

# **Pogo® Contacts**



Loaded PCB Test

Bare PCB Test

Wire Harness

**Test System Interface** 

High Current/High Frequency

Semiconductor Pogos

**Battery/Portable Application** 

**General Purpose** 



Order your ECT Test Probes from ROMEX B.V.

Remmerden 5

3911 TZ Rhenen, The Netherlands,

Phone: +31-(0)317-389787, Fax: +31-(0)317-389780, E-mail: info@romex.nl. WWW.ROMEX.NL.

## **Probe Quick Reference**

BMP-1		
BMP-2	BIP-1/2/356	LFRE-7219
BTM-050/075/100         .54         MEP 30         .26           CCCA003/004         .57         MEP-20         .25           CP-059-013         .58         MEP-22         .24           CSP-03G-003         .49         MEPI-22BD         .24           CSP1-1,27         .52         MSP-25C         .37           CSP4         .51         MSP-3C/5C         .37           CSP5-18/5-20/5-22         .51         P4301-1F Pylon®         .45           CSP8-15/8-20/8-25         .52         POGO-1         .10-11           DER-050/075/100         .16         POGO-25         .12-13           EPA-2         .32         POGO-25HM         .41           EPA-3         .60         POGO-25T         .41           EPA-4         .61         POGO-25T         .41           EPA-4         .61         POGO-25T         .9           EPA-4         .61         POGO-25T         .9           EPA-5         .62         RMP-22         .24           GPP-95-2         .42         SCP-080         .53           GSP-2B         .40         SCP-100         .53           HCP-13/14/15         .44         SCP-101         .53	BMP-117	LTP-1
CCA-003/004         57         MEP-20         25           CP-059-013         58         MEP-22         24           CSP-03G-003         49         MEPJ-22BD         24           CSP1-1.27         52         MSP-25C         .37           CSP4         51         MSP-3C/5C         .37           CSP5-18/5-20/5-22         51         P4301-1F Pylon®         .45           CSP8-15/8-20/8-25         52         POGO-1         .10-11           DER-050/075/100         16         POGO-25         .12-13           EPA-2         32         POGO-25HM         .41           EPA-3         60         POGO-25T         .41           EPA-4         61         POGO-72         .9           EPA-4         61         POGO-72         .9           EPA-5         62         RMP-22         .24           GPP-95-2         42         SCP-080         .53           GSP-2B         40         SCP-100         .53           HCP-13/14/15         44         SCP-127         .53           HCP-25         44         SIP-90         .42           HPA-40         28         SPA-0         .28           HPA	BMP-217	LTP-25
CP-059-013         58         MEP-22         24           CSP-03G-003         49         MEPJ-22BD         24           CSP1.1.27         52         MSP-25C         .37           CSP4         51         MSP-3C/5C         .37           CSP5.18/5-20/5-22         51         P4301-1F Pylon®         .45           CSP8.15/8-20/8-25         52         POGO-1         .10-11           DER-050/075/100         16         POGO-25         .12-13           EPA-2         32         POGO-25HM         .41           EPA-3         60         POGO-25T         .41           EPA-4         61         POGO-72         .9           EPA-5         62         RMP-22         .24           GPP-95-2         42         SCP-080         .53           GSP-2B         40         SCP-100         .53           HCP-13/14/15         44         SCP-127         .53           HCP-25         44         SIP-90         .42           HPA-0         .28         SPA-0         .28           HPA-1         .30         SPA-1         .30           HPA-40         .26         SPA-2         .32           HPA-64<	BTM-050/075/100	MEP 30
CSP-03G-003       49       MEPJ-22BD       24         CSP1-1.27       52       MSP-25C       .37         CSP4       51       MSP-3C/5C       .37         CSP5-18/5-20/5-22       51       P4301-1F Pylon®       .45         CSP8-15/8-20/8-25       52       POGO-1       .10-11         DER-050/075/100       16       POGO-25       .12-13         EPA-2       32       POGO-25HM       .41         EPA-3       60       POGO-25T       .41         EPA-4       61       POGO-72       .9         EPA-4       61       POGO-72       .9         EPA-5       62       RMP-22       .24         GPP-95-2       42       SCP-080       .53         GSP-2B       40       SCP-100       .53         HCP-13/14/15       44       SCP-127       .53         HCP-25       44       SIP-90       .42         HPA-0       28       SPA-0       .28         HPA-1       30       SPA-1       .30         HPA-50       27       SPA-3       .60         HPA-52       29       SPA-4       .61         HPA-64       31       SPA-5	CCA-003/00457	MEP-20
CSP1-1.27     52     MSP-25C     .37       CSP4     51     MSP-3C/5C     .37       CSP5-18/5-20/5-22     .51     P4301.1F Pylon®     .45       CSP8-15/8-20/8-25     .52     POGO-1     .10-11       DER-050/075/100     .16     POGO-25     .12-13       EPA-2     .32     POGO-25HM     .41       EPA-3     .60     POGO-25T     .41       EPA-4     .61     POGO-72     .9       EPA-5     .62     RMP-22     .24       GPP-95-2     .42     SCP-080     .53       GSP-2B     .40     SCP-100     .53       HCP-13/14/15     .44     SCP-127     .53       HCP-25     .44     SIP-90     .42       HPA-0     .28     SPA-0     .28       HPA-1     .30     SPA-1     .30       HPA-50     .27     SPA-3     .60       HPA-52     .29     SPA-4     .61       HPA-64     .31     SPA-5     .62       HPA-74     .33     SPA-64     .31       K-50L-QG     .47     SPL-01L-039     .47       K-50L-QG     .47     SPL-03C-090     .36       K50L-QG-75     .46     SPL-25J-289     .36	CP-059-013	MEP-22
CSP4       51       MSP-3C/5C       .37         CSP5-18/5-20/5-22       51       P4301-1F Pylon®       .45         CSP8-15/8-20/8-25       52       POGO-1       .10-11         DER-050/075/100       16       POGO-25       .12-13         EPA-2       32       POGO-25HM       .41         EPA-3       60       POGO-25T       .41         EPA-4       61       POGO-72       .9         EPA-5       62       RMP-22       .24         GPP-95-2       42       SCP-080       .53         GSP-2B       40       SCP-100       .53         HCP-13/14/15       44       SCP-127       .53         HCP-13/14/15       44       SCP-127       .53         HCP-25       44       SIP-90       .42         HPA-0       .28       SPA-0       .28         HPA-1       .30       SPA-1       .30         HPA-3       .20       SPA-2       .32         HPA-50       .27       SPA-3       .60         HPA-52       .29       SPA-4       .61         HPA-74       .33       SPA-64       .31         K-50H-S       .48       SPL-01H-	CSP-03G-00349	MEPJ-22BD
CSP5-18/5-20/5-22       .51       P4301-1F Pylon®       .45         CSP8-15/8-20/8-25       .52       POGO-1       .10-11         DER-050/075/100       .16       POGO-25       .12-13         EPA-2       .32       POGO-25HM       .41         EPA-3       .60       POGO-25T       .41         EPA-4       .61       POGO-72       .9         EPA-5       .62       RMP-22       .24         GPP-95-2       .42       SCP-080       .53         GSP-2B       .40       SCP-100       .53         HCP-13/14/15       .44       SCP-127       .53         HCP-25       .44       SIP-90       .42         HPA-0       .28       SPA-0       .28         HPA-1       .30       SPA-1       .30         HPA-40       .26       SPA-2       .32         HPA-55       .27       SPA-3       .60         HPA-52       .29       SPA-4       .61         HPA-64       .31       SPA-5       .62         HPA-74       .33       SPA-64       .31         K-50L-Q       .47       SPL-01L-039       .47         K-50L-QG       .47	CSP1-1.27	MSP-25C
CSP8-15/8-20/8-25       .52       POGO-1       10-11         DER-050/075/100       .16       POGO-25       .12-13         EPA-2       .32       POGO-25HM       .41         EPA-3       .60       POGO-25T       .41         EPA-4       .61       POGO-72       .9         EPA-5       .62       RMP-22       .24         GPP-95-2       .42       SCP-080       .53         GSP-2B       .40       SCP-100       .53         HCP-13/14/15       .44       SCP-127       .53         HCP-25       .44       SIP-90       .42         HPA-0       .28       SPA-0       .28         HPA-1       .30       SPA-1       .30         HPA-40       .26       SPA-2       .32         HPA-50       .27       SPA-3       .60         HPA-52       .29       SPA-4       .61         HPA-74       .33       SPA-64       .31         K-50H-S       .48       SPL-01L-039       .47         K-50L-QG       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-52       .37         LFRE-1       .20       Tools </td <td>CSP451</td> <td>MSP-3C/5C</td>	CSP451	MSP-3C/5C
DER-050/075/100       .16       POGO-25       .12-13         EPA-2       .32       POGO-25HM       .41         EPA-3       .60       POGO-25T       .41         EPA-4       .61       POGO-72       .9         EPA-5       .62       RMP-22       .24         GPP-95-2       .42       SCP-080       .53         GSP-2B       .40       SCP-100       .53         HCP-13/14/15       .44       SCP-127       .53         HCP-13/14/15       .44       SCP-100       .28         HPA-0       .28       SPA-0       .28         HPA-1       .30       SPA-1       .30         HPA-2       .29       SPA-2       .32         HPA-5	CSP5-18/5-20/5-22	P4301-1F Pylon®
EPA-2       32       POGO-25HM       41         EPA-3       60       POGO-25T       41         EPA-4       61       POGO-72       9         EPA-5       62       RMP-22       24         GPP-95-2       42       SCP-080       53         GSP-2B       40       SCP-100       53         HCP-13/14/15       44       SCP-127       53         HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64	CSP8-15/8-20/8-25	POGO-1
EPA-3       60       POGO-25T       41         EPA-4       61       POGO-72       9         EPA-5       62       RMP-22       24         GPP-95-2       42       SCP-080       53         GSP-2B       40       SCP-100       53         HCP-13/14/15       44       SCP-127       53         HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-50       27       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SPL-25J-289       36         K50L-QG-75R       46       SPC-5C       37	DER-050/075/100	POGO-25
EPA-4       .61       POGO-72       .9         EPA-5       .62       RMP-22       .24         GPP-95-2       .42       SCP-080       .53         GSP-2B       .40       SCP-100       .53         HCP-13/14/15       .44       SCP-127       .53         HCP-25       .44       SIP-90       .42         HPA-0       .28       SPA-0       .28         HPA-1       .30       SPA-1       .30         HPA-40       .26       SPA-2       .32         HPA-50       .27       SPA-3       .60         HPA-50       .27       SPA-3       .60         HPA-64       .31       SPA-5       .62         HPA-74       .33       SPA-64       .31         K-50H-S       .48       SPL-01H-116       .48         K-50L       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SPL-25J-289       .36         K50L-QG-75R       .46	EPA-2	POGO-25HM
EPA-5       62       RMP-22       24         GPP-95-2       42       SCP-080       53         GSP-2B       40       SCP-100       53         HCP-13/14/15       44       SCP-127       53         HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SPS-5C       37         LFRE-1       20       Tools       63-64	EPA-3	POGO-25T
GPP-95-2       42       SCP-080       53         GSP-2B       40       SCP-100       53         HCP-13/14/15       44       SCP-127       53         HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64	EPA-4	POGO-729
GSP-2B       40       SCP-100       53         HCP-13/14/15       44       SCP-127       53         HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L-QG       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SPL-25J-289       36         K50L-QG-75R       46       SPL-25J-289       36         K50L-QG-75R       46       SPC-5C       37         LFRE-1       20       Tools       63-64	EPA-5	RMP-22
HCP-13/14/15       44       SCP-127       53         HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SP-5C       37         LFRE-1       20       Tools       63-64	GPP-95-2	SCP-08053
HCP-13/14/15       .44       SCP-127       .53         HCP-25       .44       SIP-90       .42         HPA-0       .28       SPA-0       .28         HPA-1       .30       SPA-1       .30         HPA-40       .26       SPA-2       .32         HPA-50       .27       SPA-3       .60         HPA-52       .29       SPA-4       .61         HPA-64       .31       SPA-5       .62         HPA-74       .33       SPA-64       .31         K-50H-S       .48       SPL-01H-116       .48         K-50L       .47       SPL-01L-039       .47         K-50L-QG       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	GSP-2B	SCP-10053
HCP-25       44       SIP-90       42         HPA-0       28       SPA-0       28         HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L-Q       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64		SCP-12753
HPA-1       30       SPA-1       30         HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64		SIP-90
HPA-40       26       SPA-2       32         HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64	HPA-0	SPA-0
HPA-50       27       SPA-3       60         HPA-52       29       SPA-4       61         HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64	HPA-1	SPA-1
HPA-52       29       SPA-4       .61         HPA-64       .31       SPA-5       .62         HPA-74       .33       SPA-64       .31         K-50H-S       .48       SPL-01H-116       .48         K-50L       .47       SPL-01L-039       .47         K-50L-QG       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	HPA-40	SPA-2
HPA-64       31       SPA-5       62         HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64	HPA-50	SPA-3
HPA-74       33       SPA-64       31         K-50H-S       48       SPL-01H-116       48         K-50L       47       SPL-01L-039       47         K-50L-QG       47       SPL-03C-090       36         K50L-QG-75       46       SPL-25J-289       36         K50L-QG-75R       46       SSP-5C       37         LFRE-1       20       Tools       63-64	HPA-52	SPA-4
K-50H-S       .48       SPL-01H-116       .48         K-50L       .47       SPL-01L-039       .47         K-50L-QG       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	HPA-64	SPA-5
K-50L       .47       SPL-01L-039       .47         K-50L-QG       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	HPA-74	SPA-64
K-50L-QG       .47       SPL-03C-090       .36         K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	K-50H-S	SPL-01H-116
K50L-QG-75       .46       SPL-25J-289       .36         K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	K-50L	SPL-01L-039
K50L-QG-75R .46 SSP-5C .37 LFRE-1 .20 Tools .63-64	K-50L-QG	SPL-03C-090
K50L-QG-75R       .46       SSP-5C       .37         LFRE-1       .20       Tools       .63-64	K50L-OG-75	SPL-25J-289
LFRE-1	K50L-QG-75R	SSP-5C
	LFRE-1	Tools
	LFRE-25	

#### **How to Order**

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

 $\begin{array}{c|c} POGO-25 & UN & -8-S \\ \hline probe \\ model & \hline \\ tip \\ style & \hline \\ spring \\ \hline \\ steel \\ \hline \end{array}$ 

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

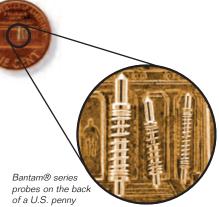


Technologies, invents the first snap-out spring probe that becomes the industry standard. Now fast-forward to 2007. After more than

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.



