General Purpose

GENERAL PURPOSE - REPLACEABLE PROBES

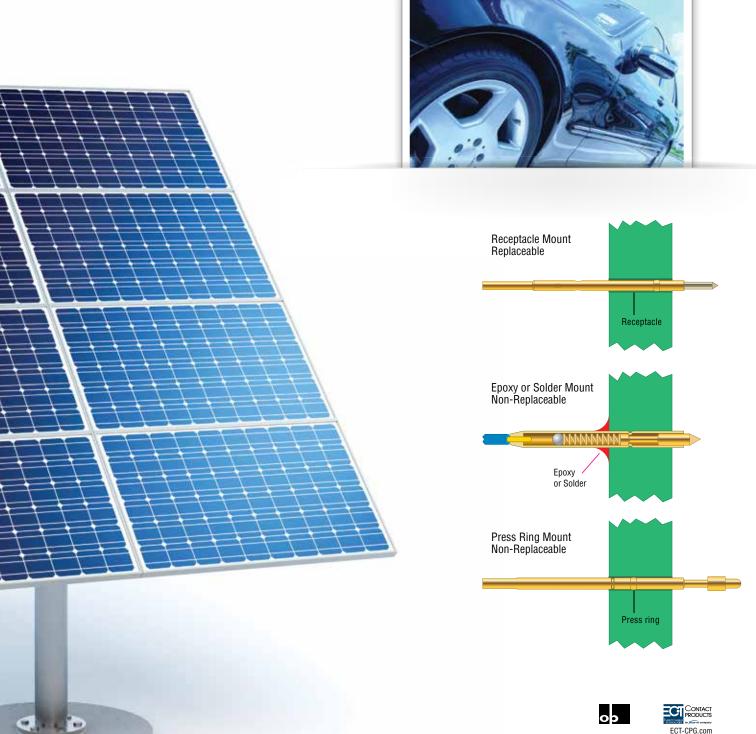
Replaceable Probes are those designed for typical Automotive and Industrial Board Test and standard continuity test, contacting industry norm test points such as leads, vias and pads.

All of the probes in this section are designed for high volume testing and are replaceable through the use of a mating receptacle mounted into a retaining plate or retaining block via a "press-ring" or knurl.

A replaceable probe is retained by a separate component, the receptacle, which is permanently fixed into a retention plate to which electrical connection is made. Removal of the probe does not damage or break the electrical connection. Typical probe retention is achieved by detents in the receptacle or additionally with a "Pylon" bend in the probe itself to prevent anti walkout.

ECT offers an extensive selection of General Purpose Probes for a wide variety of application in various industries, making ECT spring probes the first choice of test engineers worldwide.

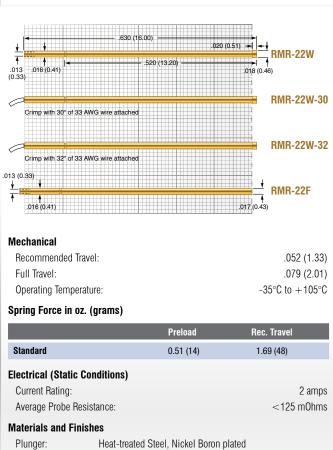
Replaceable



RMP-22B

20 mil (0.51 mm)

.520 (13.21) ← .079 (2.01) → .012 (0.30) ·





Ø .016 to .017 (0.41 to 0.43)

#78 or 0.42 mm

BeCu alloy, Gold plated

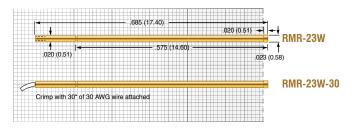
Music Wire, Gold plated

Heat-treated BeCu, Gold plated over hard Nickel

RMPJ-23B

30 mil (0.76 mm)





Mechanical	
Recommended Travel:	.050 (1.27)
Full Travel:	.075 (1.90)
Operating Temperature:	-50°C to +150°C

Spring Force in oz. (grams)

	Preload	Rec. Travel
Standard	0.23 (8)	1.1 (31)

Electrical (Static Conditions)

Current Rating: 2 amps
Average Probe Resistance: <125 mOhms

Materials and Finishes

Plunger: Heat-treated Steel, Nickel Boron plated
Barrel: Phosphor Bronze, Gold plated
Spring: Stainless Steel, Gold plated

Receptacle

Hole diameter: Ø .020 to .021 (0.52 to 0.54)

Suggested drill: #76 or 0.52 mm

Material Housing: Phosphor Bronze, Gold plated

Tip Style						
В						
Ø .009 (0.23)						

Barrel:

Spring:

Receptacle

Hole diameter:

Suggested drill:

Material Housing:

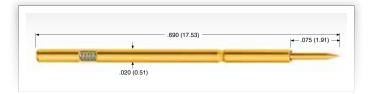


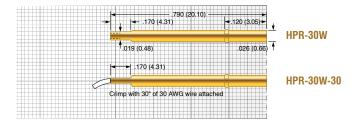
MEP-30

30 mil (0.762 mm)

HPA-40

39 mil (1.00 mm)





Mechanical

Recommended Travel: .050 (1.27) Full Travel: .075 (1.91) Operating Temperature: -55°C to +105°C

Spring Force in oz. (grams)

	Preload	Rec. Travel	
Standard	0.39 (11)	1.39 (39)	

Electrical (Static Conditions)

Current Rating: 2 amps Average Probe Resistance: <50 m0hms

Materials and Finishes

Heat-treated BeCu, Gold plated over hard Nickel Plunger:

Barrel: Work hardened BeCu,

Gold plated over hard Nickel Music Wire, Gold plated Spring:

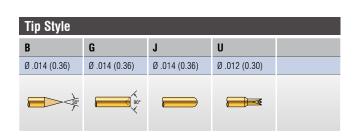
Receptacle

Hole diameter: Ø .0265 to .0276 (0.67 to 0.70)

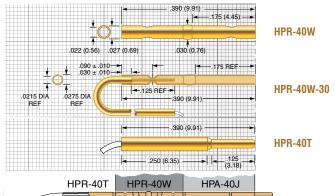
Suggested drill: #71 or 0.70 mm

Material: Work hardened BeCu,

Gold plated over hard Nickel







111 11 701	111 11 4000	11171 700	
_			
Mechanical			
Recommended Travel:			

.050 (1.27) Full Travel: .075 (1.91) Operating Temperature: -55°C to +150°C

Preload

Spring Force in oz. (grams)

Standard	0.79 (22)	1.75 (49)
Electrical (Static Conditions)		
Current Rating:		2 amps
Assess Deales Dealetones		.05 06

Average Probe Resistance: <35 m0hms

Materials and Finishes

Heat-treated BeCu, Gold plated over hard Nickel Plunger:

Barrel: Work hardened Nickel Silver, Gold plated over hard Nickel

Stainless Steel, Silver plated Spring:

Receptacle

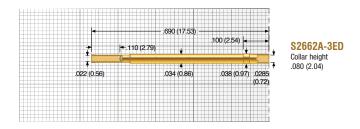
Hole diameter: Ø .0285 to .0295 (0.72 to 0.75) Suggested drill: #69 or 0.75 mm Material Housing: Work hardened Nickel Silver, Gold plated over hard Nickel

Tip Style								
В	C	G	J					
Ø .021 (0.53)	Ø .021 (0.53)	Ø .021 (0.53)	Ø .021 (0.53)					
30°		90°						

Rec. Travel

P2662A

50 mil (1.27 mm)



