (long extension)	BeCu or Steel	BeCu or Steel
Terminal End (short Extension)	BeCu or Steel Hard Gold over Nickel	BeCu or Steel Hard Gold over Nickel
Barrel:	Phosphor Bronze Hard Gold over Nickel	Phosphor Bronze Hard Gold over Nickel
Spring:	Steel Alloy/Gold Plate	Steel Alloy/Gold Plate

Environmental	CSP8-15	CSP8-20
Maximum Operating Temperature:	155°C	155°C

Electrical	CSP8-15	CSP8-20
Average DC Resistance:**	<100mΩ	<100mΩ
Current Capacity:	3A	3A
Self Inductance (Ls):	1.23nH*	1.52nH*
Capacitance (Cc):	.65pF*	.81pF*
Bandwidth @ -1dB:	9.23GHz*	7.45GHz*

Probe Specifications	CSP8-25	CSP1-1.27
Mechanical		
Pitch:	.8mm	1.0 - 1.27mm
Recommended Mounting Centers:	.0315 (.80)	.039 (1.0) / .050 (1.27)
Full Travel:	.040 (1.02)	.040 (1.02)
Recommended Travel:	.030 (.76)	.035 (.89)
Test Height:	.312 (7.92)	.315 (8.0)
Spring Force:	1.1oz (31.2g)	2.0oz (56.7g)
Overall Length:	.342 (8.69)	.350 (8.89)
Mechanical Life:	500,000 cycles	500,000 cycles

Materials and Finishes	CSP8-25	CSP1-1.27
Plunger End (long extension)	BeCu or Steel	BeCu
Terminal End (short Extension)	BeCu or Steel Hard Gold over Nickel	BeCu Hard Gold over Nickel
Barrel:	Phosphor Bronze Hard Gold over Nickel	Phosphor Bronze Hard Gold over Nickel
Spring:	Steel Alloy/Gold Plate	Steel Alloy/Gold Plate

Environmental	CSP8-25	CSP1-1.27
Maximum Operating Temperature:	155°C	155°C

Electrical	CSP8-25	CSP1-1.27
Average DC Resistance:**	<100mΩ	<100mΩ
Current Capacity:	3A	5A
Self Inductance (Ls):	1.81nH	3.1nH
Capacitance (Cc):	.96pF	.95pF
Bandwidth @ -1dB:	5.25GHz	3.8GHz

* Estimated ** DC Resistance measured contacting a clean gold plated surface on both probe tips.

PLUNGER-DUT or HIB



Semiconductor Pogos

Actual
Size

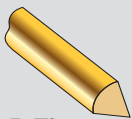
TO ORDER, CALL 909-625-9390

Probe Specifications	SCP-080ZB-001	SCP-100ZB-004
Mechanical		
Pitch:	.8mm	1.0mm
Recommended Mounting Centers:	.0295 (.75) / .0319 (.80)	.0394 (1.00)
Full Travel (Z):	.035 (.89)	.035 (.89)
Recommended Travel:	.030 (.76)	.030 (.76)
Test Height:	.200 (5.08)	.200 (5.08)
Spring Force:	1.20oz (34g) ± 20%	1.20oz (34g) ± 20%
Overall Length:	.230 (5.84)	.230 (5.84)
Mechanical Life:	1,000,000 Cycles	1,000,000 Cycles
Materials and Finishes		
Plunger:	BeCu Plated with Hard Gold over Nickel	BeCu Plated with Hard Gold over Nickel
Barrel:	BeCu Plated with Hard Gold over Nickel	BeCu Plated with Hard Gold over Nickel
Spring:	Steel Alloy Plated with Hard Gold over Nickel	Steel Alloy Plated with Hard Gold over Nickel
Environmental		
Maximum Operating Temperature:	155°C	155°C
Electrical		
Average DC Resistance:**	<50mΩ	<50mΩ
Current Capacity:		
Open Air (No Cycling)	5A	7A
Self Inductance (Ls):	1.27nH	1.4 nH
Capacitance (Cc):	.12pF	.66pF
Bandwidth @ -1dB:	6GHz	6.78GHz

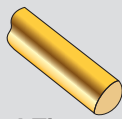
Probe Specifications	SCP-127ZB-001
Mechanical	
Pitch:	1.27mm
Recommended Mounting Centers:	.050 (1.27)
Full Travel (Z):	.035 (.89)
Recommended Travel:	.030 (.76)
Test Height:	.200 (5.08)
Spring Force:	1.20oz (34g) ± 20%
Overall Length:	.230 (5.84)
Mechanical Life:	1,000,000 Cycles
Materials and Finishes	
Plunger:	BeCu Plated with Hard Gold over Nickel
Barrel:	BeCu Plated with Hard Gold over Nickel
Spring:	Steel Alloy Plated with Hard Gold over Nickel
Environmental	
Maximum Operating Temperature:	155°C
Electrical	
Average DC Resistance:**	<50mΩ
Current Capacity:	
Open Air (No Cycling)	9A
Self Inductance (Ls):	1.4nH
Capacitance (Cc):	.79pF
Bandwidth @ -1dB:	7.63GHz

** DC Resistance measured contacting a clean gold plated surface on both probe tips.

PLUNGER-HIB

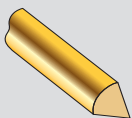


B-Tip
 (All Mini-Mite Probes)

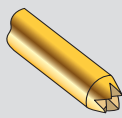


J-Tip
 (All Mini-Mite Probes)

BARREL-DUT



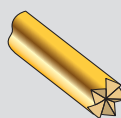
B-Tip
 (.8mm, 1.0mm)



L-Tip
 (1.0mm)