# Ball forces plunger into continuous contact with barrel wall. PogoPlus probe shown at 3.5x magnification

#### **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.

#### 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.

#### **Table of Contents**

#### 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:

o	Loaded PCB Test Probes
	Bare PCB Test Probes
	Wire Harness Probes
	Test System Interface Products
1	High Current/High Frequency Probes
•	Semiconductor Pogos
⊕⊖	Battery/Portable Application Probes
6	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

FASTITE®, HPA-GOLD®, Biasing Ball®, Cyclo-Solder® MicroSharp®, MiniMite®, Pogo®, PogoPlus®, P3®, Trident®, Superkit®, and On-Target® are trademarks of Everett Charles Technologies. All information contained in this document is furnished for the sole purpose of identifying and suggesting the nature of the product involved and does not warrant the nature or quality of the product. ©1998 Everett Charles Technologies, Pomona, CA. All international rights preserved. Everett Charles Technologies products are covered by U.S. and foreign patents and/or pat. pend. Patent Numbers 343,802; 4,461,993; 4,720,725; D343802; 5416428; 5557(21); 574,977; 5641,315; 5801,544; 29/065/622; D395,016; D4911; D422,230; 6,396,293 and pat. pend. Specifications subject to change without notice. Consult Everett Charles Technologies for latest design changes. Dimensions in inches (millimeters). Teradyne, GenBad, Hewlett-Packard, Megatest, Schlumberger, Zehntel and Factron are trademarks or registered trademarks of their respective companies.



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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.

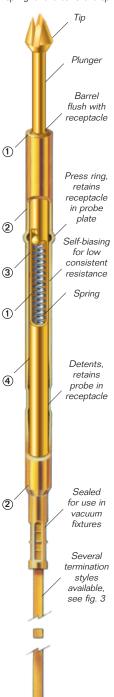
ECT probes are self-biasing, resulting in maximum metal-to-metal contact force between components at critical contact junctions.

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.

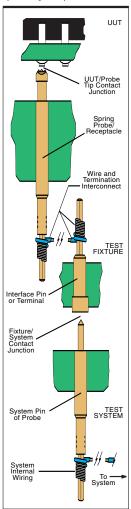


Figure 3
Receptacle Styles

Receptacles also available preterminated for easier installation.

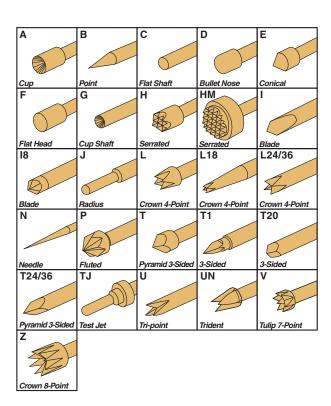


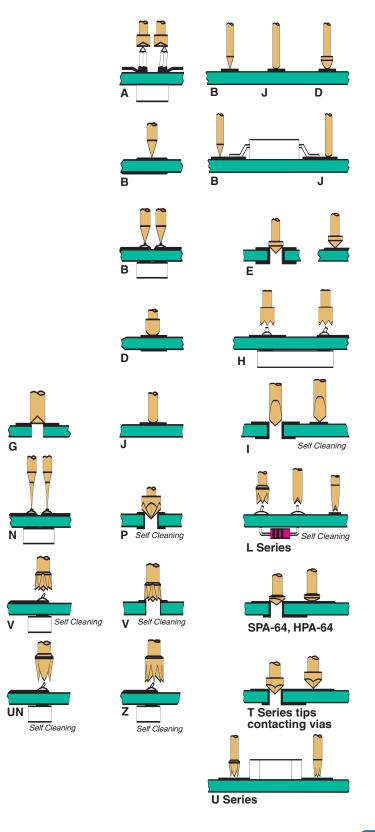
## **Tip Selection**

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.







## **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:



			_
probe	tip	spring	steel
Imodel	style	force	

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

.003

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<sup>®</sup> is also designed to be the world's most durable probe with features like optional stainless-steel MicroSharp<sup>™</sup> 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

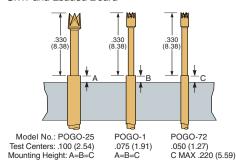
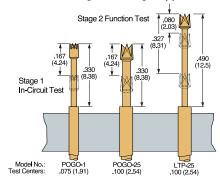


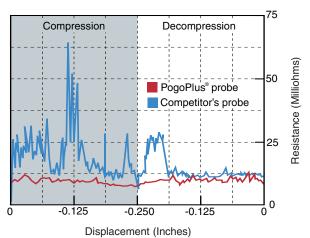
Illustration above shows 50, 75 and 100 mil probes installed in the same fixture. This is accomplished by determining the mounting height of the 100 mil probe and using the appropriate mounting height formula to establish the mounting height of the other probes. In the example, the 100 mil probe is mounted .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

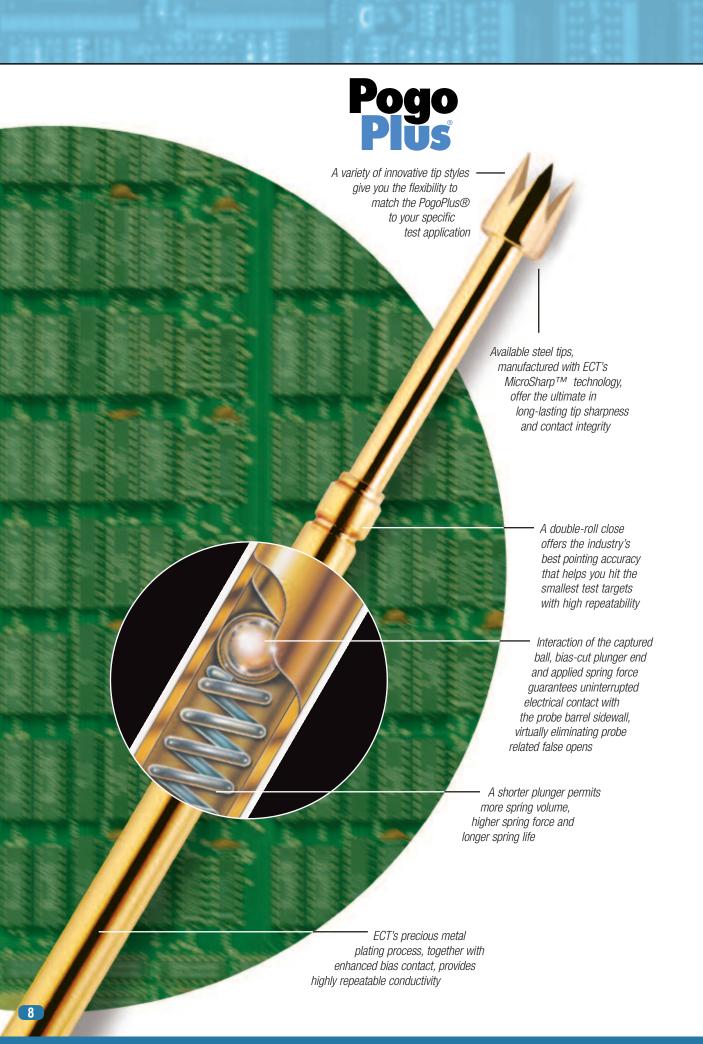


For dual-stage testing, component lead length should not exceed .050 inch.

# 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.

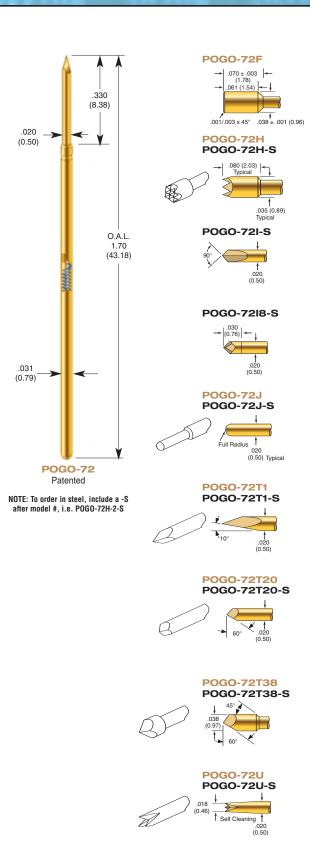


Probe Specifications	POGO-72	POGO-72 Steel
Mechanical Full Travel: Recommended Working Travel Mechanical Life Exceeds:		.250 (6.35) .167 (4.24) 1 x 10 <sup>s</sup> cycles
Operating Temperature Consult factory for other temper	-55°C to +105°C rature requirements, and applications b	-55°C to +105°C elow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, n	3 amps on-inductive at working travel	3 amps
Average Probe Resistance	15 mΩ	15 mΩ
Materials and Finishes Plunger: Barrel:	Heat-treated beryllium copper, gold-plated over hard nickel Work-hardened beryllium copper,	Heat-treated tool steel, gold-plated over hard nickel Work-hardened beryllium copper,
Spring: Ball:	HPA-GOLD™ plated (I.D. and O.D.) over hard nickel Music wire Stainless steel	HPA-GOLD™ plated (I.D. and O.D.) over hard nickel Music wire Stainless steel
Receptacle Specificat	ions	

Receptacle Specificat	tions	
Mounting Hole Size: A #61 drill is most commonly u	.039 (0.99) sed.	.039 (0.99)
Recommended Wire Gauge:	28-30 AWG	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.	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,	Work-hardened beryllium copper,

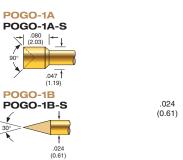
	HPA-Gold <sup>™</sup> plated (I.D. and O.D.) over hard nickel.	HPA-Gold <sup>™</sup> plated (I.D. and <sup>†</sup> O.D.) over hard nickel.
<b>Spring Force in oz. (g</b> Spring Type	rams) Preload	2/3 Travel
To order, add dash number to Light -2 Standard -4 Alternate -6 Elevated -7 High -8 Ultra High -10 Optional spring forces and materia	0.35 (10) 1.05 (30) 2.63 (75) 2.05 (58) 1.48 (42) 3.32 (94) Is are available.	2.0 (57) 4.0 (113) 6.0 (170) 7.0 (198) 8.0 (227) 10.0 (283) 1.57 39.88)
HPR-72W-1	© Solder Cup	Press Ring
HPR-72W-4 ☑ (Show	wn with DS-62-1 install	(0.97)

(8.89)

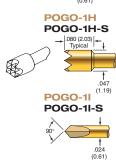














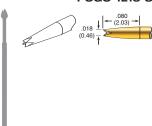












Actual Size





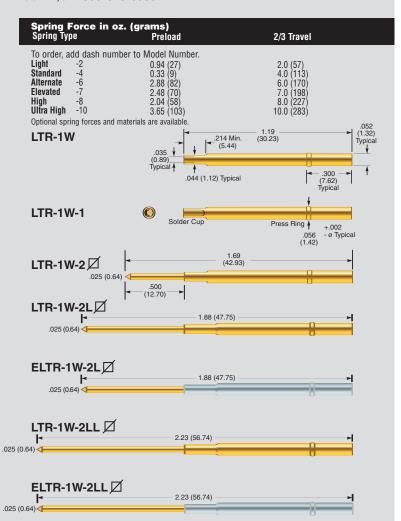
NOTE: To order in steel, include a -S after model #, i.e. POGO-1H-2-S

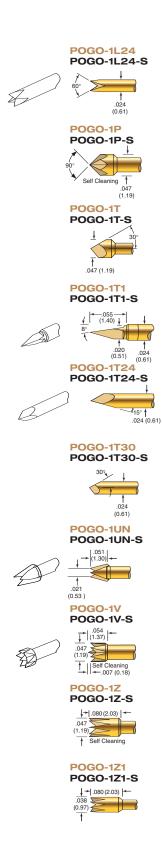
Probe Specifications	POGO-1	POGO-1 Steel
Mechanical Full Travel: Recommended Working Travel Mechanical Life Exceeds:	.250 (6.35) : .167 (4.24) 1 x 10 <sup>6</sup> cycles	.250 (6.35) .167 (4.24) 1 x 10 <sup>5</sup> cycles
Operating Temperature Consult factory for other temper	-55°C to +105°C ature requirements, and applications b	-55°C to +105°C pelow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, n	6 amps on-inductive at working travel	6 amps
Average Probe Resistance	10 mΩ	10 mΩ
Materials and Finishes Plunger:	Heat-treated beryllium copper, gold-plated over hard nickel	Heat-treated tool steel,
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: Ball:	Music wire Stainless steel	Music wire Stainless steel
Receptacle Specificat	ions	
Mounting Hole Size:	.053/.055 (1.35/1.40)	.053/.055 (1.35/1.40)
Recommended Wire Gauge:	24-28 AWG	24-28 AWG

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 <sup>-4</sup> 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 <sup>-4</sup> CFM @ 15 psi
Materials and Finishes		

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

Work-hardened nickel silver, gold plated over hard nickel Phosphor bronze, gold plated







# POGO-25A POGO-25A-S



#### **POGO-25B**



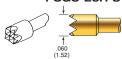
#### **POGO-25C**



#### POGO-25FL-S



#### POGO-25H POGO-25H-S



#### POGO-25HM



#### **POGO-25I**



#### POGO-2518-S



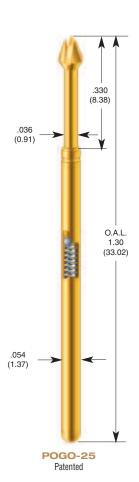
#### POGO-25135-S



#### POGO-25J POGO-25J-S







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

#### POGO-25L



Probe Specifications	POGO-25	POGO-25 Steel
Mechanical Full Travel: Recommended Working Travel Mechanical Life Exceeds:		.250 (6.35) .167 (4.24) 1 x 10 <sup>6</sup> cycles
	-55°C to +105°C rature requirements, and applications b	-55°C to +105°C elow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, n	8 amps on-inductive at working travel	8 amps
Average Probe Resistance	8 mΩ	8 mΩ
Materials and Finishes		
Plunger:	Heat-treated beryllium copper,	Heat-treated tool steel,
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and
Spring: Ball:	Music wire Stainless steel	Music wire Stainless steel
Mechanical Life Exceeds:  Operating Temperature Consult factory for other temper  Electrical (Static Conditions) Current Rating: Maximum continuous current, n  Average Probe Resistance  Materials and Finishes Plunger: Barrel:  Spring:	1 x 10s cycles  -55°C to +105°C rature requirements, and applications b  8 amps on-inductive at working travel  8 mΩ  Heat-treated beryllium copper, gold-plated over hard nickel Work-hardened phosphor bronze, HPA-GOLD° plated (I.D. and O.D.) over hard nickel Music wire	1 x 10s cycles  -55°C to +105°C elow -40° C.  8 amps  8 mΩ  Heat-treated tool steel, gold-plated over hard nickel Work-hardened phosphor bronze, HPA-GOLD* plated (I.D. and O.D.) over hard nickel Music wire

#### **Receptacle Specifications**

Mounting Hole Size: A #51 or 1.75 mm drill is most of	.067/.069 (1.7/1.75) commonly used.	.067/.069 (1.7/1.75)
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 <sup>-4</sup> CFM @ 15 psi SPR-25W-3 Connector pin/round post