Mechanical

Recommended Travel: .067 (1.70) Full Travel: .090 (2.29) Operating Temperature: -55° C to $+85^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	0.70 (20)	1.7 (48)
Alternate	2	0.60 (17)	2.5 (71)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance: <30 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu, Gold plated over hard Nickel

Barrel: Phosphorous Bronze, Gold plated

Spring: BeCu, Silver plated
Ball: Stainless Steel

Receptacle

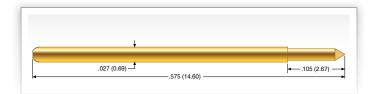
Hole diameter: Ø .0350 to .0365 (0.89 to 0.93)
Suggested drill: #64 or 0.92 mm

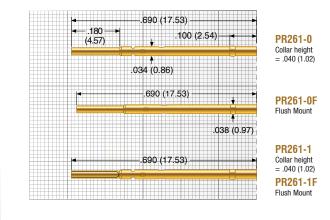
Material Housing: Nickel Silver, Gold plated

Tip Style 1C 1Q 1R 2V Ø .021 (0.53) Ø .021 (0.53) Ø .040 (1.02) F= .013 (0.33)

P2662B

50 mil (1.27 mm)





Mechanical

Recommended Travel: .050 (1.27)Full Travel: .068 (1.73)Operating Temperature: -55° C to $+85^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	1.00 (28)	1.8 (51)
Alternate	2	0.50 (14)	2.5 (71)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance: <30 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu, Gold plated over hard Nickel

Barrel: Phosphorous Bronze, Gold plated

Spring: BeCu, Silver plated
Ball: Stainless Steel

Receptacle

Hole diameter: Ø .0350 to .0365 (0.89 to 0.93)
Suggested drill: #64 or 0.92 mm

Material Housing: Nickel Silver, Gold plated

Tip Style							
1C	1Q	1R	2V				
Ø .021 (0.53)	Ø .021 (0.53)	Ø .021 (0.53)	Ø .040 (1.02)				
60°	60°	r= .013 (0.33)	120°				

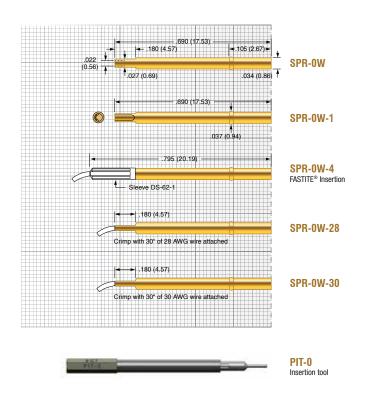






HPA-50

50 mil (1.27 mm)



Tip Style						
В	D	G	T	U		
Ø .021 (0.53)	Ø .035 (0.89)	Ø .021 (0.53)	Ø .035 (0.89)	Ø .018 (0.46)		
90°		90°	45°			

Mechanical

Recommended Travel: .050 (1.27)

Full Travel: .050 (1.27)Operating Temperature: -55° C to $+105^{\circ}$ C

Spring Force in oz. (grams)

Mechanical Mechanical Mechanical

Recommended Travel: .050 (

Current Rating: 3 amps

Full Travel: Full Travel: Average Probe Resistance: <35 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu,

Gold plated over hard Nickel Work hardened Phosphor Bronze,

Gold plated over hard Nickel

Spring: Music Wire, Gold plated

Receptacle

Barrel:

Hole diameter: Ø .035 to .0365 (0.89 to 0.93)

Suggested drill: #64 or 0.92 mm

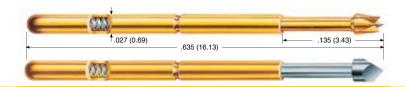
Material Housing: Work-hardened Nickel Silver,

Gold plated over hard Nickel



HPA-0 / SPA-0

50 mil (1.27 mm)



Mechanical

Recommended Travel: .067 (1.70)
Full Travel: .100 (2.54)

Operating Temperature

Standard Spring: -55°C to +150°C
 Alternate Spring: -55°C to +105°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		0.61 (17)	2.80 (79)
Alternate	- 1	0.78 (22)	3.70 (105)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance HPA: <35 m0hms
Average Probe Resistance SPA: <50 m0hms

Materials and Finishes

Plunger HPA: Heat-treated BeCu,

Gold plated over hard Nickel

Plunger SPA: Heat-treated BeCu,

Rhodium plated over hard Nickel

Barrel: Work hardened Phosphor Bronze,

Gold plated over hard Nickel

Spring

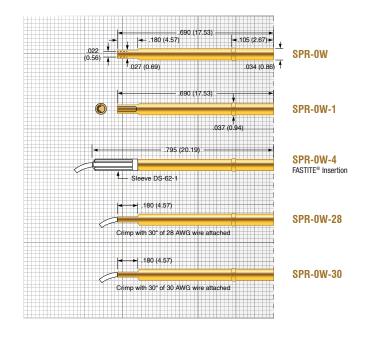
Standard: Stainless Steel, Silver plated
 Alternate: Music Wire, Silver plated

Receptacle

Hole diameter: Ø .035 to .0365 (0.89 to 0.93) Suggested drill: #64 or 0.92 mm

Material Housing: Work-hardened Nickel Silver,

Gold plated over hard Nickel



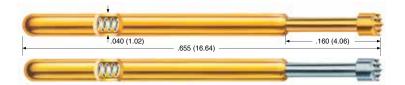
HPA Tip Sty	yle					
A	В	D	F	G12	G21	Н
Ø .035 (0.89)	Ø .021 (0.53)	Ø .035 (0.89)	Ø .035 (0.89)	Ø .012 (0.31)	Ø .021 (0.53)	Ø .035 (0.89)
90°				90°	90°	
J	L	T				
Ø .021 (0.53)	Ø .035 (0.89)	Ø .035 (0.89)				
		30"				

CDA Tim Ch	de					
SPA Tip Sty	yle					
A	В	D	G12	G21	Н	J
Ø .035 (0.89)	Ø .021 (0.53)	Ø .035 (0.89)	Ø .012 (0.31)	Ø .021 (0.53)	Ø .035 (0.89)	Ø .021 (0.53)
90°	30°		90°	90°		
L	T					
Ø .035 (0.89)	Ø .035 (0.89)					
	30"					



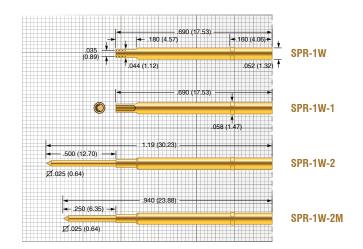






HPA-1 / SPA-1

75 mil (1.91 mm)



HPA Tip St	yle					
A	В	C	D	E	F	G
Ø .060 (1.52)	Ø .021 (0.53)	Ø .021 (0.53)	Ø .040 (1.02)	Ø .060 (1.52)	Ø .060 (1.52)	Ø .021 (0.53)
90°	30°			90°		90°
Н	J	T				
H Ø .060 (1.52)	J Ø .021 (0.53)	T Ø .057 (1.45)				

SPA Tip Sty	yle					
A	В	C	D	E	F	G
Ø .060 (1.52)	Ø .021 (0.53)	Ø .021 (0.53)	Ø .040 (1.02)	Ø .060 (1.52)	Ø .060 (1.52)	Ø .021 (0.53)
90°	30°			90°		90°
Н	J	T				
Ø .060 (1.52)	Ø .021 (0.53)	Ø .057 (1.45)				

