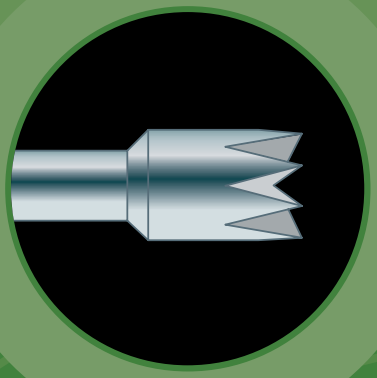
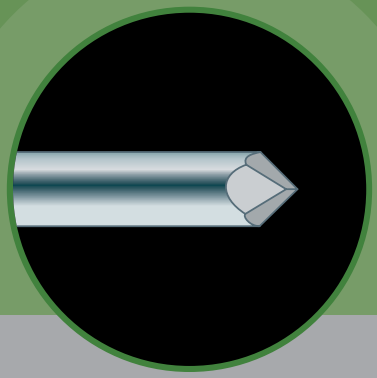
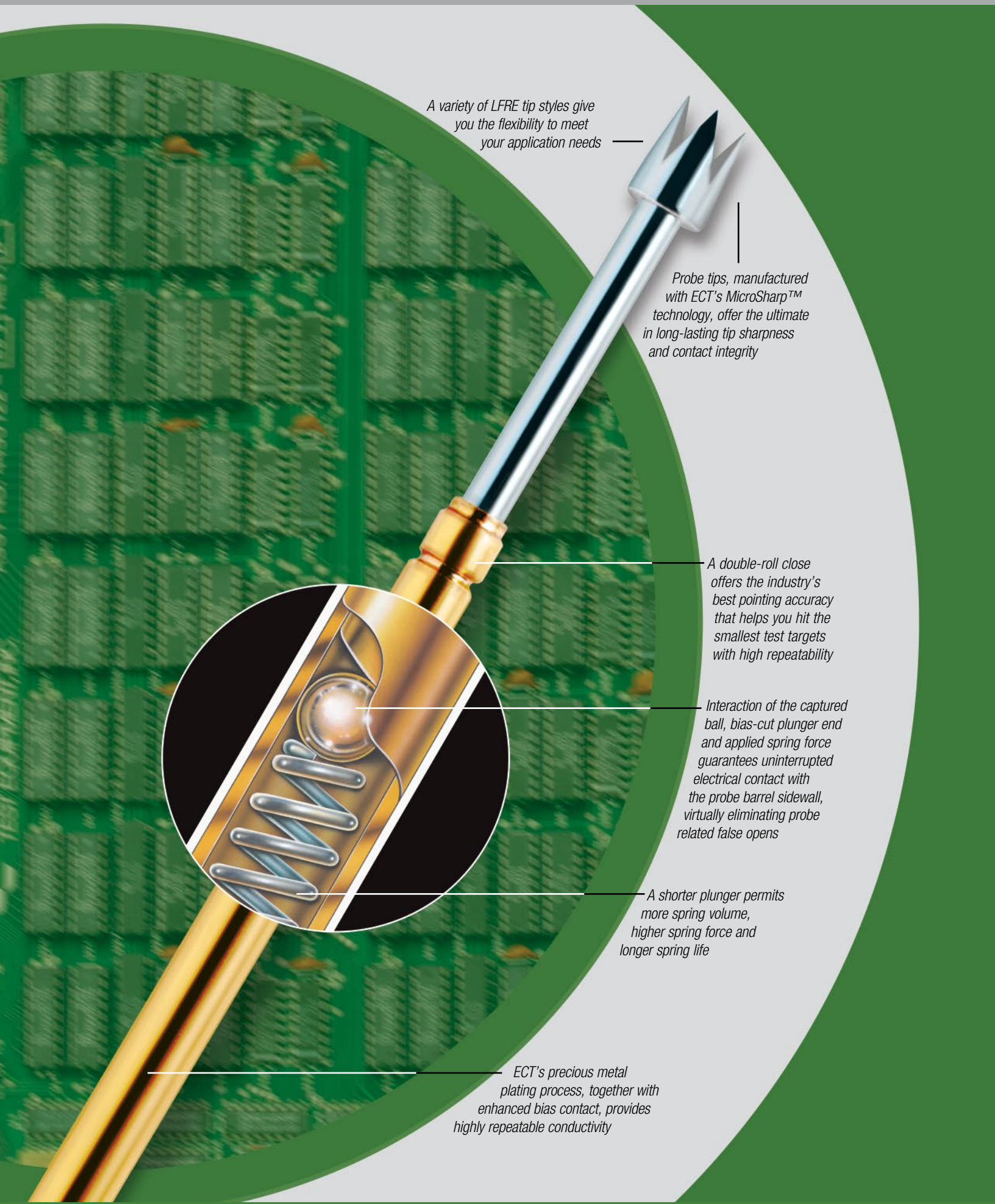
C O N T A C T P R O D U C T S G R O U P