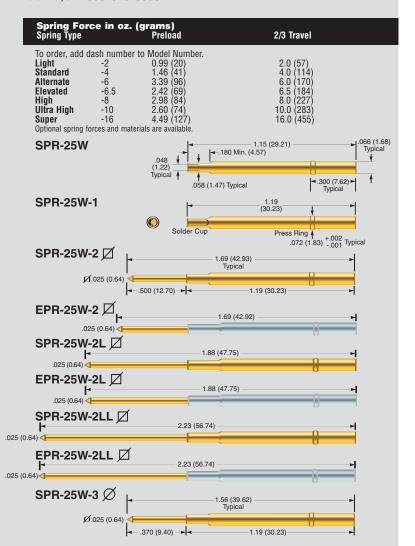
## Materials and Finishes Housing:

Round Post: Square Post:

Work-hardened nickel silver, gold plated over hard nickel Phosphor bronze, gold plated Phosphor bronze, gold plated

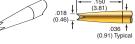
Work-hardened nickel silver, gold plated over hard nickel Phosphor bronze, gold plated Phosphor bronze, gold plated

Actual Size



#### POGO-25L18 POGO-25L18-S























POGO-25UN







Mechanical

Probe Specifications LTP-1

Electrical (Static Conditions) Current Rating:

Average Probe Resistance

**Receptacle Specifications** 

**Materials and Finishes** 

Plunger:

Barrel:

Spring: Ball:

Connections:

**Mounting Hole Size:** 

Recommended Wire Gauge:

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

6 amps

10 m $\Omega$ 

Music wire Stainless steel

24-28 AWG

.053/.055 (1.35/1.40)

Heat-treated beryllium copper, gold-plated over hard nickel

Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel

Maximum continuous current, non-inductive at working travel

#### TO ORDER, CALL 909-625-9390



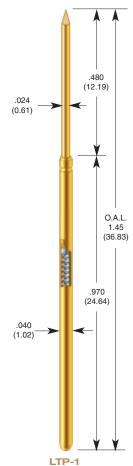




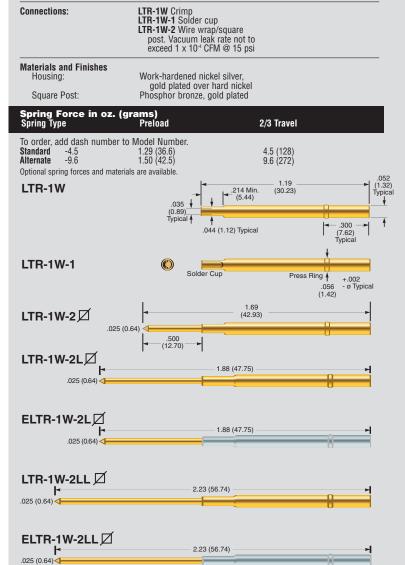




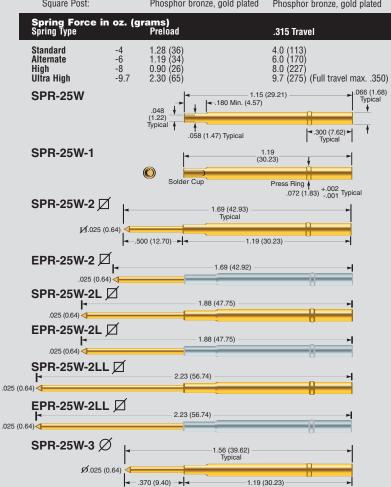


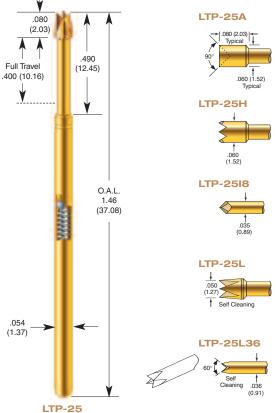






Probe Specifications	LTP-25	LTP-25 TJ
<b>Mechanical</b> Full Travel: Recommended Working Travel	.400 (10.16) :315 (8.0)	.340 (8.6) .315 (8.00)
Operating Temperature Consult factory for other temper	-55°C to +105°C ature requirements, and applications be	-55°C to +105°C elow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, n	8 amps on-inductive at working travel	8 amps
Average Probe Resistance	8 mΩ	8 mΩ
Materials and Finishes Plunger: Barrel:	Heat-treated beryllium copper, gold-plated over hard nickel Work-hardened phosphor bronze, HPA-GOLD <sup>TM</sup> plated (I.D. and	Heat-treated beryllium copper, gold-plated over hard nickel Work-hardened phosphor bronz HPA-GOLD™ plated (I.D. and
Spring: Ball:	O.D.) over hard nickel Music wire Stainless steel	O.D.) over hard nickèl Music wire Stainless steel
Receptacle Specificat	ions	
Mounting Hole Size: A #51 or 1.75 mm drill is most of	.067/.069 (1.70/1.75) commonly used.	.067/.069 (1.70/1.75)
Recommended Wire Gauge:	22-26 AWG	22-26 AWG
Recommended Wire Gauge: Connections:	22-26 AWG  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 <sup>4</sup> CFM @ 15 psi SPR-25W-3 Connector pin/round post	22-26 AWG  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 <sup>-4</sup> 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 <sup>4</sup> CFM @ 15 psi SPR-25W-3 Connector	SPR-25W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-25W-1 Solder cup SPR-25W-2 Wire wrap/squarr post. Vacuum leak rate not to exceed 1 x 10 <sup>4</sup> CFM @ 15 psi SPR-25W-3 Connector





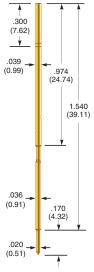


#### LTP-25T36











# .300 (7.62) .052 (1.32) .984 (24.99) 1.540 (39.11) .036 (0.91) .020 (0.51)

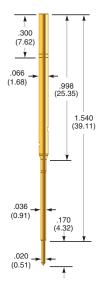
**DER-075** 



**DER-050** 







**DER-100** 

Receptacle Specifications	DER-050	DER-075	DER-100
Mechanical Recommended Mounting Centers: Full Travel: Recommended Travel: Test Height: Spring Force in oz. (grams): Overall Length: Recommended Mounting Hole Size:	.050 (1.27)	.075 (1.91)	.100 (2.54)
	.160 (4.06)	.160 (4.06)	.160 (4.06)
	.130 (3.30)	.130 (3.30)	.130 (3.30)
	1.586 (40.28)	1.586 (40.28)	1.586 (40.28)
	3.5 (99)	3.5 (99)	3.5 (99)
	1.7.10 (43.43)	1.710 (43.43)	1.710 (43.43)
	.037/.038 (.94/.97)	.053/.055 (1.35/1.40)	.067/.069 (1.70/1.75)
Materials and Finishes			
Plunger:	Beryllium copper alloy,	Beryllium copper alloy,	Beryllium copper alloy,
Barrel:	hard gold over nickel	hard gold over nickel	hard gold over nickel
	Beryllium copper alloy,	Beryllium copper alloy,	Beryllium copper alloy,
	hard gold over nickel	hard gold over nickel	hard gold over nickel
Spring:	Steel alloy,	Steel alloy,	Steel alloy,
	hard gold over nickel	hard gold over nickel	hard gold over nickel
Receptacle:	Beryllium copper alloy,	Nickel silver alloy,	Nickel silver alloy,
	hard gold over nickel	hard gold over nickel	hard gold over nickel
Fixture Probes (Ordered Separately)	Pogo-62	Pogo-1	Pogo-25/LTP-25
	(see below)	(see page 10-11)	(see pages 12, 13, 15)

		, , , , , , , , , , , , , , , , , , , ,
Probe Specifications	P0G0-62	POGO-62 Steel
Mechanical Full Travel: Recommended Working Travel: Mechanical Life:	.250 (6.35) .167 (4.24) 500,000 cycles	.250 (6.35) .167 (4.24) 500,000 cycles
3 - 1	-55°C to +105°C re requirements, and applications belo	-55°C to +105°C w -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, non-	3 amps inductive at working travel	3 amps
Average Probe Resistance	15 mΩ	15 mΩ
Materials and Finishes Plunger:	Heat-treated beryllium copper, hard gold over nickel	Heat-treated tool steel, hard gold over nickel
Barrel: Spring: Ball:	Work-hardened beryllium copper, hard gold over nickel Music wire Stainless steel	Work-hardened beryllium copper, hard gold over nickel Music wire Stainless steel

Spring Force in Spring Type	oz. (gran	n <b>s)</b> Preload	2/3 Travel
Light Standard Alternate	-2 -4 -6	.48 (14) 1.02 (29) .66 (19)	2.0 (57) 4.0 (113) 6.0 (170)
POGO-62			
,		1.300 ±.010 (33.02)	.330 (8.38)

## 0.020 (0.50) 0.031 (0.78)

#### **Tip Styles** FP T1 (Steel Only) 0.020 (0.50) 0.020 (0.50) 0.020 (0.50) 0.035 (0.89) T20

0.038 (0.97)

0.020 (0.50)

0.020 (0.50)

#### 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

Probe Specifications	BMP-1	BMP-2
Mechanical Full Marker Tip Travel: Recommended Working Travel: Direction of Rotation: Scribed Diameter:	.062 (1.57) .050 (1.27) CCW .050 (1.27)	.062 (1.57) .050 (1.27) CCW .050 (1.27)
Electrical (Operating Condition Current Rating: Voltage Rating: Recommended Duty Cycle:	s) 50 mA 15VDC 1 sec. On (min.), 5 sec. Off	50 mA 15VDC 1 sec. On (min.), 5 sec. Off
Materials and Finishes Plunger Tip: Receptacle:	Carbide Stainless steel	Carbide Stainless steel
Mounting Hole Size:	.468/.469 (11.89/11.91)	.468/.469 (11.89/11.91)

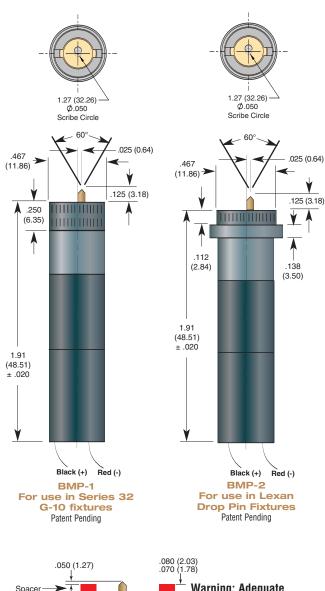
#### To Order

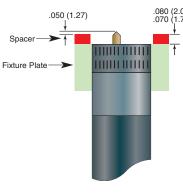
Specify model number of components or tools you require:
BMP-1, -2: Probe and receptacle, wires and connector attached, mating connector supplied,
(-red, + black).
BMR-1, -2: Receptacle only.
BMT-1: Tip replacement assembly for both BMP-1 and BMP-2.
RIT-BMP: Receptacle insertion tool for BMR-1.
FXT-RMP: Receptacle extraction tool for RMR-1.

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



BMP-1 marker probe with receptacle.





Warning: Adequate thickness spacers MUST be used to limit board travel as shown. Failure to use proper spacers will allow probe to bottom out, stalling the motor and permanently damaging the marker probe.

# 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.

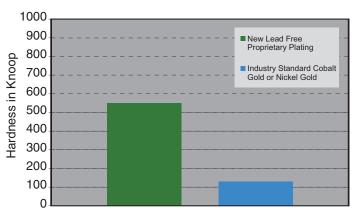
#### Pointing Accuracy

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

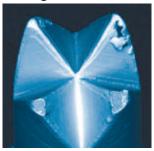
The industry standard for plated POGO pins is Gold electroplate alloyed either with cobalt of nickel to enhance its hardness. Hardness is increased from 90 Knoop for 99.7% pure electroplated gold to 130 to 200 Knoop when alloyed with nickel or cobalt. ECT's new Proprietary Lead Free plating is significantly 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

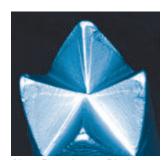


Minimum Hardness

#### **Plating Wear**

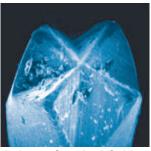


Industry Standard Gold

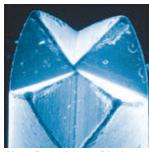


New Proprietary Plating

#### **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 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.

#### LFRE-72 Probe Specifications

Mechanical

**Test Center** .050 (1.27)

> Full Travel: .250 (6.35) Recommended Working Travel: .167 (4.24) Mechanical Life Exceeds:

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 $15~\text{m}\Omega$

**Materials and Finishes** 

High performance alloy, LFRE proprietary plating Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and Plunger: Barrel:

O.D.) over hard nickel Spring: Music wire, nickel plated Stainless steel

#### **Receptacle Specifications**

Mounting Hole Size: A #61 drill is most commonly used.

Recommended Wire Gauge:

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 = 0.19 (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 HPR-72W Crimp (To order factory for price/delivery on additional quantities.

**Materials and Finishes** 

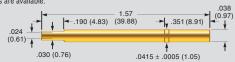
Work-hardened beryllium copper, HPA-Gold™ plated (I.D. and O.D.) over hard nickel.