Mechanical

Recommended Travel: .067 (1.70) Full Travel: .100 (2.54) Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		1.10 (31)	2.5 (71)
Alternate	- 1	1.30 (37)	4.5 (128)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance HPA: <35 mOhms
Average Probe Resistance SPA: <50 mOhms

Materials and Finishes

Plunger HPA: Heat-treated BeCu,

Gold plated over hard Nickel

Plunger SPA: Heat-treated BeCu,

Rhodium plated over hard Nickel

Barrel: Work hardened Phosphor Bronze,

Gold plated over hard Nickel

Spring: Stainless Steel, Silver plated

Receptacle

Hole diameter: \emptyset .053 to .055 (1.35 to 1.40) Suggested drill: #54 or 1.40 mm Material Housing: Work-hardened Nickel Silver,

Gold plated over hard Nickel

Material Post: Phosphorous Bronze, Gold plated





SPR-1W-2M

HPA-52

75 mil (1.91 mm)



Mechanical

Recommended Travel: .075 (1.91) Full Travel: .075 (1.91) Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		1.68 (48)	3.22 (91)
Alternate	- 1	2.54 (72)	6.20 (176)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance: <15 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu,

Gold plated over hard Nickel

Barrel: Work-hardened Phosphor Bronze,

Gold plated over hard Nickel

Spring: Stainless Steel, Silver plated

Receptacle

Hole diameter: \emptyset .053 to .055 (1.35 to 1.40) Suggested drill: #54 or 1.40 mm

Material Harrison Wards bandoned Nickel City

Material Housing: Work-hardened Nickel Silver,

Gold plated over hard Nickel

Material Post: Phosphorous Bronze, Gold plated

025	180 (4.57)	3) →.160 (4.06) *	000 41
.035 (0.89)	† †.044 (1.12)	.052 (1.32)	SPR-1V
	690 (17.53	3)	
•			SPR-1V
	1.19 (30.23)	.058 (1.47)	
.500 (12.70)			SPR-1V

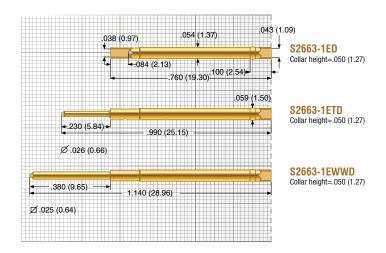
7.025 (0.64)

HPA Tip Style						
В	D	T				
Ø .021 (0.53)	Ø .040 (1.02)	Ø .057 (1.45)				
		30				





75 mil (1.91 mm)



Tip Style					
1C	1P	1R	1V	1W	
Ø .030 (0.76)	Ø .060 (1.52)	Ø .030 (0.76)	Ø .050 (1.27)	Ø .060 (1.52)	
60°	90°	r= 018 (0.46)	120°		

Mechanical

Recommended Travel: .067 (1.70)

Full Travel: .090 (2.29)

Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	- 1	1.50 (42)	3.3 (94)
Alternate	- 2	1.00 (28)	2.0 (57)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance: <10 mOhms

Materials and Finishes

Plunger: Hardened BeCu, Gold plated
Barrel: Phosphorous Bronze, Gold plated

Spring: Stainless Steel
Ball: Stainless Steel

Receptacle

Hole diameter: Ø .0561 to .0576 (1.43 to 1.46) Suggested drill: 1.45 mm

Material Housing: Brass, Gold plated

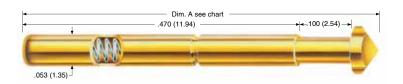
Material Post: Phosphorous Bronze, Gold plated





HPA-74

100 mil (2.54 mm)



Mechanical

Recommended Travel: .075 (1.91)
Full Travel: .100 (2.54)

Operating Temperature

Standard Spring: -55°C to +150°C
 Alternate Spring: -55°C to +105°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		1.71 (48)	3.0 (85)
Alternate	- 1	2.82 (80)	5.0 (141)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance: <35 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu,

Gold plated over hard Nickel Work hardened Phosphor Bronze, Gold plated over hard Nickel

Spring

Barrel:

Standard: Stainless Steel, Silver platedAlternate: Music Wire, Silver plated

Probe Overall Length

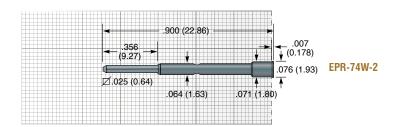
Overall Length (Dim. A)
.570 (14.48)
.598 (15.19)
.586 (14.88)

Receptacle

Hole diameter: Ø .067 to .069 (1.70 to 1.75)

Suggested drill: #51 or 1.70 mm

Material: Nickel Silver alloy



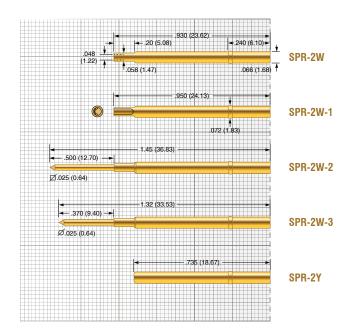
HPA Tip Style							
A	В	C	E	T65	T75		
Ø .080 (2.03)	Ø .041 (1.04)	Ø .041 (1.04)	Ø .080 (2.03)	Ø .065 (1.65)	Ø .075 (1.91)		
.045 (1.14) ×46°	⊙ 30°′)	OT .025 (0.84)	106°	√ _{37°} -	♦		
T80	T135	T156					
Ø .080 (2.03)	Ø .135 (3.43)	Ø .156 (3.96)					
✓		150 34					





EPA-2 / SPA-2

100 mil (2.54 mm)



EPA / SPA	Tip Style					
A	B30	B40	C30	C40	D	E
Ø .075 (1.91)	Ø .030 (0.76)	Ø .040 (1.02)	Ø .030 (0.76)	Ø .040 (1.02)	Ø .050 (1.27)	Ø .075 (1.91)
90°	30°	30°				90°
F	G30	G40	Н	J30	J40	L
Ø .075 (1.91)	Ø .030 (0.76)	Ø .040 (1.02)	Ø .075 (1.91)	Ø .030 (0.76)	Ø .040 (1.02)	Ø .050 (1.27)
		30.				
P	T	X				
Ø .075 (1.91)	Ø .075 (1.91)	Ø .050 (1.27)				
90°						

Mechanical

Recommended Travel: .107 (2.72) Full Travel: .160 (4.06) Operating Temperature: -55°C to +105°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		1.08 (31)	3.5 (99)
Alternate	- 1	2.64 (75)	6.5 (184)
Ultra High	- 2	4.09 (116)	10.0 (283)

Electrical (Static Conditions)

Current Rating: 5 amps Average Probe Resistance EPA: <35 m0hms <50 m0hms Average Probe Resistance SPA:

Materials and Finishes

Plunger EPA: Heat-treated BeCu,

Gold plated over hard Nickel

Plunger SPA: Heat-treated BeCu,

Rhodium plated over hard Nickel

Work hardened Nickel Silver, Gold plated over hard Nickel

Music Wire, Silver plated

Spring: Ball: Stainless Steel, Gold plated

Receptacle

Barrel:

Hole diameter: Ø .067 to .069 (1.70 to 1.75) Suggested drill: #51 or 1.70 mm

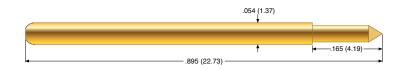
Material Housing: Work-hardened Nickel Silver,

Gold plated over hard Nickel

Phosphorous Bronze, Gold plated Material Post:



100 mil (2.54 mm)



Mechanical

Recommended Travel: .084 (2.13) Full Travel: .114 (2.90) Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	2.00 (57)	3.6 (102)
Alternate	2	3.00 (85)	5.7 (162)

Electrical (Static Conditions)

Current Rating: 5 amps
Average Probe Resistance: <10 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu, Gold plated

over hard Nickel

Barrel: Phosphorous Bronze, Gold plated

Spring: Stainless Steel
Ball: Stainless Steel

Probe Overall Length

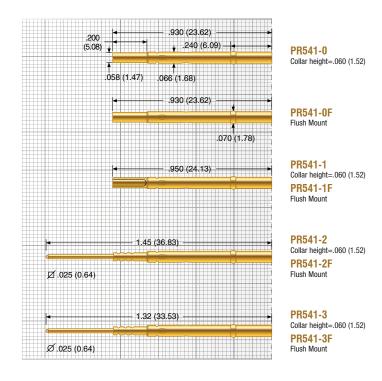
Model No.	Overall Length (Dim. A)	Plunger Extension (Dim. B)
P2664G	.895 (22.73)	0.165 (4.19)
P2664G-1C	.845 (21.46)	0.115 (2.92)
P2664G-2R	.935 (23.75)	0.205 (5.21)

Receptacle

Hole diameter: Ø .069 (1.75)
Suggested drill: 1.75 mm

Material Housing: Nickel Silver, Gold plated

Material Post: Phosphorous Bronze, Gold plated



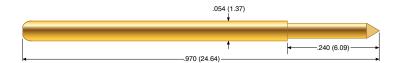
Tip Style					
1C	1R	2R	4V	1W	
Ø .040 (1.02)	Ø .040 (1.02)	Ø .050 (1.27)	Ø .070 (1.78)	Ø .070 (1.78)	
60°	r= .023 (0.58)	r=.029 (0.74)	120°		



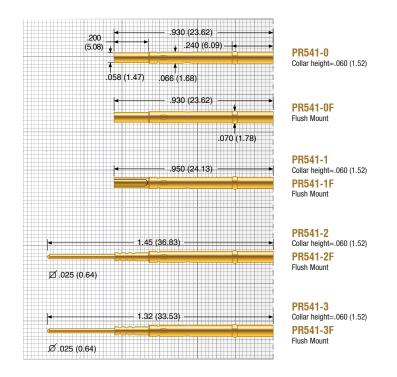








100 mil (2.54 mm)



Tip Style						
3C	1R	10	20	1V	1W	
Ø .040 (1.02)	Ø .040 (1.02)	Ø .060 (1.52)	Ø .025 (0.64)	Ø .070 (1.78)	Ø .070 (1.78)	
34°			□	120°		
Steel	r= .023 (0.58)					

Mechanical

Recommended Travel: .114 (2.90) Full Travel: .170 (4.32) Operating Temperature: -55° C to $+105^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	2.70 (77)	6.9 (196)
Alternate	2	1.30 (37)	2.8 (79)

Electrical (Static Conditions)

Current Rating: 8 amps
Average Probe Resistance: <10 mOhms

Materials and Finishes

Plunger: Heat-treated Steel or BeCu, Gold

plated over hard Nickel

Barrel: Phosphorous Bronze, Gold plated

Spring: Music Wire
Ball: Stainless Steel

Receptacle

Hole diameter: Ø .069 (1.75)

Suggested drill: 1.75 mm

Material Housing: Nickel Silver, Gold plated

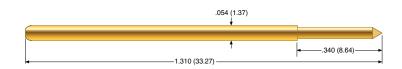
Material Post: Phosphorous Bronze, Gold plated







100 mil (2.54 mm)



Mechanical

Recommended Travel: .167 (4.24) Full Travel: .230 (5.84) Operating Temperature: -55°C to +105°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	2.50 (71)	6.5 (184)
Alternate	2	1.70 (48)	3.5 (99)
Elevated	3	2.50 (71)	8.2 (232)

Electrical (Static Conditions)

Current Rating: 8 amps Average Probe Resistance: <10 m0hms

Materials and Finishes

Plunger: Hardened Steel or BeCu, Gold plated

over hard Nickel

Phosphorous Bronze, Gold plated Barrel:

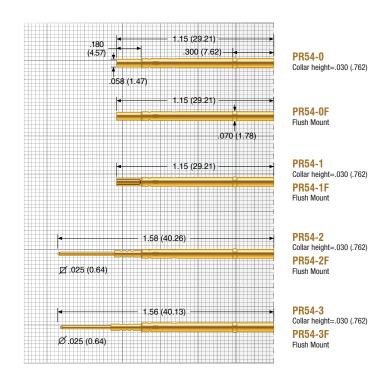
Music Wire Spring: Ball: Stainless Steel

Receptacle

Ø .069 (1.75) Hole diameter: Suggested drill: 1.75 mm

Material Housing: Nickel Silver, Gold plated Material Post:

Phosphorous Bronze, Gold plated



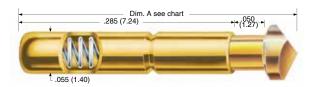
Tip Style						
2C	3C	1R	3P	10	1V	2W
Ø .040 (1.02)	Ø .040 (1.02)	Ø .030 (0.76)	Ø .060 (1.52)	Ø .060 (1.52)	Ø .060 (1.52)	Ø .060 (1.52)
60°	Steel	r= .018 (0.46)	90°		120°	







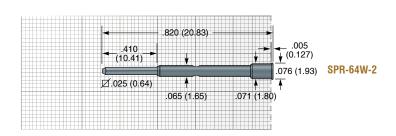




HPA-64 / SPA-64

100 mil (2.54 mm)





HPA / SPA Tip Style					
-1	-2	-3	-4	-7	-8
Ø .077 (1.96)	Ø .077 (1.96)	Ø .077 (1.96)	Ø .065 (1.65)	Ø .156 (3.96)	Ø .075 (1.99)
× 33° -	00° 90° 90° 90° 90° 90° 90° 90° 90° 90°	.075 (1.905)	√ √ 3 7° -	14° √	60°
-9	-10				
Ø .047 (1.19)	Ø .047 (1.19)				
	 =				

Mechanical

Recommended Travel: .050 (1.27)Full Travel: .050 (1.27)Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Preload	Rec. Travel
Standard	1.10 (31)	3.85 (109)

Electrical (Static Conditions)

Current Rating: 3 amps
Average Probe Resistance HPA / SPA: <50 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu, Gold plated

over hard Nickel

Barrel HPA: Work hardened Nickel Silver,

Gold plated over hard Nickel

Barrel SPA: Work hardened Nickel Silver Spring: Stainless Steel, Silver plated

Probe Overall Length

Model No.	Overall Length (Dim. 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)

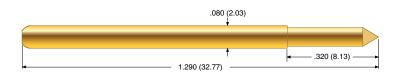
Receptacle

Hole diameter: Ø .067 to .069 (1.70 to 1.75) Suggested drill: #51 or 1.70 mm

Material: Nickel Silver alloy



125 mil (3.18 mm)



Mechanical

Recommended Travel: .167 (4.24) Full Travel: .230 (5.84) Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	1.50 (43)	3.0 (85)
Alternate	2	2.50 (71)	5.8 (164)

Electrical (Static Conditions)