LFRE





Lead-Free Pogo® Contacts


A variety of LFRE tip styles give you the flexibility to meet your application needs
Probe tips, manufactured with ECT's MicroSharp™ technology, offer the ultimate in long-lasting tip sharpness and contact integrity
A double-roll close offers the industry's best pointing accuracy that helps you hit the smallest test targets with high repeatability
Interaction of the captured ball, bias-cut plunger end and applied spring force guarantees uninterrupted electrical contact with the probe barrel sidewall, virtually eliminating probe related false opens
A shorter plunger permits more spring volume, higher spring force and longer spring life
ECT's precious metal plating process, together with enhanced bias contact, provides highly repeatable conductivity

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

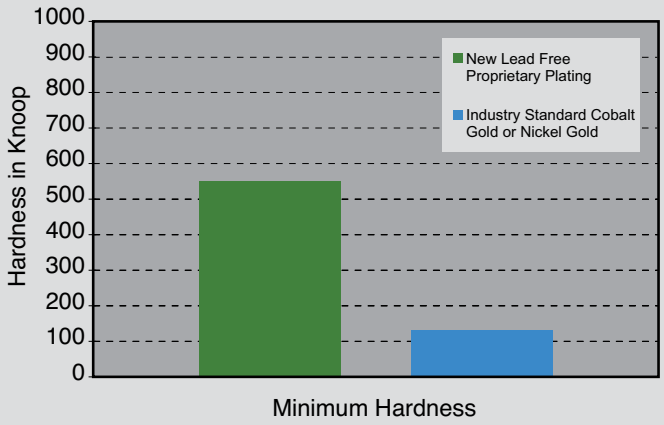
ECT's new Lead Free probe line incorporates a number of features that will significantly reduce the issues that arise when switching to lead free solder as well as those contact issues that arise with OSP and No-Clean solder flux.

- **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.
- **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.
- **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.

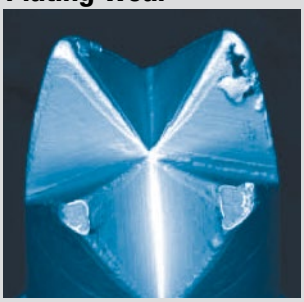
New Proprietary Lead Free Plating vs. the Industry Standard

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.

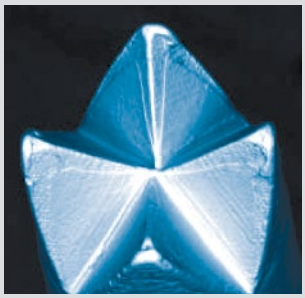
Hardness Comparison of Lead Free Proprietary Plating to the Industry Standard



Plating Wear

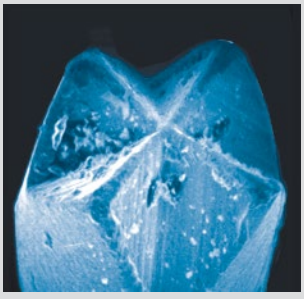


Industry Standard Gold

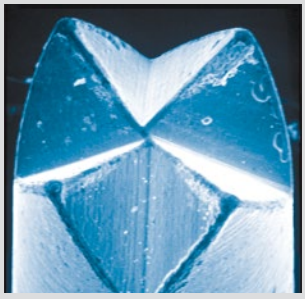


New Proprietary Plating

Contaminant Transfer



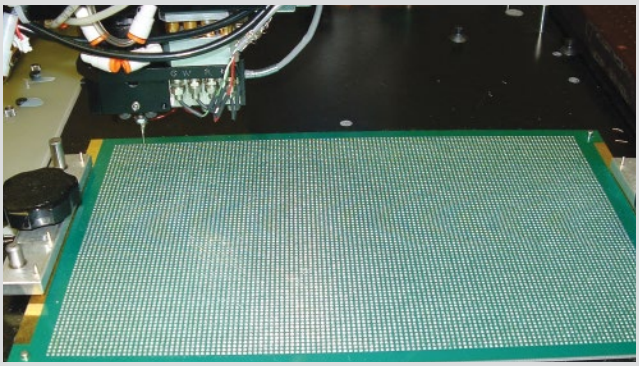
Industry Standard Gold



New Proprietary Plating

In House Testing

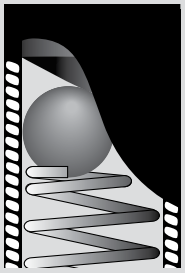
ECT has performed numerous in house tests on our new Lead Free probe in order determine its wear properties and its life against lead free solder and no clean solder flux. The following is a resistance graph of the average resistance of a group of Lead Free probes and Equivalent PogoPlus Steel probes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