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

To order, add dash number to Model Number. 2.63 (75) 2.05 (58) 3.18 (90) 6.0 (170) 7.0 (198) 8.0 (227) Elevated High -8 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

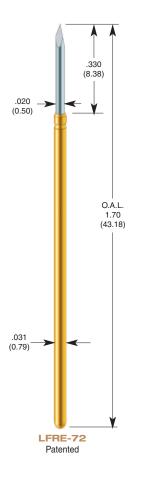


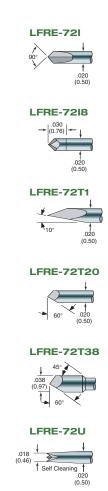
HPR-72W-1



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













## LFRE-118



#### LFRE-1I35



#### LFRE-1L18

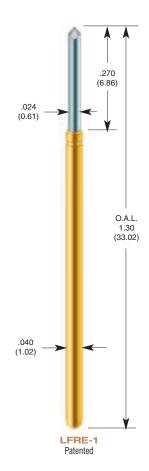


#### LFRE-1T24



#### LFRE-1Z1





**Probe Specifications** LFRE-1

Mechanical

Full Travel: .250 (6.35) Recommended Working Travel: .167 (4.24) Mechanical Life Exceeds: 5 x 10<sup>s</sup> cycl

-55°C to +105°C

 $\begin{array}{ccc} \textbf{Operating Temperature} & -55^{\circ}\text{C to } +105^{\circ}\text{C} \\ \textbf{Consult factory for other temperature requirements, and applications below } -40^{\circ}\text{ C}. \end{array}$ 

**Electrical** (Static Conditions) Current Rating:

6 amps

Maximum continuous current, non-inductive at working travel

**Average Probe Resistance** 10 m $\Omega$ 

**Materials and Finishes** 

High performance alloy, LFRE proprietary plating Work-hardened phosphor bronze, HPA-GOLD" plated (I.D. and O.D.) over hard nickel Plunger: Barrel:

Spring: Ball: Music wire, nickel plated Stainless steel

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

**Recommended Wire Gauge:** 24-28 AWG

**Receptacle Specifications** 

**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<sup>4</sup> CFM @ 15 psi

**Materials and Finishes** 

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

## **Spring Force in oz. (grams)**Spring Type Preload

#### 2/3 Travel

To order, add dash number to Model Number. 2.88 (82) 2.59 (73) 3.24 (92) 4.04 (115) 6.0 (170) 7.0 (198) 8.0 (227) 10.0 (283) Alternate Elevated -6 -7 Ultra High\* -10 \* May observe slight decrease in cycle life

Optional spring forces and materials are available



LTR-1W-1

.025 (0.64)

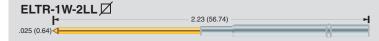


.056 (1.42) LTR-1W-2 .025 (0.64) .500 (12.70) LTR-1W-2L

1.88 (47.75)

ELTR-1W-2L 1.88 (47.75) .025 (0.64)





Actual Size



#### Probe Specifications LFRE-25 Mechanical Full Travel: .250 (6.35) Recommended Working Travel: .167 (4.24) Mechanical Life Exceeds: **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 $8~\text{m}\Omega$

**Materials and Finishes** 

Round Post:

.025 (0.64)

SPR-25W-3 ∅

Ø.025 (0.64)

.370 (9.40)

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

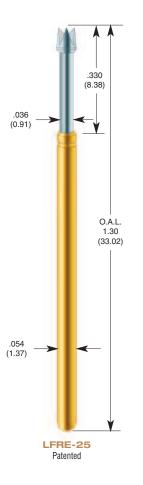
Spring: Stainless steel

#### **Receptacle Specifications** Mounting Hole Size: .067/.069 (1.7/1.75) Recommended Wire Gauge: 22-26 AWG 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<sup>-4</sup> CFM @ 15 psi **Connections:** 15 psi SPR-25W-3 Connector pin/round post Materials and Finishes

#### Work-hardened nickel silver, gold plated over hard nickel Phosphor bronze, gold plated Phosphor bronze, gold plated Square Post: **Spring Force in oz. (grams)** Spring Type Preload 2/3 Travel To order, add dash number to Model Number. | Color and cash fluther to Notice Nation | Color and Co 6.5 (184) 8.0 (227) 10.0 (283) 12.0 (340) .066 (1.68) SPR-25W 1.15 -.180 Min. (4.57) **≺**.300 (7.62)**≻** .058 (1.47) Typical SPR-25W-1 1.19 (30.23) Solder Cup .072 (1.83) +.002 -.001 Typical SPR-25W-2 ☑ 1.69 (42.93) <--.500 (12.70) → 1.19 (30.23) EPR-25W-2 Z .025 (0.64) SPR-25W-2L 1.88 (47.75) 1.88 (47.75) 2.23 (56.74) .025 (0.64) EPR-25W-2LL 🗹

1.56 (39.62) Typical

1.19 (30.23)





#### LFRE-25I



#### LFRE-2518



#### LFRE-25135



#### LFRE-25L



#### LFRE-25L18



#### LFRE-25T



#### LFRE-25T1



#### LFRE-25T36



#### LFRE-25Z1







Actual Size



## **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	<b>Y</b>	24
MEP-20		25
HPA-40/MEP-30		26
HPA-50		27
HPA-0/SPA-0		28
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:



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

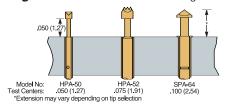
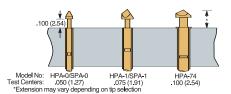
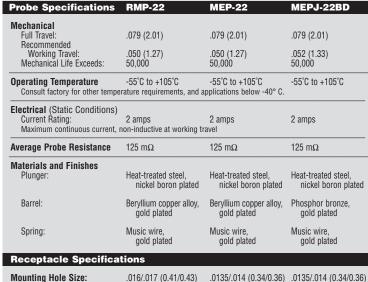


Figure 2 Bare Board – .100" Plunger Travel





.0135/.014 (0.34/0.36) .01 .020 (0.51) .02 Test Centers

33 AWG

Crimp

.0135/.014 (0.34/0.36 .020 (0.51) Test Centers

Double-ended probe

Recommended Wire Gauge: 33 AWG

Connections:

RMR-22W Crimp RMR-22W-30 Crimp with 30" of 33 AWG wire attacked

with 30" of 33 AWG wire attached RMR-22W-32 Crimp with 32" of 33 AWG wire attached RMR-22F Crimp,

**Materials and Finishes** 

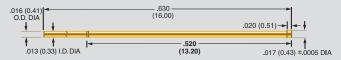
Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel

flush mounted

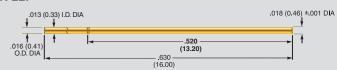
ım Gold plated, Gold plated, Phosphor bronze Phosphor bronze

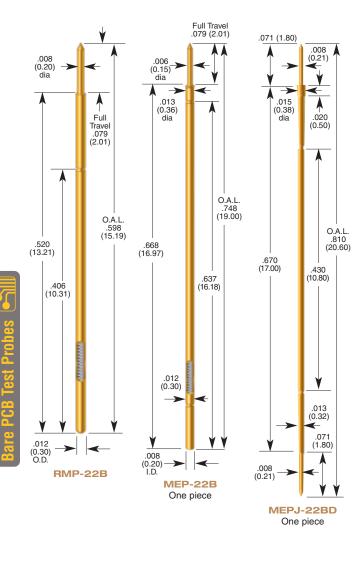
Spring Force in oz. (grams)				
Spring Type	Preload	Recommended Travel in. (mm.)	Force oz. (grams)	
RMP-22 MEP-22 MEP.I-22RD	.51 (14) .51 (14) .38 (11)	.05 (1.27) .05 (1.27) .052 (1.27)	1.50 (43) 1.50 (43) 1.69 (48)	

#### RMR-22W



#### RMR-22F





Actual Size

.010 (0.25)

#### MEP-20 Probe Specifications

Mechanical

Full Travel: Recommended .075 (1.91) 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: 2 amps
Maximum continuous current, non-inductive at working travel

Average Probe Resistance

**Materials and Finishes** 

Barrel:

Heat-treated beryllium Plunger:

copper, gold plated over hard nickel Heat-treated beryllium copper, HPA-GOLD" plated (I.D. and

O.D.) over hard Spring nickél Music wire,

silver plated

#### **Receptacle Specifications**

.0205/.0215 (0.52/0.55) .025 (0.635) Test Mounting Hole Size:

Centers A #75 or 0.52 mm drill is most commonly used.

Recommended Wire Gauge: 30 AWG

Connections:

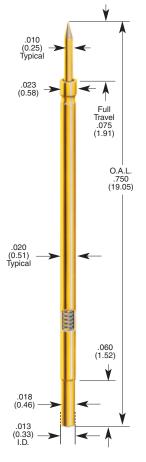
Crimp (To order with 30 inches of 30 AWG wire attached, add -30 to model number) Shrink tubing is recommended on alternating receptacles. Order Model No. ST -20

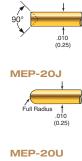
NOTE: The top of the MEP-20 barrel is flared, enabling it to be "press-fit" directly into the probe plate, eliminating the need for a receptacle or epoxy. This "press fit" feature also permits the MEP-20 to be installed in a variety of probe plate thicknesses and to be replaced easily. Recommended Probe 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)	



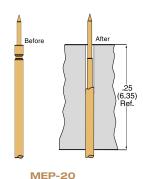


MEP-20B

MEP-20G







#### Application Notes for MEP-20

Typical Installation

- 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.

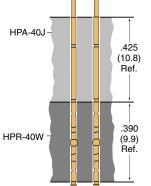












HPR-40T

**HPA-40** 

(Wire not

included)

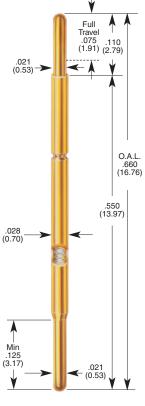




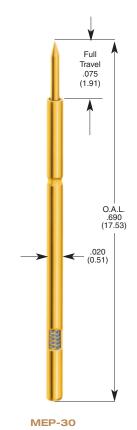
MEP-30J

**MEP-30U** 

Actual Size



**HPA-40** 



Probe Specifications	HPA-40	MEP-30
Mechanical Full Travel: Recommended Working Travel: Mechanical Life Exceeds:	.075 (1.91) : .050 (1.27) 1 x 10° cycles	.075 (1.91) .050 (1.27) 1 x 10° cycles
Operating Temperature Consult factory for other temperature	-55°C to +150°C ature requirements, and applications I	-55°C to +105°C below -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, no	2 amps on-inductive at working travel	2 amps
Average Probe Resistance	35 mΩ	50 mΩ
Materials and Finishes Plunger: Barrel:	Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver, HPA-GOLD™ plated (I.D. and	Heat-treated beryllium copper, gold plated over hard nickel Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and
Spring:	O.D.) over hard nickel Stainless steel, silver plated	O.D.) over hard nickel Music wire, silver plated

Receptac	le Speci	fications
----------	----------	-----------

lounting Hole Size:	.0285/.0295 (0.72/0.75)
·	A #69 or 0.75 mm drill is most
	aammanly uaad

.0265/.0276 (0.67/0.70) A 0.70 mm drill is most commonly used. commonly used.

30 AWG

2/3 Travel

1.75 (49) 1.39 (39)

Recommended Wire Gauge: 28-30 AWG

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

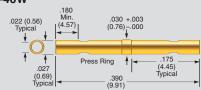
Heat-treated beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel

## **Spring Force in oz. (grams)** Spring Type Preload

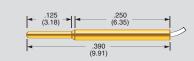
HPA-40 MEP-30 .79 (22) .39 (11) as shown as shown Optional spring forces and materials are available.

#### HPR-40W

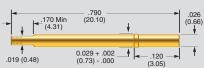
**Connections:** 



#### HPR-40T



#### HPR-30W



#### Probe Specifications HPA-50

#### Mechanical

Full Travel: .050 (1.27) Recommended Working Travel: .050 (1.27) Mechanical Life Exceeds:

#### 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**

 $35~\text{m}\Omega$ 

#### **Materials and Finishes**

Plunger: Barrel:

Heat-treated beryllium copper, gold plated over hard nickel
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.

#### **Connections:**

Recommended Wire Gauge: 28-30 AWG 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.

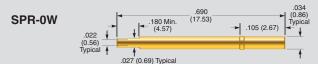
The HPA-50 may be used to test bare PCBs on mixed test centers with the SPA-64 and HPA-52 probes, see pages 31 and 29.

## Spring Force in oz. (grams)

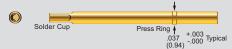
Spring Type	Preioau		Full Irav
Standard	1.55 (44)	as shown	3.2 (91)

attached

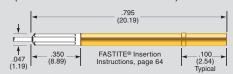
Optional spring forces and materials are available.

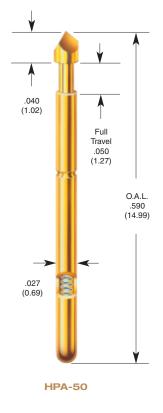


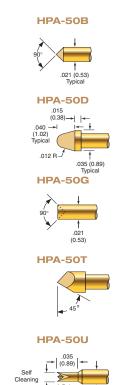
#### SPR-0W-1



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

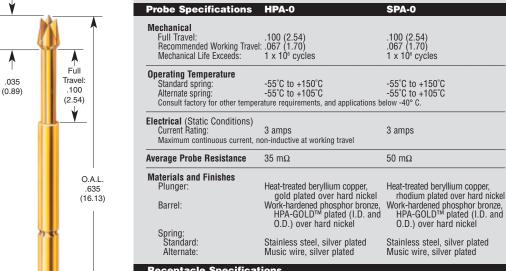






.018 (0.46) Typical





#### **Receptacle Specifications**

**Materials and Finishes** 

Mounting Hole Size: A #64 or 0.92 mm drill is most	.035/.0365 (0.89/0.93) commonly used.	.035/.0365 (0.89/0.93)
Recommended Wire Gauge:	28-30 AWG	28-30 AWG
Connections:	SPR-OW Crimp (To order with	SPR-OW 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), termination (30 AWG only), maximum insulation diameter .019 (0.48), wire strip length = .125 (3.2)
DS-62-1 Insulation sleeve (use with SPR-OW-4)
FWA-1-30 30 AWG wire with DS-62-1 insulation sleeve attached

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 attached

attached Work-hardened nickel silver, Work-hardened nickel silver, gold plated over hard nickel

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-0 and SPA-0 may be used to test bare PCBs on mixed test centers with the HPA-1 and HPA-74

<b>Spring Force in oz. (grams)</b> Spring Type Preload	2/3 Travel
To order, add dash number to Model Number.  Standard as shown .61 (17)  Alternate -1 .78 (22)  Optional spring forces and materials are available.	2.8 (79) 3.7 (105)
SPR-0W .022 (0.56) Typical (4.57) (4.57) (4.57)	.034 (0.86) Typical
SPR-0W-1  Solder Cup  SPR-0W-4 (Shown with DS-62-1 insta	ress Ring 1 +.003 (0.94) +.003 Typical
795 (20.19) (20.19)  FASTITE® Insert (8.89) Instructions, page	ion100

# **HPA-OA** SPA-OA .035 (0.89) Typical

#### **HPA-0B**





.021 (0.53)







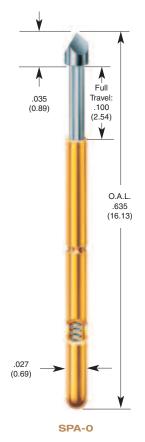
# **HPA-OH** SPA-OH

.035 (0.89) (0.53)









HPA-0

027

(0.69)

Actual

Size

#### HPA-52 Probe Specifications

#### Mechanical

Full Travel: .075 (1.91) Recommended Working Travel: .075 (1.91) Mechanical Life Exceeds: .250 x 10° cycles

## **Electrical** (Static Conditions) Current Rating:

3 amps

Maximum continuous current, non-inductive at working travel

#### Average Probe Resistance $15~\text{m}\Omega$

#### **Materials and Finishes**

Plunger:

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

Spring:

Barrel:

Stainless steel, silver plated

#### **Receptacle Specifications**

.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 x 10° CFM @ 15 psi

#### **Materials and Finishes**

Square Post:

Work-hardened nickel silver, gold plated over hard nickel Phosphorous bronze, gold plated

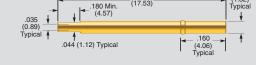
## Spring Force in oz. (grams) Spring Type Preload

To order, add dash number to Model Number. **Standard** as shown 1.68 (48)

as shown 1.68 (48) 2.54 (72) 3.22 (91) 6.2 (176)

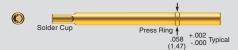
Optional spring forces and materials are available