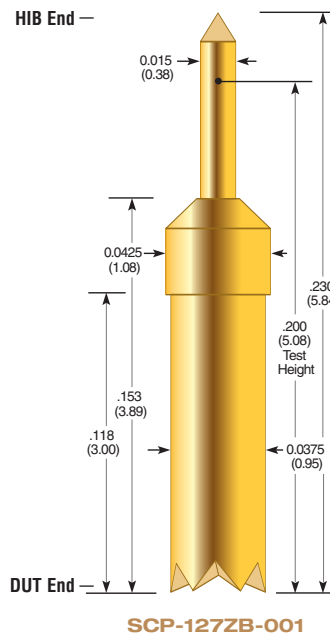
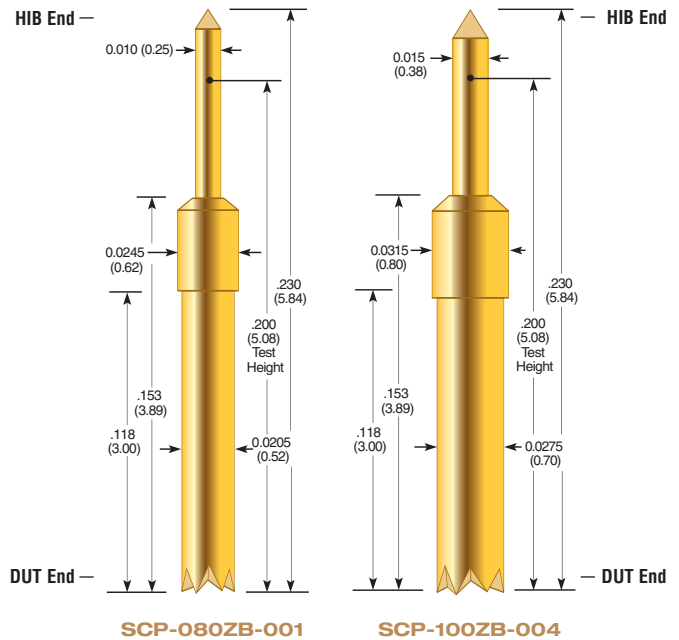


U-Tip
 (.8mm)



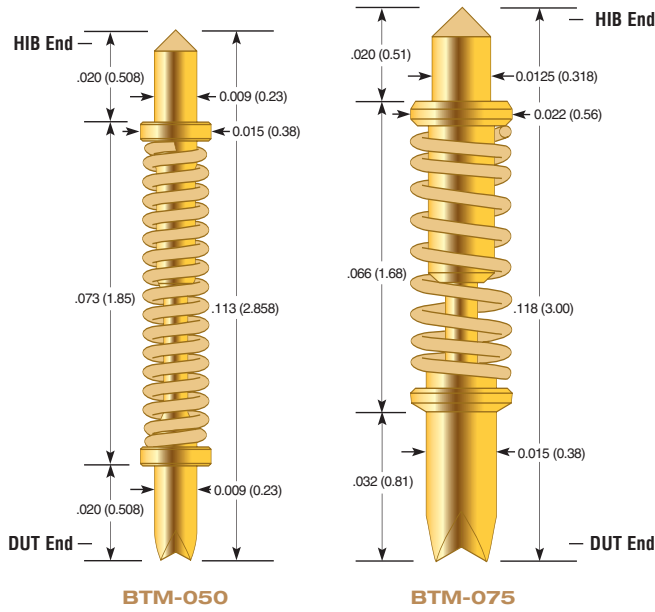
Z-Tip
 (All Mini-Mite Probes)

Note: Not all tips available in all configurations.



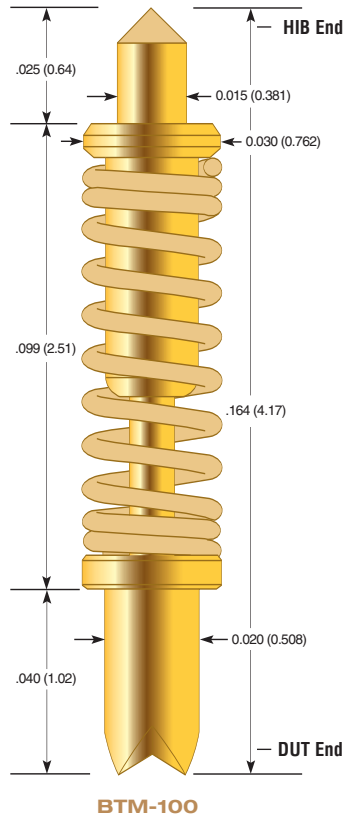
Actual Size

TO ORDER, CALL 909-625-9390



BTM-050

BTM-075



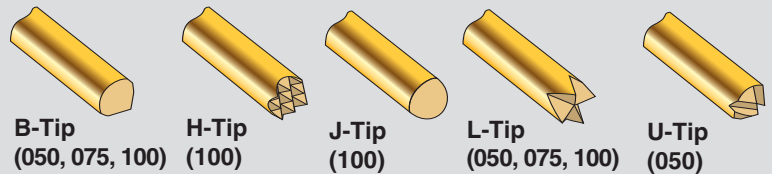
BTM-100

Probe Specifications	BTM-050	BTM-075
Mechanical		
Pitch:	.5mm	.75mm / .8mm
Recommended Mounting Centers:	.019 (.50)	.0295 (.75) / .0315 (.80)
Full Travel:	.020 (.51)	.020 (.51)
Recommended Travel:	.015 (.38)	.015 (.38)
Test Height:	.098 (2.49)	.103 (2.62)
Spring Force:	1.1oz (31g)±20%	1.0oz (28g)±20%
Overall Length:	.113 (2.87)	.118 (3.00)
Mechanical Life:	1,000,000 cycles	1,000,000 cycles
Materials and Finishes		
Plunger:	BeCu Plated with Hard Gold over Nickel	BeCu Plated with Hard Gold over Nickel
Barrel:	BeCu Plated with Hard Gold over Nickel	Brass Alloy Plated with Hard Gold over Nickel
Spring:	Steel Alloy Hard Gold over Nickel	Music Wire Hard Gold over Nickel
Environmental		
Maximum Operating Temperature:	155°C	105°C
Electrical		
Average DC Resistance:**	<50mΩ	<50mΩ
Current Capacity:		
Open Air (No Cycling)	1.5A	2A
Self Inductance (Ls):	.95nH	.77nH
Capacitance (Cc):	.28pF	.25pF
Bandwidth @ -1dB:	12.87GHz	15.65GHz