Current Rating: 15 amps
Average Probe Resistance: <10 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu, Gold plated

over hard Nickel

Barrel: Phosphorous Bronze, Gold plated

Spring: Stainless Steel
Ball: Stainless Steel

Probe Overall Length

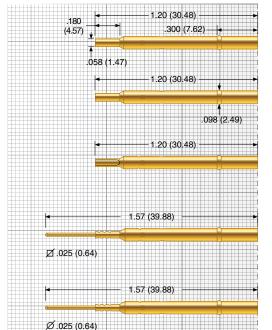
Model No.	Overall Length (Dim. A)	Plunger Extension (Dim. B)
P2665G	1.29 (32.77)	0.320 (8.13)
P2665G-2W	1.27 (32.26)	0.300 (7.62)

Receptacle

Hole diameter: Ø .094 to .096 (2.39 to 2.44) Suggested drill: #41 or 2.40 mm

Material Housing: Nickel Silver, Gold plated

Material Post: Phosphorous Bronze, Gold plated



PR80-0

Collar height = .090 (2.29)

PR80-0F

Flush Mount

PR80-1F

Flush Mount PR80-1

Collar height=.090 (2.29)

PR80-2F

Flush Mount PR80-2

Collar height=.090 (2.29)

PR80-3F

Flush Mount PR80-3

Collar height=.090 (2.29)

Tip Style					
1C	1R	1V	1W	2W	
Ø .066 (1.68)	Ø .066 (1.68)	Ø .090 (2.29)	Ø .090 (2.29)	Ø .153 (3.89)	
60°	r= .036 (0.91)	120°			





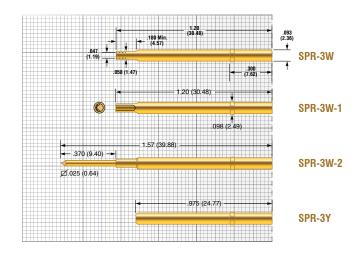






EPA-3 / SPA-3

125 mil (3.18 mm)



EPA Tip Style						
A	В	C	D	E	F	G
Ø .100 (2.54)	Ø .050 (1.27)	Ø .050 (1.27)	Ø .062 (1.58)	Ø .100 (2.54)	Ø .100 (2.54)	Ø .050 (1.27)
90°	30°			90°		90°
Н	J	L5	P5	T		
	_					
Ø .100 (2.54)	Ø .050 (1.27)	Ø .050 (1.27)	Ø .050 (1.27)	Ø .100 (2.54)		

SPA Tip Sty	/le					
A	В	C	D	E	F	G
Ø .100 (2.54)	Ø .050 (1.27)	Ø .050 (1.27)	Ø .062 (1.58)	Ø .100 (2.54)	Ø .100 (2.54)	Ø .050 (1.27)
90°	30°			90°		90°
Н	J	T				
Ø .100 (2.54)	Ø .050 (1.27)	Ø .100 (2.54)				

Mechanical

Recommended Travel: .167 (4.24)
Full Travel: .250 (6.35)

Operating Temperature

Standard Spring: -55°C to +85°C
 Alternate Spring: -55°C to +150°C
 Ultra High Spring: -55°C to +150°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		1.60 (45)	4.5 (128)
Alternate	- 1	2.52 (71)	6.5 (184)
Ultra High	- 2	4.18 (119)	11.7 (332)

Electrical (Static Conditions)

Current Rating: 6 amps
Average Probe Resistance EPA: <35 mOhms
Average Probe Resistance SPA: <50 mOhms

Materials and Finishes

Plunger EPA: Heat-treated BeCu,

Gold plated over hard Nickel

Plunger SPA: Heat-treated BeCu,

Rhodium plated over hard Nickel

Barrel: Work hardened Nickel Silver,

Gold plated over hard Nickel

Spring

Standard: BeCu, Silver plated

Alternate: Stainless Steel, Silver plated

Ultra High: Stainless Steel
Ball: Brass, Gold plated

Receptacle

Hole diameter: Ø .094 to .096 (2.39 to 2.44) Suggested drill: #41 or 2.40 mm

Material Housing: Nickel Silver,

Gold plated over hard Nickel

Material Post: Phosphorous Bronze, Gold plated

Special

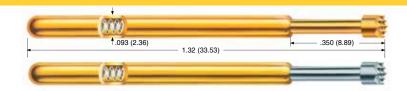
A "P" at the end of the part number in the "Special" field indicates the end of the barrel will have a slight bulge and is used with receptacles lacking detents.





EPA-4 / SPA-4

187 mil (4.75 mm)



Mechanical

 Recommended Travel:
 .167 (4.24)

 Full Travel:
 .250 (6.35)

Operating Temperature

Standard Spring: -55°C to +85°C
 Alternate Spring: -55°C to +150°C
 Ultra High Spring: -55°C to +150°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard		2.20 (62)	4.8 (136)
Alternate	- 1	3.20 (90)	6.9 (196)
Ultra High	- 2	6.70 (190)	11.8 (335)

Electrical (Static Conditions)

Current Rating: 7 amps
Average Probe Resistance EPA: <35 mOhms
Average Probe Resistance SPA: <50 mOhms

Materials and Finishes

Plunger EPA: Heat-treated BeCu,

Gold plated over hard Nickel

Plunger SPA: Heat-treated BeCu,

Rhodium plated over hard Nickel

Work hardened Nickel Silver,

Gold plated over hard Nickel

Spring

Barrel:

Standard: BeCu, Silver platedAlternate: Stainless Steel, Silver plated

• Ultra High: Stainless Steel
Ball: Brass, Gold plated

Receptacle

Hole diameter: Ø .107 to .109 (2.72 to 2.77) Suggested drill: 2.75 mm

Material Housing: Nickel Silver,

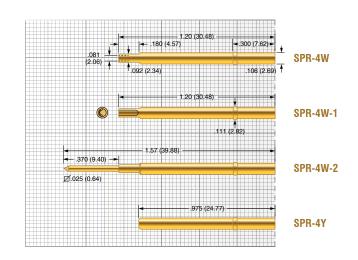
Gold plated over hard Nickel

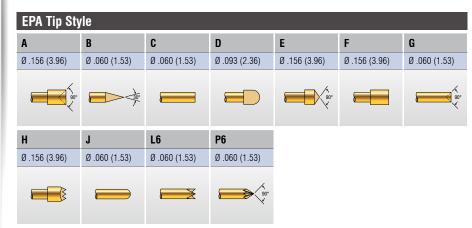
Material Post: Phosphorous Bronze, Gold plated

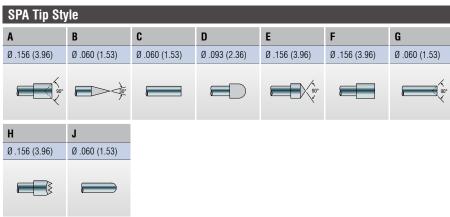
Special

A "P" at the end of the part number in the "Special" field indicates the end of the barrel will have a slight bulge and is used with receptacles lacking detents.