## SPR-1W

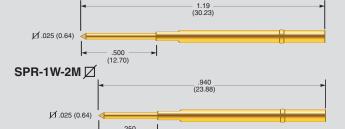


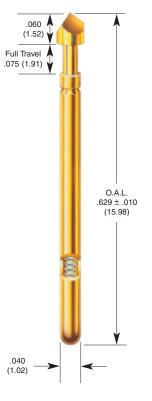
3/4 Travel

#### **SPR-1W-1**



#### 





HPA-52B



HPA-52D



HPA-52T



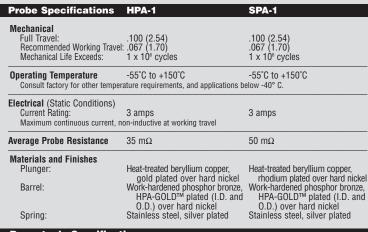
**HPA-52** 



**Materials and Finishes** 

Housing:

#### TO ORDER, CALL 909-625-9390

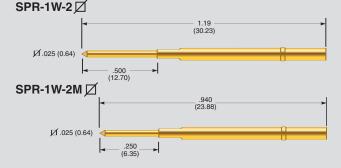


Receptacle Specifications		
Mounting Hole Size: A #54 or 1.4 mm drill is most co	.053/.055 (1.35/1.40) ommonly used.	.053/.055 (1.35/1.40)
Recommended Wire Gauge:	24-28 AWG	24-28 AWG
Connections:	SPR-1W Crimp SPR-1W-1 Solder cup SPR-1W-2/SPR-1W-2M Wire wrap/square post. Vacuum leak rate not to exceed 1 x 10 <sup>4</sup> 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 <sup>4</sup> CFM @ 15 psi

Work-hardened nickel silver, gold plated over hard nickel Phosphorous bronze, gold plated Phosphorous bronze, gold plated Phosphorous bronze, gold plated Square Post: 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 Prelo 2/3 Travel Preload To order, add dash number to Model Number. **Standard** as shown 1.1 (31) Standard as shown 1.1 (31) Alternate -1 1.3 (37) Optional spring forces and materials are available 2.5 (71) 4.5 (128) SPR-1W .052 (1.32) .180 Min. Typical





# HPA-1A SPA-1A .060 | (1.52) | Typical .060 (1.52) HPA-1B SPA-1B









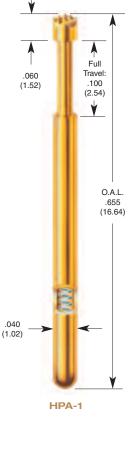


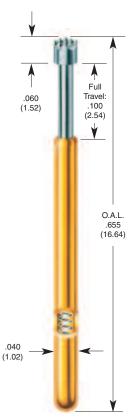












SPA-1

## **HPA-64** SPA-64

#### TO ORDER, CALL 909-625-9390

Probe Specifications	HPA-64	SPA-64
Mechanical Full Travel: Recommended Working Travel:	.050 (1.27) :.050 (1.27)	.050 (1.27) .050 (1.27) 1 x 10 <sup>6</sup> cycles
	-55°C to +150°C ature requirements, and applications belo	-55°C to +150°C w -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, no	3 amps on-inductive at working travel	3 amps
Average Probe Resistance	50 mΩ	50 mΩ
Materials and Finishes Plunger: Barrel:	Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver	Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver
Spring:	gold plated over hard nickel Stainless steel, silver plated	Stainless steel, silver plated

Receptacle Specifications		
Mounting Hole Size: A #51 or 1.75 mm drill is most	.067/.069 (1.7/1.75) commonly used.	.067/.069 (1.7/1.75)
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 Contact HPA/SPA-64-1	ed up to .073 (1.85)	up to .073 (1.85)

ole Diameters to be Co	ntacted	
HPA/SPA-64-1	up to .073 (1.85)	up to .073 (1.85)
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.

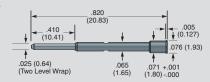
Spring Fo Spring Type	orce in oz. (grams) Preload	Full Travel
<b>Standard</b> Optional spring	as shown 1.1 (31) forces and materials are available.	3.85 (109)

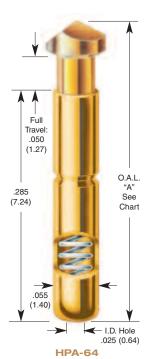
#### Recommended Test Centers

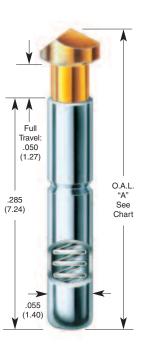
HPA/SPA-64-1, -2, -3, -4, -8, -9, -10 HPA/SPA-64-7 .100 (2.54) .187 (4.75)

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)

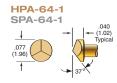
#### SPR-64W-2 Z

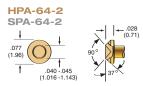


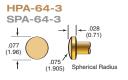




**SPA-64** 

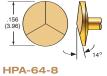




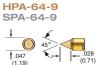












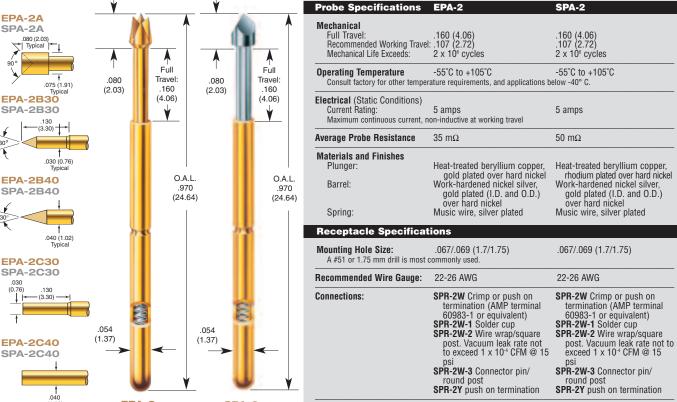


31

Work-hardened nickel silver.

gold plated over hard nickel Phosphor bronze, gold plated

Phosphor bronze, gold plated



**Materials and Finishes** 

Housing:

Round Post:

Square Post:

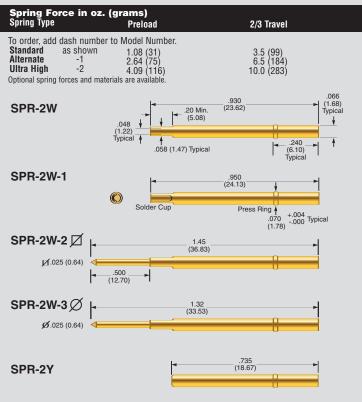
PE Series: Dimensionally identical to EPA-2. The PE Series replaceable probe has a slight bulge at the end of the barrel and is designed for use in receptacles lacking detents. To order, write the letter "P" after the model number. Example: EPA-2P, EPA-2AP-1.

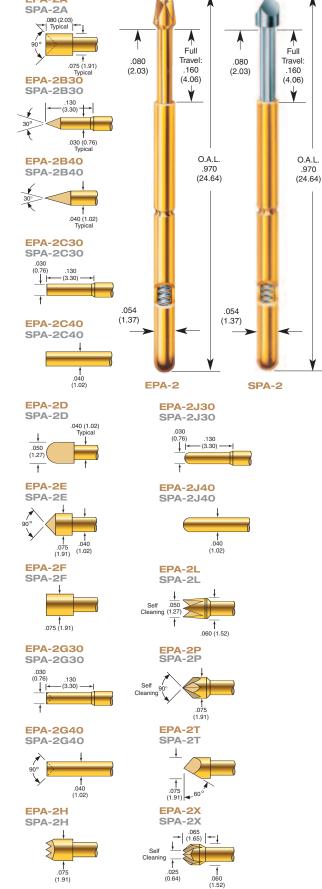
Work-hardened nickel silver.

Phosphor bronze, gold plated

Phosphor bronze, gold plated

gold plated over hard nickel





Dimensions in inches (millimeters)

Actual

Size

#### Probe Specifications HPA-74

#### Mechanical

Full Travel: .100 (2.54) Recommended Working Travel: .075 (1.91) Full Travel: Mechanical Life Exceeds: 2 x 10° cycles

Operating Temperature Standard Spring: 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 $35~\text{m}\Omega$

#### **Materials and Finishes**

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

Stainless steel, silver plated Music wire, silver plated Spring: Alt Spring:

#### Receptacle Specifications

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

**Recommended Wire Gauge:** 26-30 AWG

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

**Materials and Finishes** Nickel silver alloy

#### Hole Diameters to be Contacted

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

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 Prelo Preload 3/4 Travel

To order, add dash number to Model Number. Standard as shown 1.71 (48) 2.82 (80) 3.0 (85) 5.0 (141)

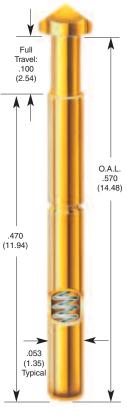
Optional spring forces and materials are available.

#### **Recommended Test Centers**

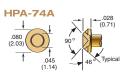
HPA-74A, B, C, E, T65, T75, T80 HPA-74T135 HPA-74T156

#### **EPR-74W-2 Ø**

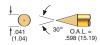




**HPA-74** 



#### **HPA-74B**



#### **HPA-74C**

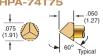


#### **HPA-74E**

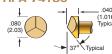


#### **HPA-74T65**

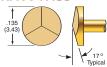




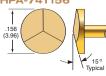
#### HPA-74T80



#### HPA-74T135



#### HPA-74T156





Order your ECT Test Probes from ROMEX B.V. via Phone: +31-(0)317-389787, Fax: +31-(0)317-389780 or E-mail: info@romex.nl.



## **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

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

O.A.L. 1.53 (38.86)

.058 (1.47) O.D.

SPL-03C-090

.030 inside (0.76)

.098 + .004 dia. - .000 Press ring dia. (2.48 + 0.10 - 0.00)

.093 (2.36)

as shown

.233 Travel

1.16 (33)

TO ORDER, CALL 909-625-9390

#### **Probe Specifications** SPL-03C-090 SPL-25J-289 One-piece design, no receptacle required Mechanical Full Travel: Recommended Working Travel: .220 (5.59) .220 (5.59) .233 (5.92) .233 (5.92) .050 (1.27) dia. outside Mechanical Life Exceeds: 1 x 10° cycles 1 x 10° cycles Operating Temperature -55°C to +105°C -55°C to +105°C Consult factory for other temperature requirements, and applications below -40° C. .041 (1.04) dia. 350 **Electrical** (Static Conditions) Current Rating: .330 (8.38) (8.89) .040 (1.02) 5 amps 5 amps Average Probe Resistance $50~\text{m}\Omega$ $50~\text{m}\Omega$ .072 + .002 dia. - .002 (1.83 + 0.05 - 0.00) Press ring dia **Materials and Finishes** .300 (7.62) Beryllium copper, gold plated Nickel silver, gold plated Music wire, silver plated Stainless steel, gold plated Beryllium copper, gold plated Nickel silver, gold plated Music wire, silver plated Brass, gold plated Plunger: Barrel: .300 (7.62) Spring Force in oz. (grams) Spring Type Preload .220 Travel SPL-03C-090 SPL-255-289 .77 (22) .25 (7) 2.30 (65)

O.A.L. 1.50 (38.10)

.058

(1.47) O.D.

048 (1.22) I.D.

SPL-25J-289



Size

36

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

# **Standard Momentary Switch Probes**

# **MSP 3C/5C** SSP-5C

#### TO ORDER, CALL 909-625-9390

.100 (2.54)

Probe Specific	cations MSP-3C	MSP-5C	MSP-25C	SSP-5C
<b>Mechanical</b> Full Travel (+/010): Recommended Travel: Mechanical Life:	.140 (3.56) .085 (2.16) 100K cycles	.185 (4.70) .132 (3.35) 100K cycles	.125 (3.18) .085 (2.16) 100K cycles	.150 (3.81) .100 (2.54) 100K cycles
Switch Point: (+/012) Electrical	.030 (0.76)	.025 (0.64)	.030 (0.76)	.025 (0.64)
Maximum Current  Average Probe Res	t Rating (Non-inductive 3 amps sistance	DC) 5 amps	3 amps	5 amps
71101ugo 1 1050 1101	50 mΩ	$20 \ \text{m}\Omega$	$50~\text{m}\Omega$	$50~\text{m}\Omega$
Materials and Fini	shes			
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: Terminal:	KEL-F™ Silver plated Beryllium copper	KEL-F <sup>™</sup> Silver plated Brass	DELRIN™ Silver plated Beryllium copper	DELRIN™ Gold plated Beryllium copper

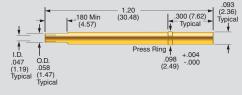
<b>Spring Force</b> Spring Type	in oz. (grams) MSP-3C	MSP-5C	MSP-25C	SSP-5C
Standard @ Switch Point: @ Recommended	3.2 (90)	2.5 (70)	6.51 (183)	2.36 (66)
Travel:	7.5 (213)	5.2 (146)	7.55 (212)	4.5 (128)
@ Switch Point: @ Recommended	24.8 (703)	26.9 (755)	_	_
Travel:	35.0 (992)	35.0 (992)	_	_
TIp Styles:	С	С	С	С

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) **Ouick disconnect** 

for replacement ease: Newark Part #871919-1



.300 (7.62) Typical

+.004

Press Ring | .072 (1.83) +.002

Press Ring 1.44 (3.66)

#### SPR-5W

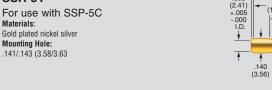
For use with MSP-5C Materials: Gold plated nickel silver **Mounting Hole:** 

.141/.143 (3.58/3.63) Quick disconnect



SSR-5Y For use with SSP-5C

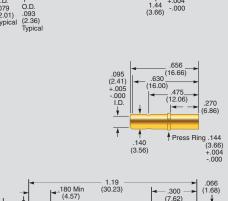
Mounting Hole: .141/.143 (3.58/3.63



#### SPR-25W For use with MSP-25C

Materials: Gold plated nickel silver Mounting Hole: .067/.069 (1.70/1.75) Quick disconnect

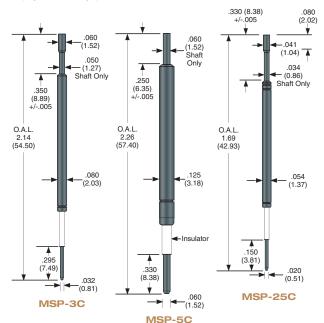


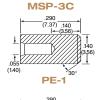


#### **Applications**

A switch probe is designed primarily for "presence/electrical" test applications such as

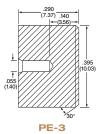
detecting the absence or presence of contacts within a wire harness connector. In this case, the switch probe provides electrical interconnection and verifies the connector has been manufactured properly.; If contacts are missing or out of place, the part is rejected. If all the contacts are in place,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

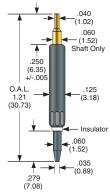




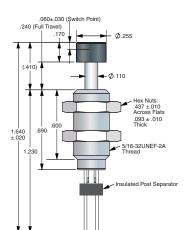
**CAPS FOR** 







SSP-5C



#### SSP-812023 PRESENCE **DETECTION DEVICE**

-.125

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

Order your ECT Test Probes from ROMEX B.V. via Phone: +31-(0)317-389787, Fax: +31-(0)317-389780 or E-mail: info@romex.nl.