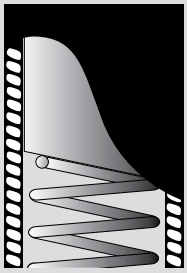
Lead-Free Solder Panel

Lead-Free PogoPlus Benefits vs. Conventional Bias Probes

ECT's new Lead Free probes are designed with the same great performance benefits as our PogoPlus probes.

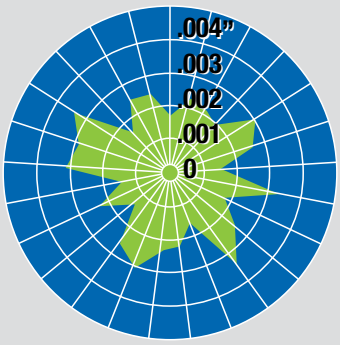


PogoPlus Bias Design
The enhanced bias-ball design forces contact between plunger and barrel wall at all times, virtually eliminating probe-related false opens.



Conventional Bias Design
Angle of spring coil end matches biased plunger end, compromising bias force and electrical contact.

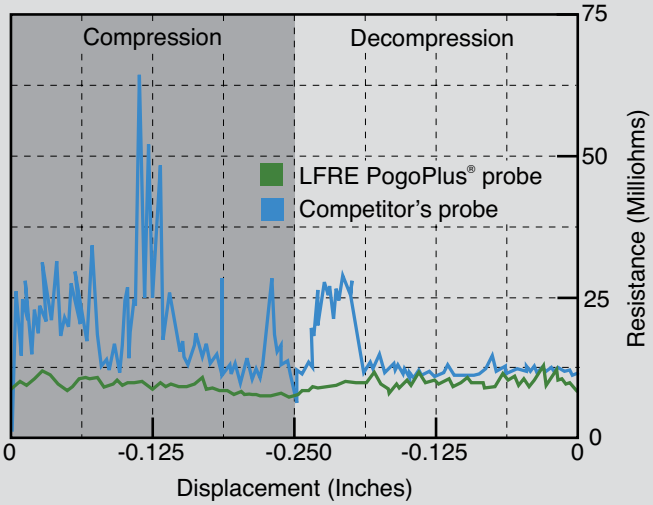
Tighter Pointing Tolerances
ECT Pogo contacts deliver superior pointing accuracy demonstrated by test results measuring sideload TIR.



Objective
Measure the resistance of ECT's LFRE probes and a standard high performance probe as they are compressed and decompressed. For reliable results, a probe should have a resistance of less than 10 milliohms (with a standard deviation of <5 milliohms) throughout the compression/decompression cycle.

Method
Each probe is placed in a calibrated test station that dynamically measures resistance relative to probe displacement. Displacement resolution is 0.0001 inch. For each increment in displacement, resistance is simultaneously measured with a resolution of 1 milliohm.

Results
Test results of ECT's LFRE probes compared to conventional bias probe performance are shown in the graph below.



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

Discussion
As the displacement vs. resistance graph clearly shows, the bias ball design of ECT's LFRE outperforms the competitor's probe by demonstrating more repeatable resistivity across its travel range. Because false opens occur when large changes in resistivity occur over short displacements, a steeper slope in the displacement/resistivity curve indicates a greater likelihood of a false reject.

For a more detailed discussion of the test method and results, please ask your ECT salesperson for a copy of the complete test report.