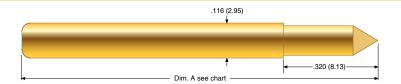




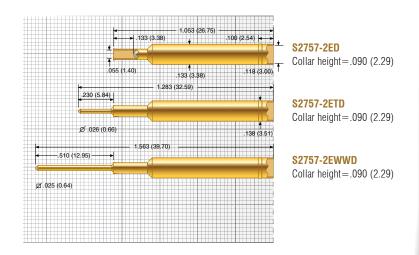








187 mil (4.75 mm)



Tip Style						
1C	1R	1V	1W	2W	3W	
Ø .098 (2.49)	Ø .120 (3.05)	Ø .152 (3.86)	Ø .154 (3.91)	Ø .250 (6.35)	Ø .122 (3.10)	
60°		120°				

Mechanical

Recommended Travel: .167 (4.24) Full Travel: .230 (5.84) Operating Temperature: -55° C to $+150^{\circ}$ C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Standard	1	2.00 (57)	4.0 (113)
Alternate	2	3.50 (99)	6.9 (194)

Electrical (Static Conditions)

Current Rating: 20 amps
Average Probe Resistance: <10 mOhms

Materials and Finishes

Plunger: Heat-treated BeCu, Gold or Silver

plated over hard Nickel

Barrel: Phosphorous Bronze, Gold plated

Spring: Stainless Steel
Ball: Stainless Steel

Probe Overall Length

Model No.	Overall Length (Dim. A)
P2757G	1.210 (30.73)
P2757G-2C	1.140 (28.96)
P2757G-1W	1.205 (30.61)
P2757G-2W	1.205 (30.61)

Receptacle

Hole diameter: Ø .1350 to .1365 (3.43 to 3.47) Suggested drill: #29 or 3.45 mm

Material Housing: Brass, Gold plated

Material Post: Phosphorous Bronze, Gold plated



EPA-5 / SPA-5

187 mil (4.75 mm)



Mechanical

Recommended Travel: .167 (4.24)
Full Travel: .250 (6.35)

Operating Temperature

Light Spring: -55°C to +85°C
 Standard Spring: -55°C to +150°C
 Ultra High Spring: -55°C to +105°C

Spring Force in oz. (grams)

	Order Code	Preload	Rec. Travel
Light	- 1	1.96 (56)	3.5 (99)
Standard		6.13 (174)	16.0 (454)
Ultra High	- 2	12.90 (366)	48.0 (1361)

Electrical (Static Conditions)

Current Rating: 8 amps
Average Probe Resistance EPA: <35 mOhms
Average Probe Resistance SPA: <50 mOhms

Materials and Finishes

Plunger EPA: Heat-treated BeCu,

Gold plated over hard Nickel

Plunger SPA: Heat-treated BeCu,

Rhodium plated over hard Nickel

Barrel: Work hardened Nickel Silver,

Gold plated over hard Nickel

Spring

Light: BeCu, Silver plated
Standard: Stainless Steel, Silver plated
Ultra High: Music Wire, Silver plated

Ball: Brass, Gold plated

Receptacle

Hole diameter: Ø .141 to .143 (3.58 to 3.63) Suggested drill: 3.60 mm

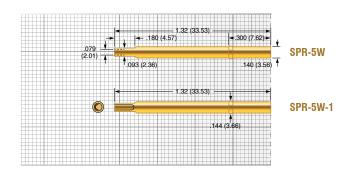
Material Housing: Nickel Silver,

Gold plated over hard Nickel

Special

A "P" at the end of the part number in the "Special" field indicates the end of the barrel will have a slight bulge and is used with receptacles lacking detents.





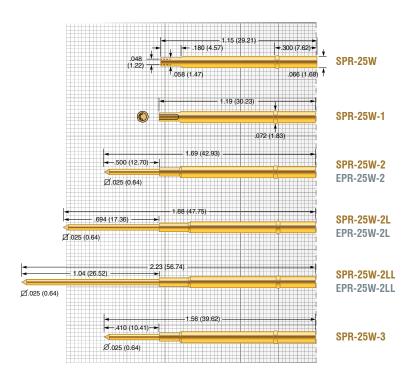
EPA Tip Sty	EPA Tip Style					
A	В	E	Н			
Ø .156 (3.96)	Ø .080 (2.03)	Ø .156 (3.96)	Ø .156 (3.96)			
90°	\$10°	90°				

SPA 11p Sty	/ie			
A	В	Н		
Ø .156 (3.96)	Ø .080 (2.03)	Ø .156 (3.96)		
90°	30°			



SPP-25

100 mil (2.54 mm)



Tip Style			
Н	HF		
Ø .060 (1.52)	Ø .080 (2.03)		

Mechanical Recommended Travel: .167 (4.24) Full Travel: .250 (6.35) Operating Temperature: -55°C to +105°C Spring Force in oz. (grams) Order Code Preload Rec. Travel Standard 0.84 (23.8) 4.0 (113) 3.08 (87.3) 6.0 (170) Alternate -6

Electrical (Static Conditions)

Current Rating: 8 amps
Average Probe Resistance: 8 mOhms

Materials and Finishes

Plunger: BeCu, LFRE proprietary plating
Barrel: Nickel Silver, Gold plated

Spring

• Standard: Stainless Steel
• Alternate: Music Wire

Receptacle

Hole diameter: \emptyset .067 to .069 (1.70 to 1.75) Suggested drill: #51 or 1.75 mm

Material

SPR Housing: Nickel Silver, Gold platedEPR Housing: Nickel Silver, unplated

Post: Phosphorous Bronze, Gold plated



Epoxy Mount

GENERAL PURPOSE — EPOXY OR SOLDER MOUNT

The ECT / Pylon line of standard products includes non-replaceable Pogo Contacts. They differ from the replaceable contacts in that they do not require a socket or receptacle and are designed to be permanently mounted. Non-Replaceable Probes are designed for industrial applications where typical probe life meets or exceeds those of the end-use product. They are typically located inside the end product where probe replacement is either impossible or end-product damage would occur.

Electrical connections are typically made with a soldered connection for electrical and mechanical stability.

The probe is retained in the retention plate either with epoxy or solder on the outside of the probe body.

Non-replaceable Pogo Contacts are another example of ECT's and Pylon's quality and innovation and how it can work for you.

EPOXY MOUNT INSTRUCTIONS

ECT non-replaceable products may be retained in mounting holes using solder or adhesives.

- Solder mount If conductivity is required, we recommend utilizing solder mounting for retention.
- Epoxy mount If conductivity is not required, utilizing epoxy adhesives for mounting is acceptable.

Adhesives used are typically two-part epoxies, and can be either conductive or non-conductive dependent upon the application. ECT does not recommend the use of fast setting Superglue® style adhesives as they can outgas and may put a nearly invisible barrier on contact surfaces. Epoxy mounting, when properly utilized, provides excellent holding or retention ability as compared to the traditional mounting techniques such as solder mounting.

Several types of epoxies are available for use, dependent on whether conductivity is required, desired set time, temperature of application and the requirements and temperature in the end use.

Here are some recommendations for epoxy adhesives which are known to work well in typical customer applications:

DEVCON #14277 Two-part epoxy
 Loctite 3140 Hysol Epoxy Resin
 Loctite 3164 Hysol Epoxy Hardener

• DURALCO #4525 Room temperature curing epoxy

Non-Replaceable Epoxy or Solder

Epoxy or Solder Mount



EPOXY MOUNTING PROCEDURE

- 1. The probe barrel must be clean and free of any coatings, paint, or other materials.
- 2. Additionally, the plated through hole, or mounting hole must be clean and free of any coatings, paint, or other materials.
- 3. To install the probe, apply a thin layer of conductive epoxy to the clean inside area of the mounting hole, or to the clean outside of the probe barrel, according to manufacturer's directions.
- 4. If desired, apply a release agent, on all other surfaces to keep the epoxy from adhering to undesirable locations. Utilize a release agent which is compatible with your process.
- 5. If the depth of the mounting hole is sh low, ensure that a fixture is used to assure perpendicularity of the probe to the mounting plane.
- 6. Once the epoxy hardens, or sets up to an acceptable stiff plastic consistency, remove any fixturing or release agents.