# **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.

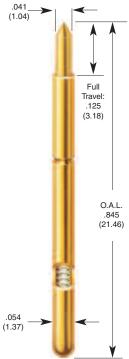
Example:

## GSP-2B

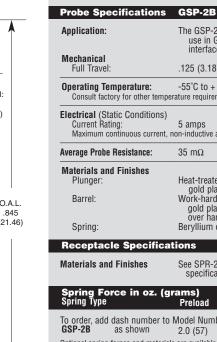
probe

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





GSP-2B For GenRad 227/82/73



The GSP-2B is designed for use in GenRad tester interfaces -55°C to + 130°C Consult factory for other temperature requirements, and applications below -40° C.

Current Rating: 5 amps
Maximum continuous current, non-inductive at working travel

Average Probe Resistance:  $35~\text{m}\Omega$ 

**Materials and Finishes** 

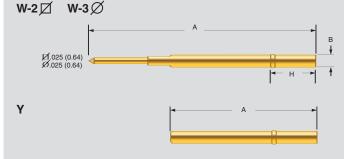
Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver, gold plated (I.D. and O.D.) over hard nickel Beryllium copper, silver plated

.125 (3.18)

See SPR-2 series specifications, page 32. **Materials and Finishes** 

Spring Force in oz. (grams) Spring Type Prelo Preload 3/4 Travel To order, add dash number to Model Number. **GSP-2B** as shown 2.0 (57) 4.5 (128)

2.0 (57) Optional spring forces and materials are available.



**Receptacle Dimensions A B C D E** .930(23.62) .066(1.68) .048(1.22) .058(1.47) .20(5.08) SPR-2W .950(24.13) .066(1.68) .048(1.22) .058(1.47) .20(5.08) 1.45(36.83) .066(1.68) Square Post = .025(0.064) 1.32(33.53) .066(1.68) Round Post = .025(0.064) DIA. SPR-2W-1 SPR-2W-2 SPR-2W-3 SPR-2Y .735(18.67) .066(1.68)

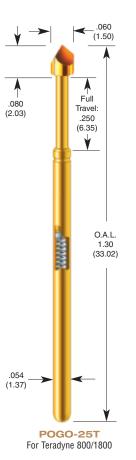
SPR-2 Series press ring diameter is typically .070 (1.78) H dimension SPR-2 Series = .240 (6.09)



**Standard** -4 1.24 (35) Optional spring forces and materials are available

Probe Specifications	POGO-25T	POGO-25HM
Mechanical Full Travel: Recommended Working Travel: Mechanical Life Exceeds:		.250 (6.35) .167 (4.24) 2 x 10 <sup>6</sup> cycles
Operating Temperature Consult factory for other temper	-55°C to +105°C ature requirements, and applications be	-55°C to +105°C elow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, no	8 amps on-inductive at working travel	8 amps
Average Probe Resistance	8 mΩ	8 mΩ
Materials and Finishes Plunger: Barrel:	Heat-treated beryllium copper, gold-plated over hard nickel Work-hardened phosphor bronze,	
Spring: Ball:	HPA-GOLD™ plated (I.D. and O.D.) over hard nickel Music wire Stainless steel	gold plated (I.D. and O.D.) over hard nickel Music wire Stainless steel
<b>Spring Force in oz. (gr</b> Spring Type	<b>ams)</b> Preload	2/3 Travel





.090 (2.29) dia. .122 (3.10) dia.

.330

(8.38)

O.A.L. 1.30 (33.02)

.020

(0.51)

.080

(2.03)





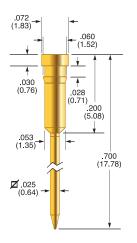




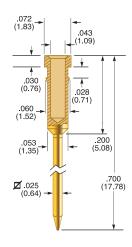
POGO-25HM For Agilent/HP 3070

.054 (1.37)

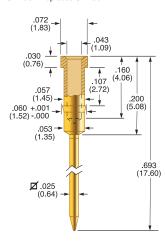
SIP-90-2 Materials: Brass, gold plated Mounting Hole Size: .055 (1.40) Applications: Designed for use in original GenRad interface blocks.



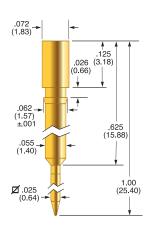
SIP-90-3 Materials: Brass, gold plated Mounting Hole Size: .055 (1.40) Applications: Designed for use in original Zehntel interface panels.



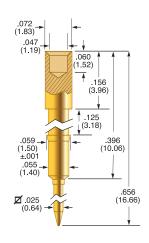
SIP-90-4 Materials: Brass, gold plated Mounting Hole Size: .055 (1.40) Applications: Designed for use in original Factron interface panels. SIP-90-4 replaces SIP-90-1.



SIP-90-5 Materials: Brass, gold plated Mounting Hole Size: .057 (1.45) Applications: General interconnect.

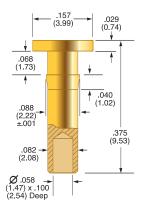


SIP-90-6 Materials: Brass, gold plated Mounting Hole Size: .057 (1.45) Applications: General interconnect.



#### GPP-95-2

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





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
P4301-1F Pylon®	45
K50L-QG-75, K50L-QG-75R	46
K-50L/K-50L-QG	47
K-50H-S	48
CSP-03G-003	49

#### **How to Order**

To order from this section, specify actual part number.

#### Example:

### K-50L

probe

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.









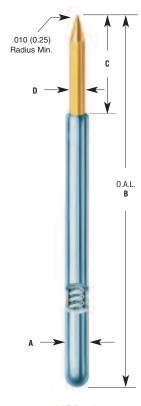
HCP-13P



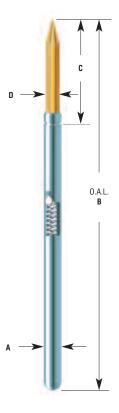
Probe	Dimen	sions
		310113

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

	HCP-15	HCP-25
<b>Test Centers</b>	.187 (4.75)	.100 (2.54)
Α	.125 (3.18) Ø	.054 (1.37)
В	1.42 (36.07)	1.30 (33.02)
C	.350 (8.89)	.330 (8.38)
D	.080 (2.03) Ø	.036 (0.91)
E	.156 (3.96) Ø	.060 (1.52)
F	.100 (2.54)	.080 (2.03)







**HCP-25** 

HCD-12 14 15	HCP-25
HCP-13, 14, 15	HCP-25
	.250 (6.35) .167 (4.24) .5 x 10 <sup>6</sup> cycles
-55°C to +150°C rature requirements, and applications b	-55°C to +150°C pelow -40° C.
15 amps 25 amps 35 amps non-inductive at working travel	10 amps
25 mΩ	25 mΩ
Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver, silver plated (I.D. and O.D.) over hard nickel Stainless steel, silver plated Races endle lated	Heat-treated beryllium copper, gold plated over hard nickel Work-hardened phosphor bronze, silver plated (I.D. and O.D.) over hard nickel Stainless steel, silver plated Stainless steel
	1: .167 (4.24) .25 x 10° cycles  -55°C to +150°C rature requirements, and applications to the second seco

#### **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)
HCD-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.

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

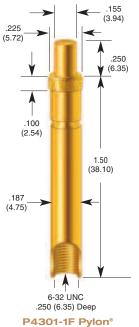
Optional spring forces and tip styles are available for the HCP-25.

### TO ORDER, CALL 909-625-9390

Probe Specifications	P4301-1F Brute
Mechanical Full Travel: Recommended Working Travel: Mechanical Life Exceeds:	.250 (6.35) : .167 (4.24) 1 x 10° cycles
Operating Temperature Consult factory for other temperature	-40°C to +204°C ature requirements.
Electrical (Static Conditions) Current Rating: maximum continuous current, non-	50 amps inductive at working travel
Average Probe Resistance	$5~\text{m}\Omega$
Materials and Finishes Plunger:	Gold-plated, tellurium copper

Plunger: Barrel: Spring: Ball:	Gold-plated, tellurium copper Gold-plated, tellurium copper Stainless steel Stainless steel	
<b>Spring Force in oz. (gr</b> Spring Type	r <b>ams)</b> Preload	Working Travel
Standard	16.0 (454)	32.0 (909)

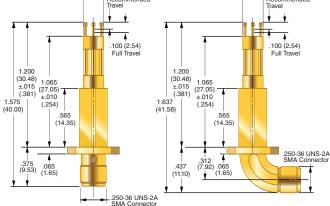
Note: Termination by tapped hole with wire attached



**Brute** 

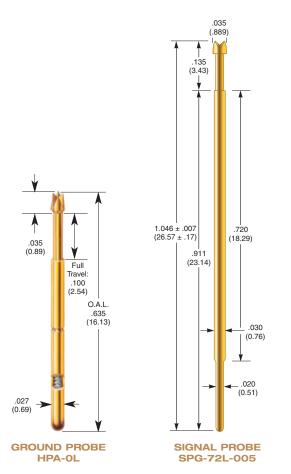


# .500 — (12.70) Sq .500 — (12.70) Sq -.075 (1.90)Typ -.075 (1.90)Typ .340 (8.64) Typ -.410 (10.41) 2 X Ø.197 > 2 X Ø.197 • (5.00)



K-50L-QG-75

K-50L-QG-75R



#### 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 accessing Acquirate and 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: Minimum Return Loss	50 Ohms	50 Ohms
@ 1 Ghz: @ 5 Ghz: @ 10 Ghz: Maximum Insertion Loss	23.8 dB, 22.8 dB 18.3 dB, 16.4 dB 17.7 dB, 17.0 dB	25.1 dB, 25.2 dB 18.0 dB, 17.5 dB 27.0 dB, 35.3 dB
@ 1 Ghz: @ 5 Ghz: @ 10 Ghz: Maximum VSWR	0.183 dB, 0.186 dB 0.370 dB, 0.371 dB 0.577 dB, 0.572 dB	0.160 dB, 0.159 dB 0.421 dB, 0.405 dB 0.489 dB, 0.429 dB
@ 1 Ghz: @ 5 Ghz: @ 10 Ghz:	1.14:1, 1.16:1 1.28:1, 1.36:1 1.30:1, 1.33:1	1.12:1, 1.12:1 1.29:1, 1.31:1 1.09:1, 1.03:1

Probe Specifications	Ground Probe HPA-0L	Signal Probe SPG-72L-005
Mechanical Full Travel: Recommended Working Travel: Mechanical Life Exceeds:	.100 (2.54) .067 (1.70) 1 x 10° cycles	.100 (2.54) .067 (1.70) 1 x 10 <sup>6</sup> cycles
Operating Temperature Consult factory for other temperat	-55°C to +105°C ure requirements, and applications bel	-55°C to +105°C ow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, nor	3 amps -inductive at working travel	3 amps
Average Probe Resistance	35 mΩ	15 mΩ
Materials and Finishes Plunger:	Heat-treated beryllium copper,	Heat-treated beryllium copper,
Barrel:	Work-hardened phosphor bronze, HPA-GOLD™ plated (I.D. and O.D.) over hard nickel	
Spring: Ball:	Stainless steel, silver plated	Stainless steel, silver plated Stainless steel

Spring Force in oz. (gra Spring Type	ms) Preload	2/3 Travel
To order, add dash number to Me HPA-0L SPG-72L-005	odel Number. 0.61 (17) 1.30 (37)	2.8 (79) 2.8 (79)

K-50L-QG

Specifications (at full compression) K-50L

#### 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.

		,	
	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: Dielectric:	Gold plated copper zinc alloy Premium virgin teflon per MIL-P-18468	Gold plated copper zinc alloy 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



Design Patent D343,802

#### Probe Specifications SPL-01L-039

Mechanical

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

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

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

Electrical (Static Conditions)

Current Rating:

Maximum continuous current, non-inductive at working travel

Average Probe Resistance

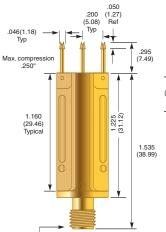
**Materials and Finishes** 

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

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

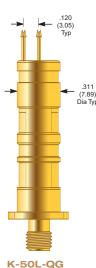
To order, add dash number to Model Number. **SPL-01L-039** 1.09 (30.9) 2.71 (76.8) 1.09 (30.9)

 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.



Mates with Standard SMA R.F. Connector

### **SIDE VIEW** Patented



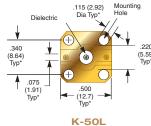
**SIDE VIEW** Patented



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

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

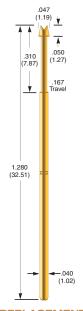
Also available in .125 Centers. Length and Flange dimensions for K-50L-QG same as K-50.



## **TOP VIEW**

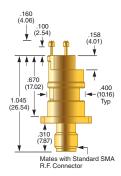
Gold plated replaceable SPL-01L-039 spring probes rated at 5.2 oz. (147.42g) @full compression

# K-50L

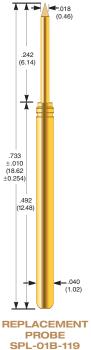


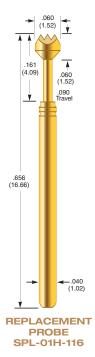
**REPLACEMENT PROBE** SPL-01L-039\*

\* 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



K-50H-S SIDE VIEW





#### 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: Minimum Return Loss @ 1 Ghz:

Maximum Insertion Loss

@ 1 Ghz: Maximum VSWR @ 1 Ghz:

23 db, 26 db Typical 0.12 db, 0.06 db Typical 1.15:1, 1.11:1 Typical

**Materials and Finishes** 

**Probe Specifications** 

Housing: Dielectric: SMA Connector Pin: Consult factory for more information

Gold plated copper zinc alloy Premium virgin teflon per MIL-P-18468 Gold plated beryllium copper

SPL-01B-119	SPL-01H-116

Mechanical

.100 (2.54) .090 (2.29) 1 x 10<sup>6</sup> cycles .100 (2.54) .090 (2.29) Full Travel: Recommended Working Travel: Mechanical Life Exceeds: 1 x 106 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
Maximum continuous current, non-inductive at working travel

6 amps

 $10~\text{m}\Omega$ 

Average Probe Resistance

Plunger: Barrel:

Spring: Ball:

**Materials and Finishes** Heat-treated beryllium copper, gold-plated over hard nickel Work-hardened phosphor bronze,

HPA-GOLD™ plated (I.D. and O.D.) over hard nickel Music wire Stainless steel

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

Music wire Stainless steel

# Spring Force in oz. (grams) Spring Type Preload

## 2/3 Travel

To order, add dash number to Model Number. SPL-018-119 1.49 (42.2) SPL-01H-116 1.49 (42.2)

4.0 (113) 4.0 (113)

# **High-Frequency Coaxial Test & Measurement Probe**

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

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

#### Specifications CSP-03G-003

**Test Centers:** Ground Shield Travel:

.300 (7.62) .250 (6.35) .252/.254 (6.40/6.45) dia. **Mounting Hole Size:** .252/.25 Mates with Amphenol SMB 27-1 or equivalent.