LFRE-25

Test Centers .100" (2.54mm)

Specifications

Mechanical
Full Travel: .250" (6.35mm)
Recommended Travel: .167" (4.24mm)
Mechanical Life Exceeds: 1 x 10^6 Cycles

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

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

Average Probe Resistance 8 mOhms

Materials and Finishes

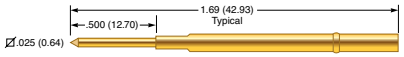
Plunger:	High Performance Alloy, LFRE proprietary plating
Barrel:	Work hardened Phosphor Bronze, HPA-GOLD™ plated (I.D. and O.D.) over Hard Nickel
Spring:	Music wire, Nickel Plated
Ball:	Stainless Steel

Spring Force in oz. (grams)

	Order Code	Preload	2/3 travel
Elevated	-6.5	2.65 (75)	6.5 (184)
High	-8	3.49 (99)	8.0 (227)
Ultra High	-10	4.42 (125)	10.0 (283)
Premium	-12	5.08 (144)	12.0 (340)

Receptacle Specifications

SPR-25W-2 ⌀ (wire wrap, square post)



SPR-25W (Crimp termination)
SPR-25W-1 (Solder cup termination)
SPR-25W-2 (Wire wrap, square post)
EPR-25W-2 (Wire wrap, square post)
SPR-25W-2L (Wire wrap, long square post)
EPR-25W-2L (Wire wrap, long square post)
SPR-25W-2LL (Wire wrap, extra-long square post)
EPR-25W-2LL (Wire wrap, extra-long square post)
SPR-25W-3 (Connector pin/round post)

Note: EPR receptacles are non-finished versions.

LFRE-1

Test Centers .075" (1.94mm)

Specifications

Mechanical
Full Travel: .250" (6.35mm)
Recommended Travel: .167" (4.24mm)
Mechanical Life Exceeds: 5 x 10^5 Cycles

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

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

Average Probe Resistance 10 mOhms

Materials and Finishes

Plunger:	High Performance Alloy, LFRE proprietary plating
Barrel:	Work hardened Phosphor Bronze, HPA-GOLD™ plated (I.D. and O.D.) over Hard Nickel
Spring:	Music wire, Nickel Plated
Ball:	Stainless Steel

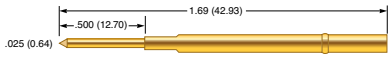
Spring Force in oz. (grams)

	Order Code	Preload	2/3 travel
Alternate	-6	2.44 (69)	6.0 (170)
Elevated	-7	2.85 (81)	7.0 (198)
High	-8	3.18 (90)	8.0 (227)
Ultra High*	-10	3.73 (106)	10.0 (283)

* May observe slight decrease in cycle life

Receptacle Specifications

LTR-1W-2 ⌀ (wire wrap, square post)



LTR-1W (Crimp termination)
LTR-1W-1 (Solder cup termination)
LTR-1W-2 (Wire wrap, square post)
LTR-1W-2L (Wire wrap, long square post)
ELTR-1W-2L (Wire wrap, long square post)
LTR-1W-2LL (Wire wrap, extra-long square post)
ELTR-1W-2LL (Wire wrap, extra-long square post)

Note: ELTR receptacles are non-finished versions.

LFRE-72

Test Centers .050" (1.27mm)

Specifications

Mechanical
Full Travel: .250" (6.35mm)
Recommended Travel: .167" (4.24mm)
Mechanical Life Exceeds: 5 x 10^5 Cycles

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

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

Average Probe Resistance 15 mOhms

Materials and Finishes

Plunger:	High Performance Alloy, LFRE proprietary plating
Barrel:	Work hardened Beryllium copper, HPA-GOLD™ plated (I.D. and O.D.) over Hard Nickel
Spring:	Music wire, Nickel Plated
Ball:	Stainless Steel

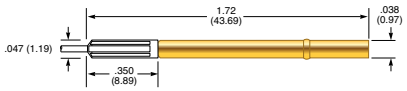
Spring Force in oz. (grams)

	Order Code	Preload	2/3 travel
Alternate	-6	2.63 (75)	6.0 (170)
Elevated	-7	2.05 (58)	7.0 (198)
High	-8	3.18 (90)	8.0 (227)
Ultra High*	-10	3.99 (113)	10.0 (283)

* May observe slight decrease in cycle life

Receptacle Specifications

HPR-72W-4 ⌀ (Fastite™ wire termination)
(Shown with DS-62-1 installed)



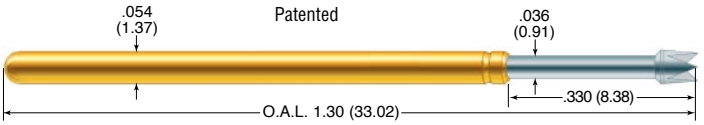
HPR-72W (Crimp termination)
HPR-72W-1 (Solder cup termination)
HPR-72W-4 (FASTITE® wire termination)
HPR-72W-28 (Preterminated with 28 AWG wire)
HPR-72W-30 (Preterminated with 30 AWG wire)

HOW TO ORDER

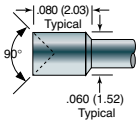
1. For each probe, specify the probe model, tip style, and spring force as shown in example.