Probe Specifications	BTM-100
Mechanical	
Pitch:	1.0mm
Recommended Mounting Centers:	.0394 (1.00) / .050 (1.27)
Full Travel:	.030 (.76)
Recommended Travel:	.028 (.71)
Test Height:	.136 (3.45)
Spring Force:	1.4oz (39g)±20%
Overall Length:	.164 (4.17)
Mechanical Life:	1,000,000 cycles
Materials and Finishes	
Plunger:	BeCu Plated with Hard Gold over Nickel
Barrel:	Brass Alloy Plated with Hard Gold over Nickel
Spring:	Steel Alloy Hard Gold over Nickel
Consult factory about additional plating options.	
Environmental	
Maximum Operating Temperature:	155°C
Electrical	
Average DC Resistance:**	<50mΩ
Current Capacity:	
Open Air (No Cycling)	3.5A
Self Inductance (Ls):	1.3nH
Capacitance (Cc):	.34pF
Bandwidth @ -1dB:	9.73GHz

* Estimated ** DC Resistance measured contacting a clean gold plated surface on both probe tips. Available through Semiconductor Test Group.

PLUNGER-DUT



BARREL-HIB



Note: Not all tips available in all configurations.



Battery • Portable Application

Everett Charles Technologies interconnect probes for mobile and consumer products give you the design flexibility to match your performance, cost, and assembly requirements. Our expertise in compliant connectors, patented innovations like the low cost Accordion technology, and full engineering support during development, design and manufacturing help you bring prototypes and production quantities to market one step ahead of the competition.

Contents

BIP-1/2/3	56
CCA-003/004	57
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How to Order

To order from this section, specify actual part number.

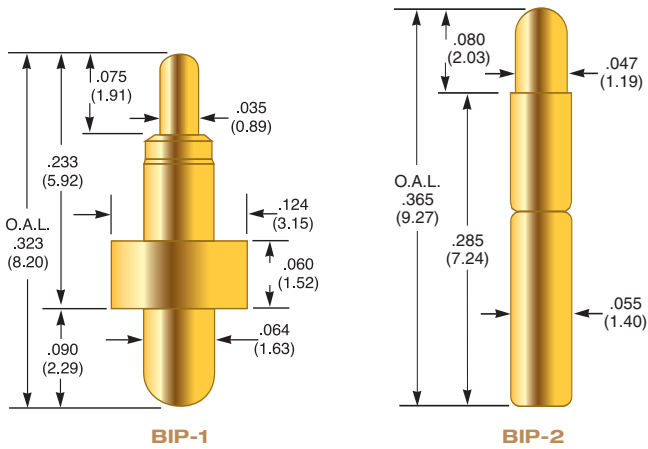
Example:

BIP - 1

probe
model

Call 909-625-9390 to order, or fax to 909-624-9746.

TO ORDER, CALL 909-625-9390



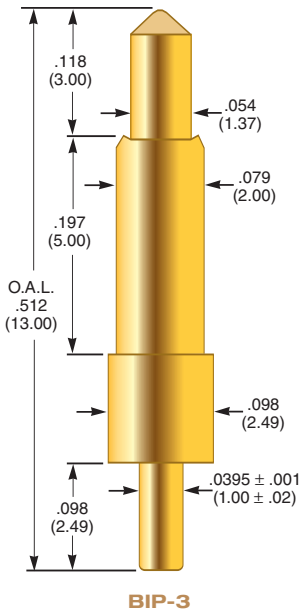
Applications for BIP Series

BIP Series probes are used in battery charger or electronic device applications such as:

1. Camcorders
2. Circuit board to board docking stations
3. Cellular Phones
4. 2-way radios
5. Computer docking stations
6. Cordless phones
7. Chargers
8. InkJet Printers
9. Notebook and laptop computers
10. AC/DC power supplies

Benefits and Features:

1. Low resistance (average 16 milliohms)
2. Better contact than nickel-plated strip contacts
3. Maintains high compliancy
4. Less susceptible to damage
5. Can accommodate up to .025" subsurface battery mating contact
6. Longer life than conventional interconnects



Probe Specifications	BIP-1	BIP-2	BIP-3
Mechanical			
Full Travel:	.075 (1.91)	.050 (1.27)	.100 (2.54)
Recommended Travel:	.050 (1.27)	.050 (1.27)	.060 (1.52)
Mechanical Life Exceeds:	250 x10 ³ cycles	1 x10 ⁶ cycles	250 x10 ³ cycles
Operating Temperature:	-55°C to +150°C	-55°C to +150°C	-55°C to +105°C
Consult factory for other temperature requirements.			
Electrical (Static Conditions)	5 amps d.c. max	5 amps d.c. max	5 amps d.c. max
Maximum Current Rating (Non-inductive DC)			
Average Probe Resistance	16 mΩ	30 mΩ	30 mΩ
Materials and Finishes			
Plunger:	Hard nickel over beryllium copper, gold plated	Hard nickel over beryllium copper, gold plated	Hard nickel over beryllium copper, gold plated
Barrel:	Hard nickel over brass, gold plated	Hard nickel over nickel silver, gold plated	Hard nickel over brass, gold plated
Spring:			
Standard:	Stainless steel, silver plated	Stainless steel, silver plated	Music wire, silver plated
Alternate:	Consult factory	Consult factory	Music wire, silver plated
Mounting Hole Size:	.067 (1.70) min.	.053 (1.35)	.043 (1.09) min

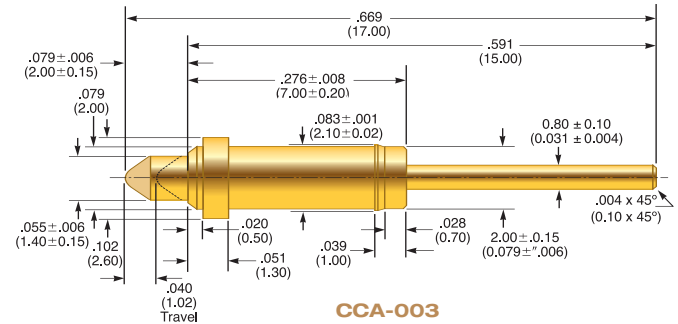
Spring Force in oz. (grams)			
Spring Type	Preload	Recommended Travel	
BIP-1 Standard	1.39 (39.44)	3.50 (99.31)	
BIP-2 Standard	1.10 (31.2)	3.85 (109)	
BIP-3 Standard	0.40 (11.35)	1.14 (32.35)	
BIP-3 Alternate	1.0 (28.38)	3.0 (85.13)	
Tip Styles	J	J	B