Nominal Impedance: Probe Resistance: Dielectric Withstanding 50 Ohms  $50~\text{m}\Omega$  maximum

1K VAC

Voltage: VSWR: 1.15:1 @ GHz (Tested with Target) 0.13 db @ 1 GHz (Tested with Insertion Loss:

Target)

**Materials and Finishes** 

Housing: Ground Shield: Dielectric: Connector Pin: Spring Probe: Plunger: Barrel:

Spring:

Spring Type

SPL-03G-043: SPL-03B-121:

Gold plated copper zinc alloy Gold plated beryllium copper Teflon per MIL-P-18468 Gold plated beryllium copper

Gold plated beryllium copper Gold plated brass Music wire, silver plated

Consult factory for more information.



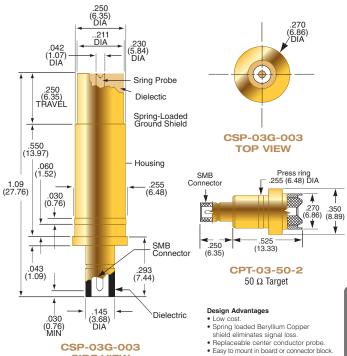
Probe Specifications	SPL-03G-043	SPL-03B-121
Mechanical Full Travel: Recommended Working Travel: Mechanical Life Exceeds:		.250 (6.35) .167 (4.24) 1 x 10 <sup>6</sup> cycles
Operating Temperature Consult factory for other temperature	-35°C to +105°C ature requirements.	-35°C to +105°C
Electrical (Static Conditions) Current Rating: Maximum continuous current, no	6 amps on-inductive at working travel	6 amps
Average Probe Resistance	50 mΩ	50 mΩ
Materials and Finishes Plunger: Barrel: Spring:	Gold plated beryllium copper Gold plated brass Music wire, silver plated	Gold plated beryllium copper Gold plated brass Music wire, silver plated
Spring Force in oz /gr	amel	

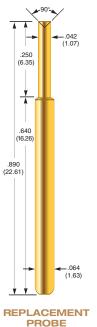
2/3 Travel

4.0 (114) 4.0 (114)

Preload

.80 (22) .80 (22)





SPL-03G-043

CSP-03G-003

**SIDE VIEW** 

-.042 (1.07) .250 (6.35) .890 (22.61) -.064 (1.63) REPLACEMENT

**PROBE** SPL-03B-121



# Semiconductor Pogos

# How to Order

# Double-Ended CSP Probes

#### CSP5-20LCBC

Probe
Model

Barrel Length:
18 = .180
20 = .200
22 = .220

Plunger Tip Style:
B, L

Plunger Material:
C = BeCu S = Steel

Terminal Tip Style:
B

Terminal Material:

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

# Single-Ended SCP Probes

C = BeCu S = Steel

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

Contents	
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CSP8-15/8-20/8-25	52
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SCP-127ZB-001	53
BTM-050	54
BTM-075	54
BTM-100	54

#### TO ORDER, CALL 909-625-9390

Probe Specifications	CSP4	CSP5-18
Mechanical Pitch: Recommended Mounting Centers: Full Travel: Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	.4mm .016 (.40) .025 (.64) .020 (.51) .217 (5.51) .85 (24.1g) .237 (6.02) 250,000 cycles	.5mm .020 (.50) .025 (.64) .020 (.51) .214 (5.44) .70z (19.8g) .234 (5.94) 500,000 cycles
Materials and Finishes Plunger End (long extension) Terminal End (short Extension) Barrel: Spring:	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Music Wire/Gold Plate	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate
Environmental Maximum Operating Temperature:	105°C	155°C
Electrical Average DC Resistance:** Current Capacity: Self Inductance (Ls): Capacitance (Cc): Bandwidth @ -1dB:	<100mΩ 2A 1.71nH .58pF 6.8GHz	<100mΩ 2A 1.5nH* .63pF* 8.13GHz*
Probe Specifications	CSP5-20	CSP5-22

Ducks Cussifications	CCDE OO	OCDE OO
Probe Specifications	CSP5-20	CSP5-22
Mechanical Pitch: Recommended Mounting Centers: Full Travel: Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	.5mm .020 (.50) .025 (.64) .020 (.51) .234 (5.94) .70z (19.8g) .254 (6.45) 500,000 cycles	.5mm .020 (.50) .035 (.89) .020 (.51) .254 (6.45) 1.00z (28.4g) .274 (6.96) 500,000 cycles
Materials and Finishes Plunger End (long extension) Terminal End (short Extension) Barrel: Spring:	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate
Environmental Maximum Operating Temperature:	155°C	155°C
Electrical Average DC Resistance:** Current Capacity: Self Inductance (Ls): Capacitance (Cc): Bandwidth @ -1dB:	<100mΩ 2A 1.65nH* .69pF* 7.4GHz*	<100mΩ 2A 1.79nH .75pF 6.8GHz

<sup>\*</sup> Estimated \*\* DC Resistance measured contacting a clean gold plated surface on both probe tips.

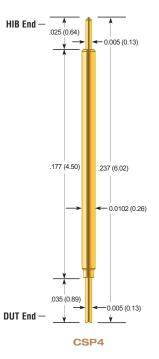
#### **PLUNGER-DUT or HIB**

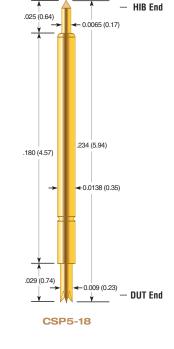


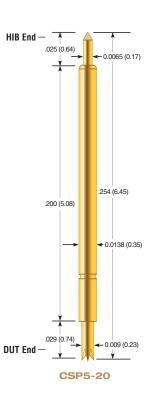


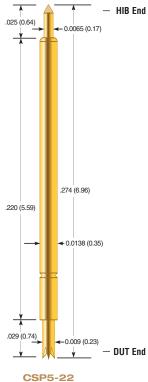


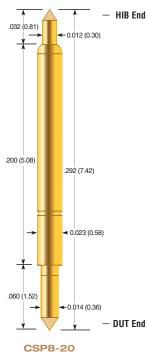
L-Tip (All CSP Probes)

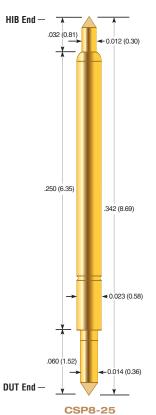


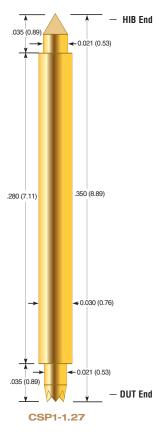












	Probe Specifications	CSP8-15	CSP8-20
	Mechanical Pitch: Recommended Mounting Centers: Full Travel: Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	.8mm .0315 (.80) .040 (1.02) .030 (.76) .212 (5.38) 1.10z (31.2g) .242 (6.15) 500,000 cycles	.8mm .0315 (.80) .040 (1.02) .030 (.76) .262 (6.65) 1.10z (31.2g) .292 (7.42) 500,000 cycles
	Materials and Finishes Plunger End (long extension) Terminal End (short Extension) Barrel: Spring:	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate
	Environmental Maximum Operating Temperature:	155°C	155°C
	Electrical Average DC Resistance:** Current Capacity: Self Inductance (Ls): Capacitance (Cc): Bandwidth @ -1dB:	<100mΩ 3A 1.23nH* .65pF* 9.23GHz*	<100mΩ 3A 1.52nH* .81pF* 7.45GHz*
	Probe Specifications	CSP8-25	CSP1-1.27
I	Mechanical Pitch: Recommended Mounting Centers: Full Travel: Recommended Travel:	.8mm .0315 (.80) .040 (1.02) .030 (.76)	1.0 - 1.27mm .039 (1.0) / .050 (1.27) .040 (1.02) .035 (.89)

Mechanical Pitch: Recommended Mounting Centers: Full Travel: Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	.8mm .0315 (.80) .040 (1.02) .030 (.76) .312 (7.92) 1.10z (31.2g) .342 (8.69) 500,000 cycles	1.0 - 1.27mm .039 (1.0) / .050 (1.27) .040 (1.02) .035 (.89) .315 (8.0) 2.00z (56.7g) .350 (8.89) 500,000 cycles
Materials and Finishes Plunger End (long extension) Terminal End (short Extension) Barrel: Spring:	BeCu or Steel BeCu or Steel Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate	BeCu BeCu Hard Gold over Nickel Phosphor Bronze Hard Gold over Nickel Steel Alloy/Gold Plate
Environmental Maximum Operating Temperature:	155°C	155°C
Electrical  Average DC Resistance:** Current Capacity: Self Inductance (Ls): Capacitance (Cc): Bandwidth @ -1dB:	<100mΩ 3A 1.81nH .96pF 5.25GHz	<100mΩ 5A 3.1nH .95pF 3.8GHz

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

#### **PLUNGER-DUT or HIB**







#### TO ORDER, CALL 909-625-9390

Probe Specifications	SCP-080ZB-001	SCP-100ZB-004
Mechanical Pitch: Recommended Mounting Centers: Full Travel (Z): Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	.8mm .0295 (.75) / .0319 (.80) .035 (.89) .030 (.76) .200 (5.08) 1.200z (34g) ± 20% .230 (5.84) 1,000,000 Cycles	1.0mm .0394 (1.00) .035 (.89) .030 (.76) .200 (5.08) 1.2002 (34g) ± 20% .230 (5.84) 1,000,000 Cycles
Materials and Finishes Plunger: Barrel: Spring:	BeCu Plated with Hard Gold over Nickel BeCu Plated with Hard Gold over Nickel Steel Alloy Plated with Hard Gold over Nickel	BeCu Plated with Hard Gold over Nickel BeCu 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:** Current Capacity: Open Air (No Cycling) Self Inductance (Ls): Capacitance (Cc): Bandwidth @ -1dB:	<50mΩ 5A 1.27nH .12pF 6GHz	<50mΩ  7A 1.4 nH .66pF 6.78GHz

Probe Specifications	SCP-127ZB-001
Mechanical Pitch: Recommended Mounting Centers: Full Travel (Z): Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	1.27mm .050 (1.27) .035 (.89) .030 (.76) .200 (5.08) 1.200z (34g) ± 20% .230 (5.84) 1,000,000 Cycles
Materials and Finishes	RaCu Platad with

Hard Gold over Nickel

Plunger: BeCu Plated with
Hard Gold over Nickel
Barrel: BeCu Plated with
Hard Gold over Nickel
Spring: Steel Alloy Plated with

Environmental
Maximum Operating Temperature: 155°C

Electrical
Average DC Resistance:\*\*

 $^{\star\star}$  DC Resistance measured contacting a clean gold plated surface on both probe tips.

#### **PLUNGER-HIB**







J-11p (All Mini-Mite Probes)

#### **BARREL-DUT**







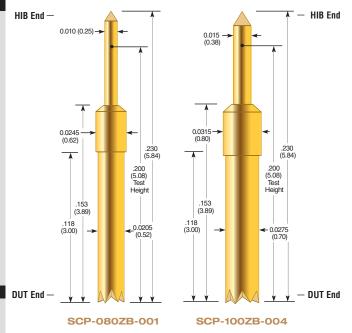
L-Tip (1.0mm)

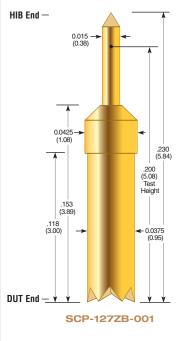


Z-Tip

Z-Tip (All Mini-Mite Probes)

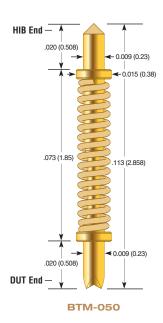
Note: Not all tips available in all configurations.

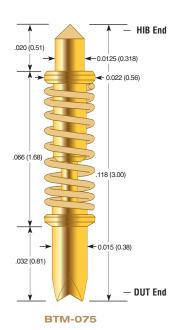


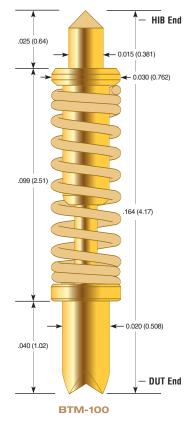




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#### TO ORDER, CALL 909-625-9390

Probe Specifications	BTM-050	BTM-075
Mechanical Pitch: Recommended Mounting Centers: Full Travel: Recommended Travel: Test Height: Spring Force: Overall Length: Mechanical Life:	.5mm .019 (.50) .020 (.51) .015 (.38) .098 (2.49) 1.10z (31g)±20% .113 (2.87) 1,000,000 cycles	.75mm / .8mm .0295 (.75) / .0315 (.80) .020 (.51) .015 (.38) .103 (2.62) 1.00z (28g)±20% .118 (3.00) 1,000,000 cycles
Materials and Finishes Plunger: Barrel: Spring:	BeCu Plated with Hard Gold over Nickel BeCu Plated with Hard Gold over Nickel Steel Alloy Hard Gold over Nickel	BeCu Plated with Hard Gold over Nickel Brass Alloy Plated with Hard Gold over Nickel Music Wire Hard Gold over Nickel
Environmental Maximum Operating Temperature:	155°C	105°C
Electrical  Average DC Resistance:** Current Capacity: Open Air (No Cycling) Self Inductance (Ls): Capacitance (Cc): Bandwidth @ -1dB:	<50mΩ 1.5A .95nH .28pF 12.87GHz	<50mΩ 2A .77nH .25pF 15.65GHz

Probe Sr	pecifications	BTM-100

Mechanical	1.0
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 cýcles

Materials and Finishes
Plunger:
Barrel:
Barrel:
Barrel:
Brass Alloy Plated with
Hard Gold over Nickel
Hard Gold over Nickel
Spring:
Steel Alloy

Hard Gold over Nickel Consult factory about additional plating options.

**Environmental**Maximum Operating Temperature: 155°C

Electrical

Herrical
Average DC Resistance:\*\* <50mΩ
Current Capacity:
Open Air (No Cycling)
Self Inductance (Ls):
Capacitance (Cc):
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







Note: Not all tips available in all configurations.



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 CP-059-013 58

### **How to Order**

To order from this section, specify actual part number.