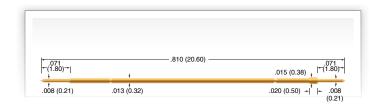
MEP-22B

20 mil (0.51 mm)

.748 (19.00) .079 (2.01) .012 (0.30) .013 (0.36) .006 (0.15) .008 (0.20)

MEPJ-22BD

20 mil (0.51 mm)



Mechanical

Recommended Travel: .050 (1.27) Full Travel: .079 (2.01) Operating Temperature: -55°C to +105°C

		Preload	Rec. Travel
Standard		0.51 (14)	1.69 (48)
lectrical (Static C	onditions)		
Current Rating:			2 amp
Average Probe Res	istance:		<125 m0hm
Materials and Fini	shes		
Plunger:	Heat-treated	Steel, Nickel Boron	plated
Barrel:	BeCu alloy,	Gold plated	
Spring:	Music Wire,	Gold plated	
Nounting			
Hole diameter:		Ø .0 ⁻	135 to .0140 (0.34 to 0.36
Suggested drill:			#80 or 0.35 mn
Tin Ohulo			
Tip Style			
В			
Ø .006 (0.15)			

Mechanical

Recommended Travel: .052 (1.33) Full Travel: .079 (2.01) -55° C to $+105^{\circ}$ C Operating Temperature:

Standard Electrical (Static Cor Current Rating: Average Probe Resist Materials and Finish Plunger: Barrel:	nce:	1.69 (48) 2 amp <125 m0hm
Current Rating: Average Probe Resist Materials and Finish Plunger:	nce:	
Average Probe Resist Naterials and Finish Plunger:	s	
Materials and Finish Plunger:	s	<125 m0hm
Plunger:	=	
0	Host treated Steel Nickel Boron	
Barrel:	ical-licalcu Sicci, Mickel Doloi	plated
	Phosphor Bronze, Gold plated	
Spring:	Music Wire, Gold plated	
Nounting		
Hole diameter:	Ø .0	0135 to .0140 (0.34 to 0.36
Suggested drill:		
Mounting Hole diameter:	0. 0	0135 to .0140 (0.34 to 0



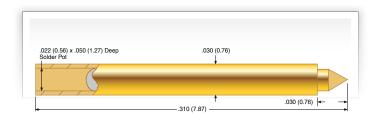


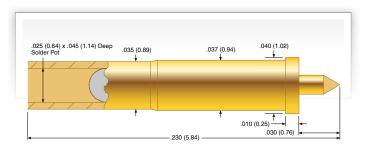
A-A-S

39 mil (1.00 mm)

A-S

50 mil (1.27 mm)





Mechanical

Recommended Travel: .020 (0.51) Full Travel: .030 (0.76) Operating Temperature: -55° C to $+150^{\circ}$ C

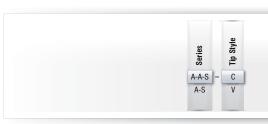
Spring Force in oz. (grams)

		Preload	Rec. Travel
Standard		0.5 (14)	2.0 (57)
Electrical (Sta	tic Conditions)		
Current Rating	j:		2 amps
Average Probe	e Resistance:		<30 m0hms
Materials and	Finishes		
Plunger:	Heat treated B	seCu, Gold plated	
Barrel:	Phosphor Bro	nze, Gold plated	
Spring:	Stainless Stee	el, Gold plated	
Ball:	Stainless Stee	el, Gold plated	
Epoxy Mountin	ıg		
Hole diameter	:		Ø .0315 (0.80)
Suggested dri	II:		#68 or 0.79 mm
Tip Style			
C	R		
Ø .021 (0.53)	Ø .021 (0.53)		
60°			

Mechanical

Recommended Travel: .020 (0.51) Full Travel: .030 (0.76) Operating Temperature: -55° C to $+150^{\circ}$ C

		Preload	Rec. Travel
Standard		0.7 (20)	1.3 (37)
Electrical (Stat	ic Conditions)		
Current Rating	:		2 amps
Average Probe	Resistance:		<30 m0hms
Materials and I	Finishes		
Plunger:	Heat trea	ted BeCu or Brass, Gold	plated
Barrel:	Brass, G	old plated	
Spring:	Stainless	Steel, Gold plated	
Ball:	Stainless	Steel, Gold plated	
Viounting			
Hole diameter:			Ø .0380 (0.97
Suggested dril	l:		#62 or 0.97 mn
Tip Style			
C	R	V	
Ø .014 (0.36)	Ø .014 (0.36)	Ø .014 (0.36)	
		,	
<			

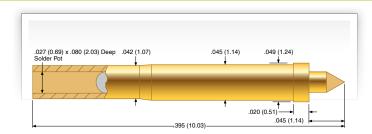






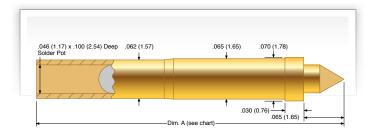
C-S

75 mil (1.91 mm)



E-S

100 mil (2.54 mm)



Mechanical

Recommended Travel: .030 (0.76) Full Travel: .045 (1.14) Operating Temperature: -55°C to +150°C

		Preload	1	Rec. Travel
Standard		0.5 (14)		3.4 (96)
lectrical (Static	Conditions)			
Current Rating:				5 amps
Average Probe R	esistance:			<30 m0hms
Materials and Fi	nishes			
Plunger:	Heat treated	BeCu, Gold pl	ated	
Barrel:	Brass, Gold	plated		
Spring:	Stainless St	eel, Gold plate	t	
Ball:	Stainless St	eel, Gold plate	d	
poxy Mounting				
Hole diameter:				Ø .0465 (1.18
Suggested drill:				#56
Tip Style				
	R			
Ø .026 (0.66)	Ø .026 (0.66)			

Mechanical

Recommended Travel: .043 (1.09) Full Travel: .065 (1.65) Operating Temperature: -55°C to +150°C

		Preload	Red	c. Travel		
Standard		1.0 (29)	2.	75 (78)		
Electrical (Stat	ic Conditions)					
Current Rating:				5 amp		
Average Probe	Resistance:			<30 m0hm		
Materials and F	aterials and Finishes					
Plunger:	Heat treat	ed BeCu, Gold pl	ated			
Barrel:	Brass, Go	ld plated				
Spring:	Stainless	Steel, Gold plate	d			
Ball:	Stainless	Steel, Gold plate	d			
Probe Overall L Model No.	.ciiylii	Over	all Length (D	Oim A)		
E-S-C, F,R		.495 (1				
E-S-V, W		.540 (1	3.72)			
Tip Style						
C	F	R	V	W		
Ø .045 (1.14)	Ø .045 (1.14)	Ø .045 (1.14)	Ø .090 (2.29)	Ø .070 (1.78)		
			/			





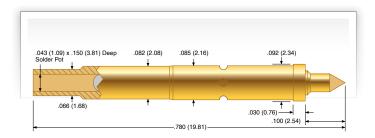


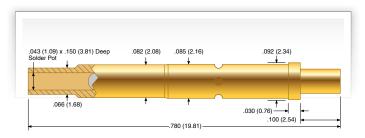
F-S

125 mil (3.18 mm)

G-S

125 mil (3.18 mm)