Termination
BIP-1: Soldered into PCB
BIP-2: Press Fit
BIP-3: Soldered into PCB

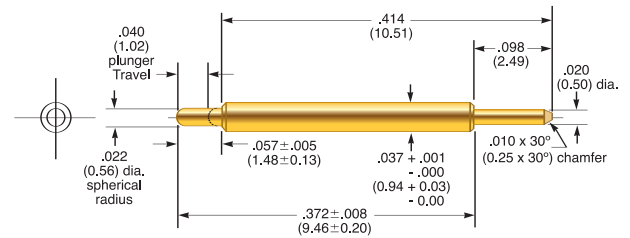
Battery/Portable Application Probes

TO ORDER, CALL 909-625-9390

Probe Specifications	CCA-003	CCA-004
Mechanical		
Full Travel:	.078 (1.98)	.057 (1.48)
Recommended Working Travel:	.040 (1.00)	.040 (1.02)
Mechanical Life Exceeds:	100,000 cycles	100,000 cycles
Operating Temperature	-35°C to +105°C	-35°C to +105°C
Electrical (Static Conditions)		
Current Rating:	5 amps continuous	5 amps continuous
Average Probe Resistance	50 mΩ	50 mΩ
Materials and Finishes		
Plunger:	Brass, gold plated	Brass, gold plated
Barrel:	Brass, gold plated	Brass, gold plated
Spring:	Music wire, gold plated	Music wire, gold plated
Spring Force in oz. (grams)		
Spring Type	Preload	Working Travel
CCA-003	1.27 (36.04)	2.59 (73.49)
CCA-004	.83 (23.55)	2.85 (80.87)



CCA-003



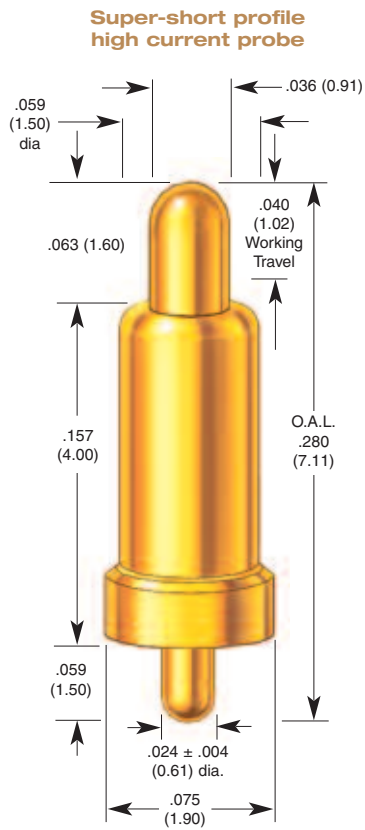
CCA-004

Battery/Portable Application Probes

Note: CCA prefix represents non-standard probes. Please consult factory, lead times may vary.

Dimensions in inches (millimeters)

TO ORDER, CALL 909-625-9390



CP-059-013

Probe Specifications CP-059-013

Mechanical

Full Travel: .062 (1.57)
 Recommended Working Travel: .040 (1.00)
 Mechanical Life Exceeds: 100,000 cycles

Operating Temperature

-35°C to +105°C
 Consult factory for other temperature requirements.

Electrical (Static Conditions)

Current Rating: 10 amps
 Maximum continuous current, non-inductive at working travel

Average Probe Resistance

< 25 mΩ

Materials and Finishes

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

Spring Force in oz. (grams)

Spring Type	Preload	.040 Travel
Standard	as shown 1.63 (46)	4.50 (128)

Optional spring forces and materials are available.

Battery/Portable Application Probes






Actual Size



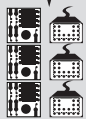
General Purpose

Proven performance, ISO-9000-registered quality and direct technical support have made ECT spring probes the first choice of test engineers worldwide. For the fastest possible response to your probe purchase, we offer you the world's largest selection of off-the-shelf spring probes and same-day shipping of most orders. Extensive in-house engineering and manufacturing resources enable us to deliver custom probe designs in weeks instead of months.

Contents

EPA-3, SPA-3		60
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EPA-5, SPA-5		62

Other applications: icons



How to Order

For each probe, specify the probe model and tip style as shown in the example below. If required, specify the optional non-standard spring force.

Example:

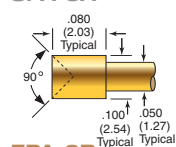
SPA-3C-1

probe model	tip style	spring force
----------------	--------------	-----------------

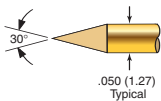
Call 909-625-9390 to order, or fax to 909-624-9746.