Example: LFRE-25T36-10
(probe model | tip style | spring force)

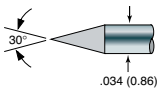
For the BeNeLux countries contact:
Romex B.V.
Remmerden 5
3911 TZ Rhenen, Netherlands.
Phone: +31-(0)317298787
Fax: +31-(0)317398780
E-mail: info@romex.nl
Webshop: http://www.romex.nl



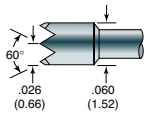
LFRE-25A



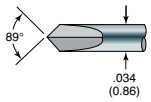
LFRE-25B



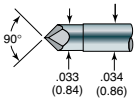
LFRE-25H



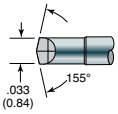
LFRE-25I



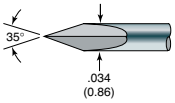
LFRE-25I8



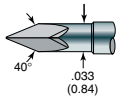
LFRE-25I15



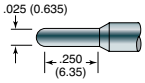
LFRE-25I35



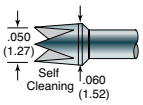
LFRE-25I40



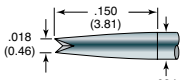
LFRE-25J



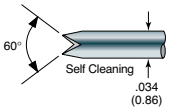
LFRE-25L



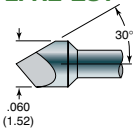
LFRE-25L18



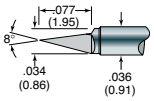
LFRE-25L36



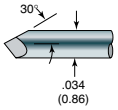
LFRE-25T



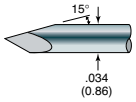
LFRE-25T1



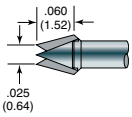
LFRE-25T30



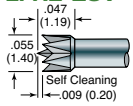
LFRE-25T36



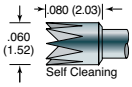
LFRE-25UN



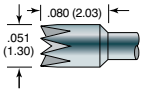
LFRE-25V

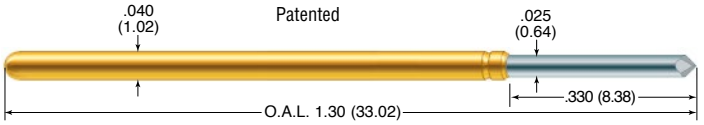


LFRE-25Z

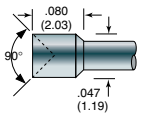


LFRE-25Z1

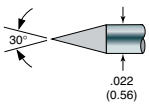




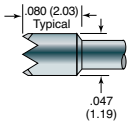
LFRE-1A



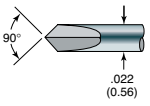
LFRE-1B



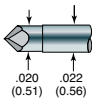
LFRE-1H



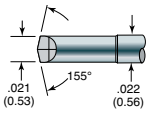
LFRE-1I



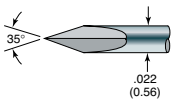
LFRE-1I8



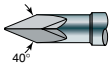
LFRE-1I15



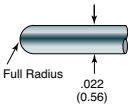
LFRE-1I35



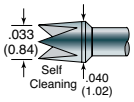
LFRE-1I40



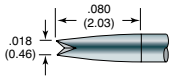
LFRE-1J



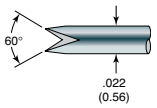
LFRE-1L



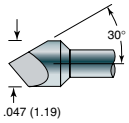
LFRE-1L18



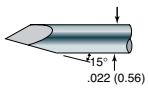
LFRE-1L24



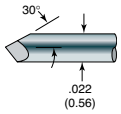
LFRE-1T



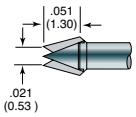
LFRE-1T24



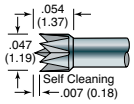
LFRE-1T30



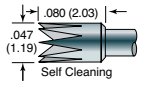
LFRE-1UN



LFRE-1V



LFRE-1Z



LFRE-1Z1

LFRE-72H

LFRE-72I

LFRE-72I8

LFRE-72I15

LFRE-72I40

LFRE-72J

LFRE-72T1

LFRE-72T20

LFRE-72T38

LFRE-72U

For the BeNeLux countries contact:
Romex B.V.
Remmerden 5
3911 TZ Rhenen, Netherlands.
Phone: +31-(0)317298787
Fax: +31-(0)317398780
E-mail: info@romex.nl
Webshop: http://www.romex.nl

 Lit. #1473-02-13