Mechanical

Recommended Travel: .066 (1.68) Full Travel: .100 (2.54) Operating Temperature: -55° C to $+150^{\circ}$ C

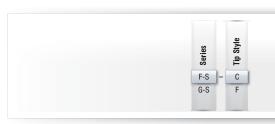
Spring Force in oz. (grams)

		Preload	Rec. Travel		
Standard		2.0 (57)	6.0 (170)		
Electrical (Statio	c Conditions)				
Current Rating:			5 amps		
Average Probe I	Average Probe Resistance:				
Materials and F	inishes				
Plunger:	Heat treat	ted BeCu, Gold pla	ated or		
	Heat treat	ated			
Barrel:	Brass, Go	old plated			
Spring:	Stainless	Steel, Gold plated	t		
Ball:	Stainless	Steel, Gold plated	d		
Epoxy Mounting					
Hole diameter:			Ø .0860 (2.18)		
Suggested drill:	;		#44		
Tip Style					
C	R	W			
Ø .045 (1.14)	Ø .045 (1.14)	Ø .090 (2.29)			
60°					

Mechanical

Recommended Travel: .067 (1.68) Full Travel: .100 (2.54) Operating Temperature: -55° C to $+150^{\circ}$ C

		Preload	Rec. Travel
Standard		3.0 (85)	6.0 (170)
Electrical (Statio	: Conditions)		
Current Rating:	•		5 amp
Average Probe F	Resistance:		<30 m0hm
Materials and Fi	inishes		
Plunger:	Heat treated	BeCu, Gold plated	
Barrel:	Brass, Gold	plated	
Spring:	Stainless St	eel, Gold plated	
Ball:	Stainless St	eel, Gold plated	
Mounting			
Hole diameter:			Ø .0860 (2.18
Suggested drill:			#44
=1 0.1			
Tip Style			
F	R		
Ø .061 (1.55)	Ø .061 (1.55)		





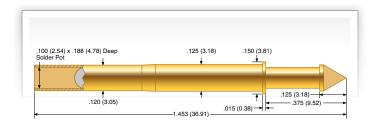


156 mil (3.96 mm)

.062 (1.57) x .110 (2.79) Deep Solder Pot .088 (2.24) .093 (2.36) .110 (2.79) .812 (20.62)

P2550

187 mil (4.75 mm)



Mechanical

Recommended Travel: .093 (2.36) Full Travel: .139 (3.53) -55°C to +150°C Operating Temperature:

Spring Force in oz (grams)

		Preload	Rec. Travel
Standard		1.0 (28)	2.3 (65)
lectrical (Static (Conditions)		
Current Rating:			5 amp
Average Probe Re	sistance:		<30 m0hm
Materials and Fini	shes		
Plunger:	Heat-treate	d BeCu, Gold plated o	over hard Nickel
Barrel:	Brass, Gol	d plated	
Spring:	Stainless S	Steel	
Ball:	Stainless S	Steel, Gold plated	
poxy Mounting			
Hole diameter:			Ø .0945 (2.40
Suggested drill:			#41 mm or 2.40 mn
Tip Style			
1 2			

Mechanical

Recommended Travel: .167 (4.24) Full Travel: .250 (6.35) Operating Temperature: -55°C to +150°C

Spring Force in oz. (grams)				
		Preload	Rec. Travel	
Standard		1.00 (28)	3.20 (91)	
High	-8	4.00 (113)	6.70 190)	

Electrical (Static Conditions)

Current Rating: 5 amps Average Probe Resistance: <30 m0hms

Materials and Finishes

Heat-treated BeCu, Gold plated over hard Nickel Plunger:

Barrel: Brass, Gold plated Spring: Stainless Steel

Stainless Steel, Gold plated Ball:

Epoxy Mounting

Hole diameter: Ø .126 (3.20) Suggested drill: #30 or 3.20 mm

Tip Style				
8	0	6	9	
Ø .156 (3.96)	Ø .122 (3.10)	Ø .154 (3.91)	Ø .125 (3.18)	
	60°			



Ø .059 (1.50)

Ø .059 (1.50)





General Purpose

GENERAL PURPOSE - PRESS RING MOUNT

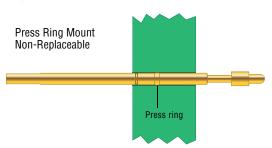
The ECT / Pylon line of standard products include non-replaceable Pogo Contacts. They differ from the replaceable contacts in that they do not require a socket or receptacle and are designed to be permanently mounted. Non-Replaceable Probes are those designed for industrial applications where typical probe life meets or exceeds those of the end-use product. They are typically located inside the end product where probe replacement is either impossible or end-product damage would occur.

Electrical connections are typically made by crimping or soldering a wire at the terminal of the probe.

The probe is retained in the retention plate by its provided press ring, which will deform during the installation process and therefore provides a permanent mount.

Non-replaceable Pogo Contacts are another example of ECT's and Pylon's quality and innovation and how it can work for you.

Press Ring Mount







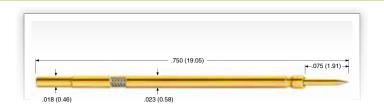
MEPJ-21

18 mil (0.45 mm)

.059 (1.50) .039 (1.50) .039 (1.50) .008 (0.20) .009 (0.25) .0012 (0.30)

MEP-20

25 mil (0.635 mm)



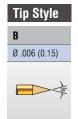
Mechanical

Recommended Travel: .026 (0.67) Full Travel: .039 (1.00) Operating Temperature: .55°C to +105°C

Spring Force in oz. (grams)

		Preload	Rec. Travel	
Standard		.18 (5)	.53 (15)	
Electrical (Static Current Rating: Average Probe R	,		2 amps <150 mOhms	
Materials and Fi	nishes			
Plunger:	Heat-treated	Steel, Gold plated		
Barrel:	Phosphor Br	onze, Gold plated		
Spring:	Music Wire,	Gold plated		
Mounting				
Hole diameter:		Ø .0	102 to .0106 (0.26 to 0.27)	
Suggested drill:			.0102 or 0.26 mm	
Termination (
Crimp connection	on for 35 AWG or 0	016 mm ²		

150 20 21 B MEP 20 B



Mechanical

Recommended Travel: .050 (1.27) Full Travel: .075 (1.91) Operating Temperature: -55° C to $+105^{\circ}$ C

Spring Force in oz. (grams)

		Preload	Rec. Travel		
Standard		.39 (11)	1.39 (39)		
Electrical (Static (Conditions)				
Current Rating:			2 amps		
Average Probe Resistance:			<50 m0hm		
Materials and Fini	shes				
Plunger:	Heat-treated Be	Cu, Gold pla	ated over hard Nickel		
Barrel: Work hardened BeCu,					
	Gold plated ove	r hard Nicke	9		
Spring:	Music Wire, Silv	ver plated			
Mounting					
Hole diameter:			Ø .0205 to .0215 (0.52 to 0.55		
Suggested drill:			#75 or 0.52 mm		
Minimum mounting plate thickness			.250 (6.35)		
Order versions					
MEP-20x	Crimp				
MED OOM OO	Orimo with 20 i	nahaa af 20	AVA/Oittll		

MEP-20x-30 Crimp with 30 inches of 30 AWG wire attached

Application

- 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).
- Shrink tubing is recommended for use on alternating receptacles to reduce the possibility of electrical shorting.

Tip Style				
В	G	J	U	
Ø .010 (0.25)	Ø .010 (0.25)	Ø .010 (0.25)	Ø .006 (0.15)	
	90°			