TO ORDER, CALL 909-625-9390

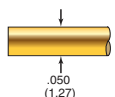
**EPA-3A
SPA-3A**



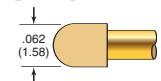
**EPA-3B
SPA-3B**



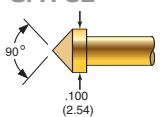
**EPA-3C
SPA-3C**



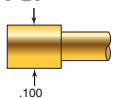
**EPA-3D
SPA-3D**



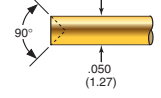
**EPA-3E
SPA-3E**



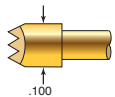
**EPA-3F
SPA-3F**



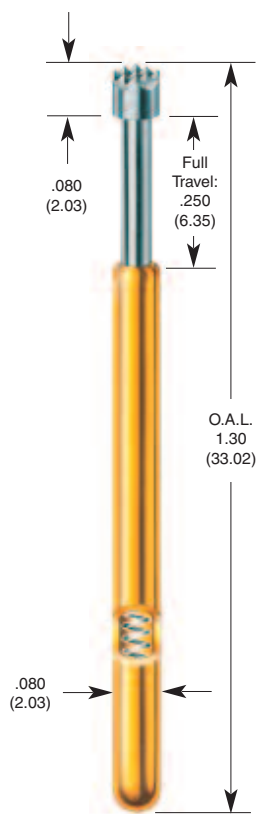
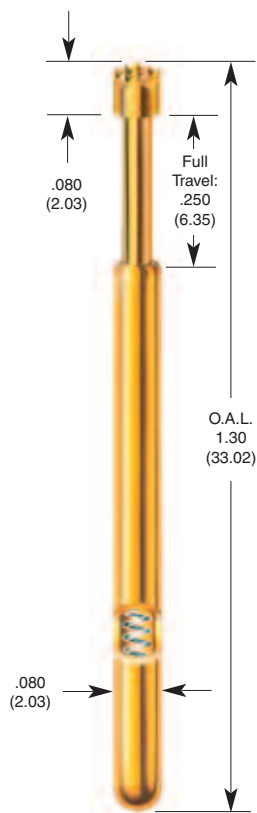
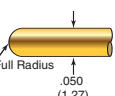
**EPA-3G
SPA-3G**



**EPA-3H
SPA-3H**



**EPA-3J
SPA-3J**



Probe Specifications EPA-3 SPA-3

Mechanical	EPA-3	SPA-3
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	2 x 10 ⁶ cycles	2 x 10 ⁶ cycles

Operating Temperature	EPA-3	SPA-3
Standard spring:	-55°C to +85°C	-55°C to +85°C
Alternate/Ultra High spring:	-55°C to +150°C	-55°C to +150°C
Consult factory for other temperature requirements, and applications below -40° C.		

Electrical (Static Conditions)	EPA-3	SPA-3
Current Rating:	6 amps	6 amps
Maximum continuous current, non-inductive at working travel		

Average Probe Resistance	EPA-3	SPA-3
	50 mΩ	50 mΩ

Materials and Finishes	EPA-3	SPA-3
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, rhodium plated over hard nickel
Barrel:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Spring:		
Standard:	Beryllium copper, silver plated	Beryllium copper, silver plated
Alternate:	Stainless steel, silver plated	Stainless steel, silver plated
Ultra High:	Stainless steel	Stainless steel
Ball:	Brass, gold plated	Brass, gold plated

Receptacle Specifications

Mounting Hole Size:	EPA-3	SPA-3
	.094/.096 (2.39/2.44)	.094/.096 (2.39/2.44)
A #41 or 2.4 mm drill is most commonly used.		

Recommended Wire Gauge:	EPA-3	SPA-3
	22-26 AWG	22-26 AWG

Connections:	EPA-3	SPA-3
SPR-3W Crimp or push-on termination (AMP terminal 60983-1 or equivalent)		SPR-3W Crimp or push-on termination (AMP terminal 60983-1 or equivalent)
SPR-3W-1 Solder cup		SPR-3W-1 Solder cup
SPR-3W-2 wire wrap/square post		SPR-3W-2 wire wrap/square post
SPR-3Y Push-on termination (AMP terminal 42827-2 or equivalent)		SPR-3Y Push-on termination (AMP terminal 42827-2 or equivalent)

Materials and Finishes	EPA-3	SPA-3
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Square Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated

Spring Force in oz. (grams)

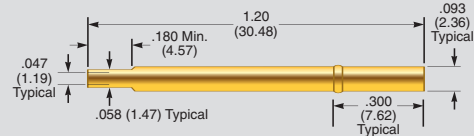
Spring Type	Preload	2/3 Travel
Standard	1.60 (45)	4.5 (126)
Alternate	2.52 (71)	6.5 (184)
Ultra High	4.18 (119)	11.7 (332) (SPA only)

To order, add dash number to Model Number.

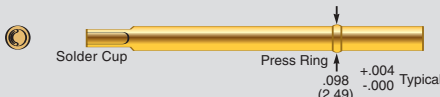
Standard	as shown	1.60 (45)	4.5 (126)
Alternate	-1	2.52 (71)	6.5 (184)
Ultra High	-2	4.18 (119)	11.7 (332) (SPA only)

Optional spring forces and materials are available.

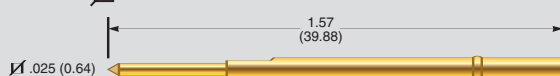
SPR-3W



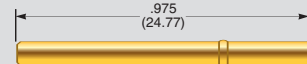
SPR-3W-1



SPR-3W-2



SPR-3Y



General Purpose Probes

Actual Size

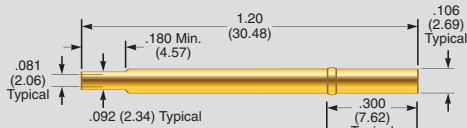
TO ORDER, CALL 909-625-9390

Probe Specifications	EPA-4	SPA-4
Mechanical		
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	2 x 10 ⁶ cycles	2 x 10 ⁶ cycles
Operating Temperature		
Standard spring:	-55°C to +85°C	-55°C to +85°C
Alternate/Ultra High spring:	-55°C to +150°C	-55°C to +150°C
Consult factory for other temperature requirements, and applications below -40° C.		
Electrical (Static Conditions)		
Current Rating:	7 amps	7 amps
Maximum continuous current, non-inductive at working travel		
Average Probe Resistance	50 mΩ	50 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, rhodium plated over hard nickel
Barrel:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Spring:		
Standard:	Beryllium copper, silver plated	Beryllium copper, silver plated
Alternate:	Stainless steel, silver plated	Stainless steel, silver plated
Ultra High:	Stainless steel	Stainless steel
Ball:	Brass, gold plated	Brass, gold plated
Receptacle Specifications		
Mounting Hole Size:	.107/.109 (2.72/2.77)	.107/.109 (2.72/2.77)
A 2.75 mm drill is most commonly used.		
Recommended Wire Gauge:	22-26 AWG	22-26 AWG
Connections:	SPR-4W Crimp or push-on termination (AMP terminal 61260-1 or equivalent) SPR-4W-1 Solder cup SPR-4W-2 Wire wrap/square post. SPR-4Y Push-on termination (AMP terminal 60908-1 or equivalent)	SPR-4W Crimp or push-on termination (AMP terminal 61260-1 or equivalent) SPR-4W-1 Solder cup SPR-4W-2 Wire wrap/square post. SPR-4Y Push-on termination (AMP terminal 60908-1 or equivalent)
Materials and Finishes		
Housing:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Square Post:	Phosphor bronze, gold plated	Phosphor bronze, gold plated

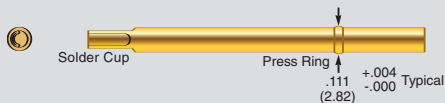
Spring Force in oz. (grams)		
Spring Type	Preload	2/3 Travel
Standard as shown	2.2 (62)	4.8 (136)
Alternate -1	3.2 (90)	6.9 (196)
Ultra High inquire	6.7 (190)	11.8 (335) (SPA only)

To order, add dash number to Model Number.
 Optional spring forces and materials are available.