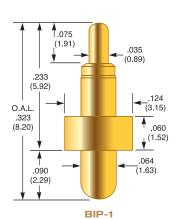
#### Example:

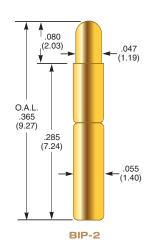
#### BIP-1

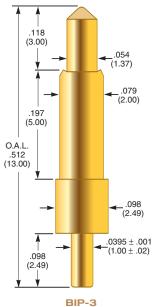
probe

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:

- Camcorders
   Circuit board to board docking stations
- 3. Cellular Phones
- 2-way radios
   Computer docking stations
- 6. Cordless phones 7. Chargers 8. InkJet Printers

- 9. Notebook and laptop computers
- 10. AC/DC power supplies

#### Benefits and Features:

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

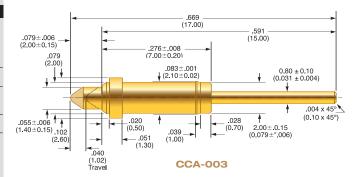
<b>Probe Specifications</b>	BIP-1	BIP-2	BIP-3
Mechanical Full Travel: Recommended Travel: Mechanical Life Exceeds:	.075 (1.91) .050 (1.27) 250 x10 <sup>3</sup> cycles	.050 (1.27) .050 (1.27) 1 x10 <sup>6</sup> cycles	.100 (2.54) .060 (1.52) 250 x10 <sup>3</sup> cycles
Operating Temperature: Consult factory for other tempe	-55°C to +150°C rature requirements.	-55°C to +150°C	-55°C to +105°C
Electrical (Static Conditions)	5 amps d.c. max	5 amps d.c. max	5 amps d.c. max
Maximum Current Rating (Non- Average Probe Resistance	inductive DC) 16 mΩ	30 m $\Omega$	30 m $\Omega$
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. (gr Spring Type	rams) Preload	Recommended Trav	el
			o1
BIP-1 Standard BIP-2 Standard	1.39 (39.44) 1.10 (31.2)	3.50 (99.31) 3.85 (109)	
BIP-3 Standard BIP-3 Alternate	0.40 (11.35) 1.0 (28.38)	1.14 (32.35) 3.0 (85.13)	
Tip Styles	J	J	В
Termination			

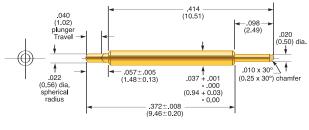
**BIP-1:** Soldered into PCB **BIP-2:** Press Fit **BIP-3:** Soldered into PCB

### TO ORDER, CALL 909-625-9390

Probe Specifications	CCA-003	CCA-004
Mechanical Full Travel: Recommended Working Travel: Mechanical Life Exceeds:	.078 (1.98) .040 (1.00) 100,000 cycles	.057 (1.48) .040 (1.02) 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: Barrel: Spring:	Brass, gold plated Brass, gold plated Music wire, gold plated	Brass, gold plated Brass, 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-004** 

Barrel: Spring:

#### Super-short profile high current probe



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 cyc Operating Temperature -35°C to +105°C Consult factory for other temperature requirements. -35°C to +105°C **Electrical** (Static Conditions) Current Rating: 10 amps Maximum continuous current, non-inductive at working travel Average Probe Resistance < 25 m $\Omega$ Materials and Finishes Plunger:

Brass, gold plated Brass, gold plated Music wire, gold plated Spring Force in oz. (grams) Spring Type Prelo Preload .040 Travel

1.63 (46) 4.50 (128) Standard as shown Optional spring forces and materials are available.



Actual Size





# **General Purpose**

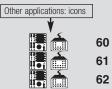
Proven performance, ISO-9000-registered quality and direct technical support have made ECT spring probes the first choice of test engineers worldwide. For the fastest possible response to your probe purchase, we offer you the world's largest selection of off-the-shelf spring probes and same-day shipping 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** 

EPA-4, SPA-4

**EPA-5**, **SPA-5** 



#### **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 tip spring

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









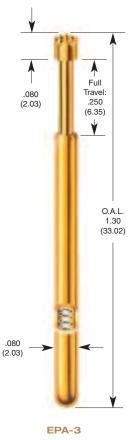


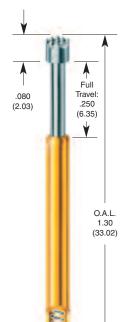










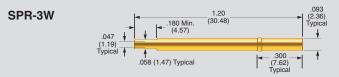


Probe Specifications	EPA-3	SPA-3
<b>Mechanical</b> Full Travel: Recommended Working Travel: Mechanical Life Exceeds:	.250 (6.35) .167 (4.24) 2 x 10 <sup>6</sup> cycles	.250 (6.35) .167 (4.24) 2 x 10 <sup>s</sup> cycles
Operating Temperature Standard spring: Alternate/Ultra High spring: Consult factory for other temper	-55°C to +85°C -55°C to +150°C ature requirements, and applications b	-55°C to +85°C -55°C to +150°C elow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, no	6 amps on-inductive at working travel	6 amps
Average Probe Resistance	50 mΩ	50 mΩ
Materials and Finishes Plunger:  Barrel:  Spring: Standard: Alternate: Ultra High: Ball:	Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Beryllium copper, silver plated Stainless steel, silver plated Stainless steel Brass, gold plated	Heat-treated beryllium copper, rhodium plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Beryllium copper, silver plated Stainless steel, silver plated Stainless steel Brass, gold plated
Receptacle Specificat	, 3	, g
Mounting Hole Size: A #41 or 2.4 mm drill is most co	.094/.096 (2.39/2.44)	.094/.096 (2.39/2.44)

Receptacle Specifications				
Receptacle Specifications				
Mounting Hole Size: A #41 or 2.4 mm drill is most co	.094/.096 (2.39/2.44) ommonly used.	.094/.096 (2.39/2.44)		
Recommended Wire Gauge:	22-26 AWG	22-26 AWG		
Connections:	SPR-3W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-3W-1 Solder cup SPR-3W-2 wire wrap/square post SPR-3Y Push-on termination (AMP terminal 42827-2 or equivalent)	SPR-3W Crimp or push-on termination (AMP terminal 60983-1 or equivalent) SPR-3W-1 Solder cup SPR-3W-2 wire wrap/square post SPR-3Y Push-on termination (AMP terminal 42827-2 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
<b>Spring Force in oz. (g</b> i Spring Type	rams) Preload	2/3 Travel
To order, add dash number to Model Number.		

Standard as shown 1.60 (45)
Alternate -1 2.52 (71)
Ultra High -2 4.18 (119)
Optional spring forces and materials are available. 4.5 (126) 6.5 (184) 11.7 (332) (SPA only)







Actual Size

.080 (2.03)

SPA-3

Ultra High:

**Materials and Finishes** 

Housing:

Beryllium copper, silver plated Stainless steel, silver plated Stainless steel

Work-hardened nickel silver, gold plated over hard nickel

Brass, gold plated

<b>Probe Specifications</b>	EPA-4	SPA-4
Mechanical Full Travel: Recommended Working Travel Mechanical Life Exceeds:		.250 (6.35) .167 (4.24) 2 x 10 <sup>e</sup> cycles
Alternate/Ultra High spring:	-55°C to +85°C -55°C to +150°C ature requirements, and applications b	-55°C to +85°C -55°C to +150°C elow -40° C.
Electrical (Static Conditions) Current Rating: Maximum continuous current, n	7 amps on-inductive at working travel	7 amps
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: Spring:	Work-hardened nickel silver, gold plated over hard nickel	Work-hardened nickel silver, gold plated over hard nickel
Standard: Alternate:	Beryllium copper, silver plated Stainless steel, silver plated	Beryllium copper, silver plated Stainless steel, silver plated

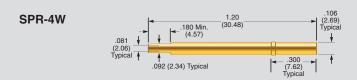
#### Receptacle Specifications Mounting Hole Size: .107/.109 (2.72/2.77) .107/.109 (2.72/2.77) A 2.75 mm drill is most commonly used. **Recommended Wire Gauge:** 22-26 AWG 22-26 AWG SPR-4W Crimp or push-on termination (AMP terminal 61260-1 or equivalent) SPR-4W-1 Solder cup SPR-4W-2 Wire wrap/square SPR-4W Crimp or push-on termination (AMP terminal 61260-1 or equivalent) SPR-4W-1 Solder cup SPR-4W-2 Wire wrap/square Connections: SPR-4Y Push-on termination SPR-4Y Push-on termination (AMP terminal 60908-1 or equivalent) (AMP terminal 60908-1 or equivalent)

Beryllium copper, silver plated Stainless steel, silver plated Stainless steel

Brass, gold plated

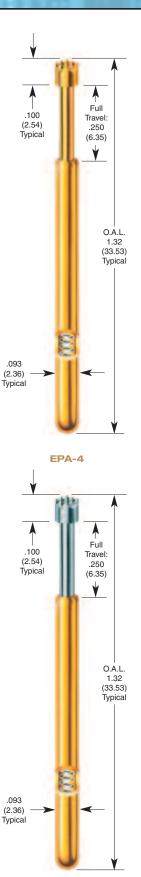
#### Work-hardened nickel silver, gold plated over hard nickel Phosphor bronze, gold plated Phosphor bronze, gold plated Square Post: Spring Force in oz. (grams) Spring Type Preload 2/3 Travel

To order, add dash number to Model Number. Standard as shown 2.2 (62) 3.2 (90) 6.7 (190) 4.8 (136) 6.9 (196) 11.8 (335) (SPA only) Alternate Ultra High inquire Optional spring forces and materials are available

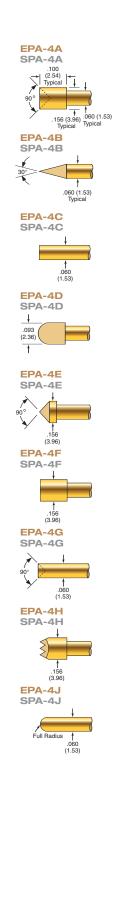








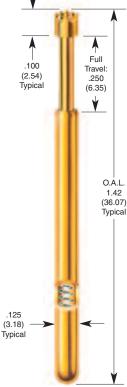
SPA-4

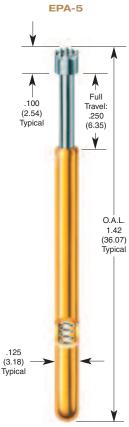


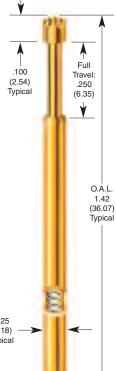


Actual Size









Mechanical   Full Travel:			
Full Travel:	Probe Specifications	EPA-5	SPA-5
Light spring: -55°C to +85°C -55°C to +85°C standard spring: -55°C to +150°C	Recommended Working Travel:	.167 (4.24)	.167 (4.24)
Current Rating: Maximum continuous current, non-inductive at working travel     8 amps     8 amps       Average Probe Resistance     50 mΩ     50 mΩ       Materials and Finishes Plunger: Barrel: Barrel: Barrel: Barrel: Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Beryllium copper, silver plated Stainless steel, silver plated Ultra High: Music wire, silver plated Music wire, silver plated Music wire, silver plated	Light spring: Standard spring: Ultra High spring:	-55°C to +150°C -55°C to +105°C	-55°C to +150°C -55°C to +105°C
Materials and Finishes Plunger: Heat-treated beryllium copper, gold plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Spring: Low: Beryllium copper, silver plated Standard: Stainless steel, silver plated Ultra High: Music wire, silver plated			8 amps
Plunger: gold plated over hard nickel Barrel: Work-hardened nickel silver, gold plated over hard nickel Spring: gold plated over hard nickel Low: Beryllium copper, silver plated Standard: Stainless steel, silver plated Ultra High: Music wire, silver plated	Average Probe Resistance	50 mΩ	50 mΩ
	Plunger: Barrel: Spring: Low: Standard: Ultra High:	gold plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Beryllium copper, silver plated Stainless steel, silver plated Music wire, silver plated	rhodium plated over hard nickel Work-hardened nickel silver, gold plated over hard nickel Beryllium copper, silver plated Stainless steel, silver plated Music wire, silver plated

neceptacie specificat	iiviia	
Mounting Hole Size: A 3.6 mm drill is most common	.141/.143 (3.58/3.63) ly used.	.141/.143 (3.58/3.63)
Recommended Wire Gauge:	22-26 AWG	22-26 AWG
Connections:	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	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 Prelo Preload 2/3 Travel To order, add dash number to Model Number.

Light inquire 1.96 (56)

Standard as shown 6.13 (174)

Ultra High inquire 12.90 (366)

Optional spring forces and materials are available. 3.5 (99) (SPA only) 16.0 (454) 48.0 (1360) (SPA only)

.140 (3.56) Typical SPR-5W 180 Min. (4.57) .079 (2.01) Typical \_ .300 \_ (7.62) Typical .093 (2.36) Typical



Actual Size

SPA-5



## **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.

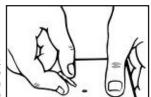
#### **Insertion/Extraction Tools**

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.





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.

 a) Hold the top of the probe barrel firmly between the forefinger and thumb of one hand. b) 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. 900 900 900 900 900 900 900	DCL-Locator No. DCL-0 DCL-1 DCL-2 DCL-3 DCL-20 DCL-25 DCI-30	SPR-0W SPR-1W SPR-2W SPR-3W MEP-20* SPR-25W
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





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-64
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	Used On
No. Ext-BMP	BMR-1/BMR-2
TET-1	LCT Series Terminals

#### **Probe Insertion Tools**

Model	Used
No.	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

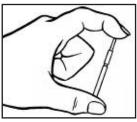
Model Used No. On FIT-1 HPR-72W-4 SPR-0W-4



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



CORRECT



NCORRECT



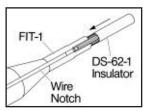
## **Tools, continued**

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

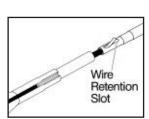
	Minimum Number of Turns		
Wire	Diameter	Class A	Class B
Size		(Modified)	(Standard)
30	.010 (0.25)	7 stripped turns plus 1/2 insulated	7 stripped turns
28	.0126 (0.32)	7 stripped turns plus 1/2 insulated	7 stripped turns
26	.0159 (0.40)	6 stripped turns plus 1/2 Insulated	6 stripped turns
24	.0201 (0.51)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

#### FASTITE® Insertion Instructions



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



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.



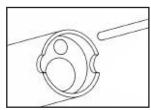
2. Insert prestripped wire into notch on FIT tool and slide until it protrudes approximately 1/8 inch from insulator.



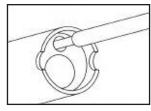
4. Complete termination.

## **Wire Wrapping Tips**

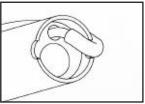
A wire-wrapped termination is made by coiling the wire around the sharp corners of a .025 inch square receptacle post. By bending the wire around the sharp corner, the oxide layer of both surfaces is broken, revealing an oxide-free surface. This provides clean metal-to-metal contact between the wire 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.



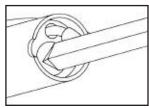
1. Pre-stripped wire, bit and sleeve



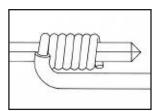
2. Insert wii



3. Secure wire



4. Insert terminal, actuate wrapping gun.



5. Completed 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.



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