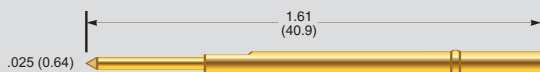
SPR-4W



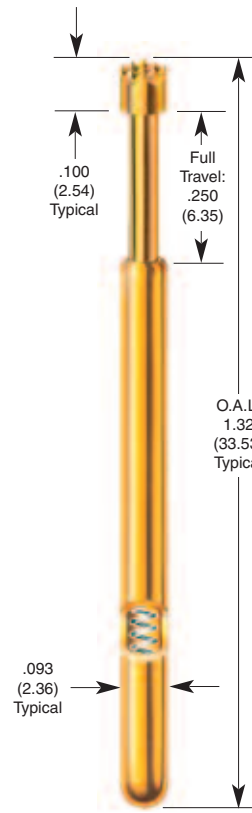
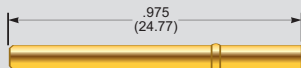
SPR-4W-1



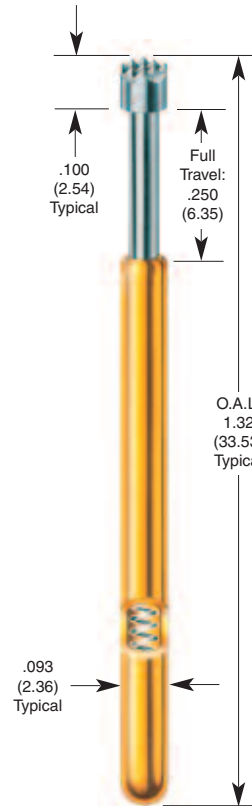
SPR-4W-2



SPR-4Y

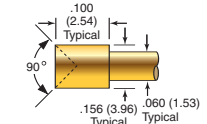


EPA-4

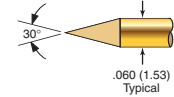


SPA-4

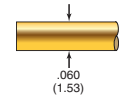
**EPA-4A
 SPA-4A**



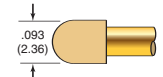
**EPA-4B
 SPA-4B**



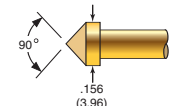
**EPA-4C
 SPA-4C**



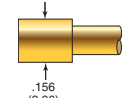
**EPA-4D
 SPA-4D**



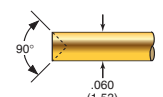
**EPA-4E
 SPA-4E**



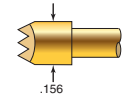
**EPA-4F
 SPA-4F**



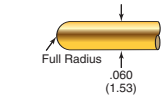
**EPA-4G
 SPA-4G**



**EPA-4H
 SPA-4H**



**EPA-4J
 SPA-4J**



General Purpose Probes



Actual Size

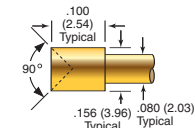
Other applications:

Dimensions in inches (millimeters)

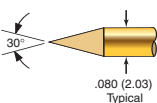
Note: EPA tips shown for reference.

TO ORDER, CALL 909-625-9390

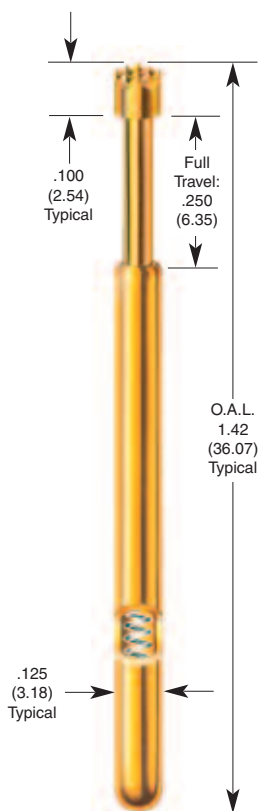
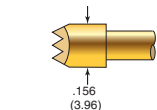
EPA-5A SPA-5A



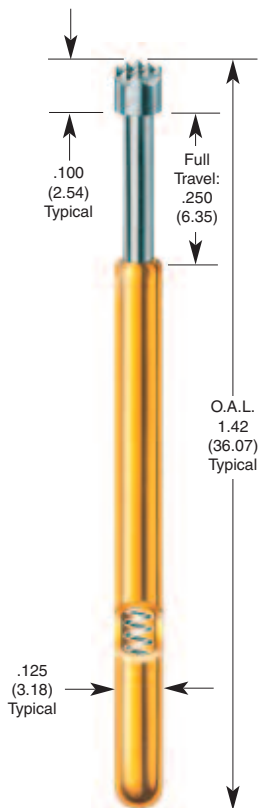
EPA-5B SPA-5B



EPA-5H SPA-5H



EPA-5



SPA-5

Probe Specifications EPA-5 SPA-5

Mechanical	EPA-5	SPA-5
Full Travel:	.250 (6.35)	.250 (6.35)
Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Mechanical Life Exceeds:	2 x 10 ⁶ cycles	2 x 10 ⁶ cycles

Operating Temperature	EPA-5	SPA-5
Light spring:	-55°C to +85°C	-55°C to +85°C
Standard spring:	-55°C to +150°C	-55°C to +150°C
Ultra High spring:	-55°C to +105°C	-55°C to +105°C
Consult factory for other temperature requirements, and applications below -40° C.		

Electrical (Static Conditions)	EPA-5	SPA-5
Current Rating:	8 amps	8 amps
Maximum continuous current, non-inductive at working travel		

Average Probe Resistance	EPA-5	SPA-5
	50 mΩ	50 mΩ

Materials and Finishes	EPA-5	SPA-5
Plunger:	Heat-treated beryllium copper, gold plated over hard nickel	Heat-treated beryllium copper, rhodium plated over hard nickel
Barrel:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Spring:		
Low:	Beryllium copper, silver plated	Beryllium copper, silver plated
Standard:	Stainless steel, silver plated	Stainless steel, silver plated
Ultra High:	Music wire, silver plated	Music wire, silver plated
Ball:	Brass, gold plated	Brass, gold plated

Receptacle Specifications

Mounting Hole Size:	EPA-5	SPA-5
	.141/.143 (3.58/3.63)	.141/.143 (3.58/3.63)
A 3.6 mm drill is most commonly used.		

Recommended Wire Gauge:	EPA-5	SPA-5
	22-26 AWG	22-26 AWG

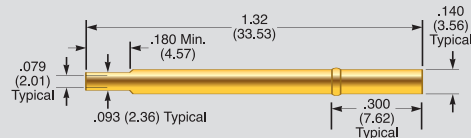
Connections:	EPA-5	SPA-5
	SPR-5W Crimp or push-on termination (AMP terminal 42827-2 or equivalent) SPR-5W-1 Solder cup	SPR-5W Crimp or push-on termination (AMP terminal 42827-2 or equivalent) SPR-5W-1 Solder cup

Materials and Finishes	EPA-5	SPA-5
	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel

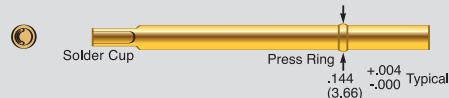
Spring Force in oz. (grams)

Spring Type	Preload	2/3 Travel
To order, add dash number to Model Number.		
Light	inquire 1.96 (56)	3.5 (99) (SPA only)
Standard	as shown 6.13 (174)	16.0 (454)
Ultra High	inquire 12.90 (366)	48.0 (1360) (SPA only)
Optional spring forces and materials are available.		

SPR-5W



SPR-5W-1



General Purpose Probes



Actual Size



Tools

Crimp Pliers

ECT crimping pliers make receptacle crimping fast and easy. The standard ratchet-action jaws are individually fitted and inspected to ensure quick insertion and removal of the receptacle.

The tool features an internal high-tension coil spring for fatigue-free operation and a lifetime of dependable service. Vinyl cushion grips ensure a firm grip with minimum applied pressure. Instructions are provided.

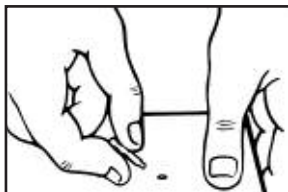
The 900 series crimp plier requires a corresponding crimp locator (DCL) in order to function properly. Example: To order a plier to crimp a SPR-1W, specify a 900 plier and a DCL-1 crimp locator. If you already have the 900 plier, order only the DCL for the specific receptacle series you require.

Insertion/Extraction Tools

Made from the highest quality stainless steel, these durable, corrosion-resistant tools are guaranteed to provide years of service. They are engineered to minimum size for easy control and to fit comfortably in your hand for ease of use.

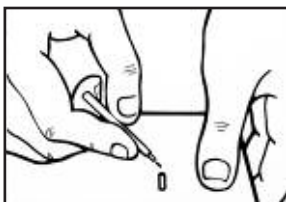
For receptacle installation, choose the RIT or ART tool that matches the receptacle (Table 2 and Table 3) and follow the Insertion Instructions below. The press ring keeps the receptacle in place, so no glue is required. The spring probe can then be inserted into the receptacle to complete the installation.

The height of the probe can be changed by mounting the receptacle at different heights. For more information on receptacles, refer to the technical section of this catalog.

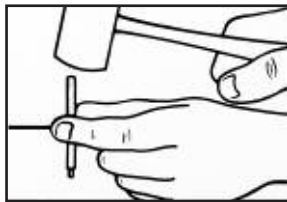


Quick Reference Insertion Instructions

1. Insert receptacle into the drill hole.



2. Insert tip of RIT tool into the top of the receptacle and, with slight hand pressure, seat the receptacle into the drill hole until resistance is met.



3. Tap the top of the tool with a small plastic hammer until the receptacle is seated at the proper height. The press ring keeps the receptacle in place.

Pogo® Handling Instructions

Special care should be used when handling some small diameter probes such as the POGO-72. Their long length makes them more susceptible to bending than their 100 mil counterparts. It is recommended that the plunger not be deflected unless it is in its mating receptacle, which should be installed in a probe plate. If deflection is required prior to insertion into the mating receptacle, please follow these guidelines to reduce the possibility of damage.

- Hold the top of the probe barrel firmly between the forefinger and thumb of one hand.
- Using the forefinger of the opposite hand (or a wooden dowel if it is a pointed tip), deflect the plunger the required distance.

Consult factory for lead time and price on all tools.

Pliers

Plier No.	DCL-Locator No.	Receptacle
900	DCL-0	SPR-0W
900	DCL-1	SPR-1W
900	DCL-2	SPR-2W
900	DCL-3	SPR-3W
900	DCL-20	MEP-20*
900	DCL-25	SPR-25W
900	DCL-30	HPR-30W
900	DCL-40	HPR-40W, T
900	DCL-62	HPR-62W, WD
900	DCL-72	HPR-72W

* The MEP-20 is a microprobe with no receptacle.



Plier No. 900 and DCL Locator

Receptacle Insertion Tools

Model No.	Tool Mounting Height	Used On
ARIT-1/1M	Flush to .220"	SPR-1W/LTR-1W
ARIT-25/25M	Flush to .220"	SPR-2W/SPR-25W/SPR-64W
ART-62	Flush to .285"	HPR-62W
ART-72	Flush to .220"	HPR-72W
RIT-0-0	Flush	SPR-0W
RIT-3-0	Flush	SPR-3W
RIT-3-220	.220"	SPR-3W
RIT-30-0	Flush	HPR-30W
RIT-4-0	Flush	SPR-4W
RIT-40-0	Flush	HPR-40W
RIT-5-0	Flush	SPR-5W
RIT-64-005	.005"	SPR-64W
RIT-74-005	.005"	EPR-74W-2
RIT-BMP	Flush	BMR-1/BMR-2
RIT-80-0	Flush	STT-80W

Extraction Tools

Model No.	Used On
EXT-BMP	BMR-1/BMR-2
TET-1	LCT Series Terminals

Probe Insertion Tools

Model No.	Used On
PIT-0	SPA-0/HPA-0/HPA-50
PIT-20	MEP-20
PIE-25*	POGO-25/LTP-25

*PIE-25 can also be used as an extraction tool on the 25 series probes

FASTITE® Insertion Tool

Model No.	Used On
FIT-1	HPR-72W-4 SPR-0W-4



Probe Insertion/Extraction Tool (PIE)
Receptacle Insertion Tool (ARIT-25)
Receptacle Insertion Tool (RIT)
FASTITE® Insertion Tool (FIT)
Adjustable Receptacle Insertion Tool (ART)



CORRECT



INCORRECT



TOOLS



Tools, continued

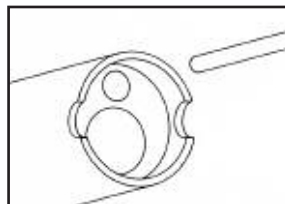
Table 4 — Wire turns per MIL-STD-1130B

Wire Size	Diameter	Minimum Number of Turns	
		Class A (Modified)	Class B (Standard)
30	.010 (0.25)	7 stripped turns plus 1/2 insulated	7 stripped turns
28	.0126 (0.32)	7 stripped turns plus 1/2 insulated	7 stripped turns
26	.0159 (0.40)	6 stripped turns plus 1/2 Insulated	6 stripped turns
24	.0201 (0.51)	5 stripped turns plus 1/2 insulated	5 stripped turns
22	.0253 (0.64)	5 stripped turns plus 1/2 insulated	5 stripped turns

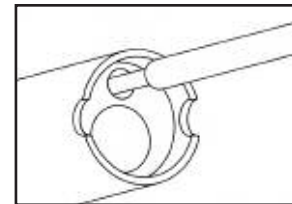
Note: This information is for .025" x .025" wrap post. While 22 AWG is often used, MIL-STD-1130B does not recommend it for this size post.

Wire Wrapping Tips

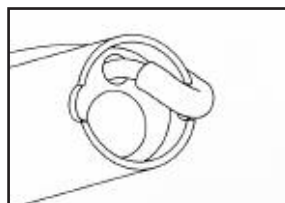
A wire-wrapped termination is made by coiling the wire around the sharp corners of a .025 inch square receptacle post. By bending the wire around the sharp corner, the oxide layer of both surfaces is broken, revealing an oxide-free surface. This provides clean metal-to-metal contact between the wire and the post. The minimum number of turns is based on wire gauge and the type of wrap. A standard wrap coils only the bare wire around the post. A modified wrap coils the wire and a portion of the insulation. The modified wrap increases the ability to withstand vibration.



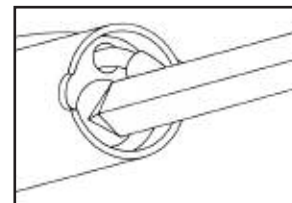
1. Pre-stripped wire, bit and sleeve



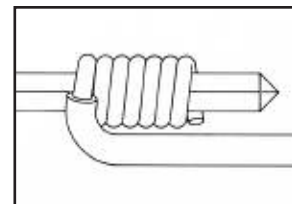
2. Insert wire.



3. Secure wire.

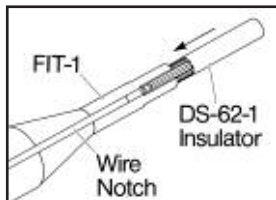


4. Insert terminal, actuate wrapping gun.

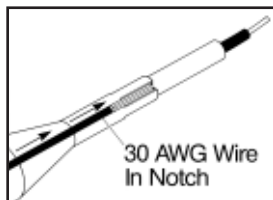


5. Completed termination.

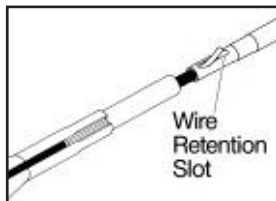
FASTITE® Insertion Instructions



1. Insert insulator, knurled end first into tip of FIT tool.



2. Insert prestripped wire into notch on FIT tool and slide until it protrudes approximately 1/8 inch from insulator.



3. Hold wire firmly against tool with forefinger. Insert protruding wire into termination end of W-4 receptacle. Release grasp on wire and push insulator onto end of receptacle, completing termination.



4. Complete termination.

Pogo® Maintenance

Generally, Pogo cleaning is not recommended. However, in some cases the spring probe performance in relationship to electrical conductivity can be improved if the spring probe tips are cleaned of any contaminants. Contaminants can form an insulation barrier on the probe tip, thus reducing contact integrity.

One of the more widely used methods for cleaning spring contact probes involves the use of brushes to clean the probe heads without probe removal from the test fixture. This technique allows for more frequent maintenance resulting in improved fixture reliability. After brushing contaminants free from the probes, the fixture should be vacuumed to insure no remaining particles create future problems.

Another cleaning method involves removal of probes from the test fixture, bundling them together, and submerging only the probe tips in a shallow pan of safe solution such as alcohol or citric cleaner for five minutes. After soaking, the probe tips can be scrubbed with a soft bristle brush to remove any residue still remaining, then rinsed and dried. The probes can then be installed back into the test fixture. We caution the reader that this cleaning method should be attempted only as a last resort, as cleaning fluids and solvents can wash contaminants into the probes as well as the fixture.

For more information on probe maintenance, contact our professional sales staff.



MPB-01 Brass bristle brush (4 1/2" x 2 1/2")

MPB-03 Nylon brush (6 1/4")

MPB-02 Four row brass brush (3 1/4" x 1 1/4")



ECT Test Fixture Headquarters

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