

# C SERIES SPRING PROBES

*Discrete Contact & Connector Solutions*



# SPRING PROBE TECHNOLOGY

Smiths Connectors is the world leader in spring contact probe design and the industry's expert in applying spring probes as connector contacts. Embodied in our connector products, probes are an enabling technology that fundamentally changes the capabilities of the products in which they are incorporated.



## FEATURES

### LOW PROFILE, HIGH COMPLIANCE RATIO

Spring probe technology permits a very high compliance-to-length ratio. This allows Smiths Connectors to design connectors as dense as 2mm, while maintaining 0.5mm of compliance. Spring probe connectors are low profile designs which are forgiving of challenging mating conditions and vibration environments.

### HIGH FREQUENCY

A short signal path, combined with design and signal integrity expertise, ensures remarkable connector solutions for both analog and digital applications.

### LOW STABLE RESISTANCE

Smiths Connectors' spring probes feature several innovations for control of DC performance. Advanced biasing techniques provide excellent stability of contact resistance, even under conditions of heavy shock and vibration. Our connectors can be designed to withstand up to 30 Amps of current.

### HIGHER CURRENT RATINGS

The design parameters of the contact (e.g., the number, diameter and angle of the wires) may be modified for any requirement. The number of wires can be increased so the contact area is distributed over a larger surface. Thus, the high current carried by each wire because of its intimate line contact, can be multiplied many times.

### HIGH INSERTION LIFE

Spring contact probes are capable of remarkable longevity from 20K to 300K cycles based on design. Our probes are driven by helical coil springs, which maintain a constant force of contact over millions of cycles. Our extensive plating and materials knowledge combined with engineering expertise delivers contacts that exceed the highest customer specifications for insertion life.

## BENEFITS

### EXCELLENT FOR BLIND MATE

Spring probe connectors are compliant on the surface of their mating half, rather than extending into it as with conventional pin and socket connectors, allowing unique blind-mate capabilities. Designed to engage and disengage at a 90° angle to its target, wiping into positions to clear contaminants, making probe technology the best approach to quick-disconnect applications.

### EXCEPTIONAL MISALIGNMENT TOLERANCE

A spring contact probe only requires a flat pad for its target. It will safely mate to that target if its tip strikes with the target's diameter. A probe-based connector is thus very forgiving of X-Y-Z, angular and rotational misalignment.

### ENVIRONMENTALLY SEALED

Smiths Connectors' application expertise and the durable nature of our contacts permit us to design connectors with excellent performance in harsh environments. IP68 and MIL810 requirements can be accommodated without sacrificing performance.

### SHOCK & VIBRATION

Spring contact probes provide a constant force against the mating contact surface, easily absorbing and compensating for movement seen during shock and vibration without contact interruption as defined by MIL-STD-810.

### SPRING PROBE CONNECTORS

Spring contact probes provide repeatable contact in the field for modular components, reduce costs and eliminate cable connections by providing a dependable direct connection in rotating or sliding joints.

## FEATURES

- ▶ **0.100 (2.54) pitch**
- ▶ **Design flexibility**
  - ▶ Ground and power currents available
  - ▶ 6 mm and 4 mm compressed heights
  - ▶ Surface mount, thru hole and solder cup terminations offered
  - ▶ Standard pins offered in custom configurations to meet your applications exact footprint
- ▶ **Consistently low resistance through tens of thousands of connections**
- ▶ **Current ratings up to 10 Amps**
- ▶ **Minimal insertion and return loss for signals up to 10 GHz**
- ▶ **Durability**
  - ▶ Superior continuity in high shock and vibration environments
  - ▶ Resistance to dust and a range of chemicals
  - ▶ Ingress protection under the most stringent requirements
  - ▶ Consistent performance in broad temperature ranges

## BENEFITS

- ▶ **Exceptional compliance**
- ▶ **Great for RF, high speed and mixed signal connectors**
- ▶ **Ground contacts mate first, break last to support hot swap applications**
- ▶ **Power contacts are designed to support increased current carrying capacity**
- ▶ **Ensure a rugged, reliable connection in the harshest environments**
- ▶ **Allow unique blind mate capabilities**
- ▶ **Advanced misalignment tolerance**
- ▶ **Direction connections for rotating or sliding joints**

# C SERIES CONNECTORS



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# TECHNICAL CHARACTERISTICS

<b>Minimum Centers</b>	0.100 (2.54)
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## ELECTRICAL

<b>Current Rating</b>	
Ground	10 A continuous
Power	10 A continuous
Bias Ball*	15 A continuous <i>(individual probe in free air @ ambient temperature)</i>
<b>Typical Resistance</b>	
Ground	< 10 mΩ
Power	< 10 mΩ
Bias Ball*	< 10 mΩ

## MECHANICAL

<b>Spring Force</b>	
4mm	85 g @ working travel
6mm	82 g @ working travel
Bias Ball*	130 g @ working travel
<b>Working Travel</b>	
4mm Ground	0.039 (1.00)
4mm Power	0.098 (2.50)
6mm Ground	0.028 (0.71)
6mm Power	0.079 (2.00)
<b>Maximum Travel</b>	
4mm Ground	0.039 (1.00)
4mm Power	0.098 (2.50)
6mm Ground	0.028 (0.71)
6mm Power	0.079 (2.00)

## MATERIALS

<b>Barrel</b>	Brass, gold plated
<b>Spring</b>	Stainless steel
<b>Plunger</b>	Brass, gold plated

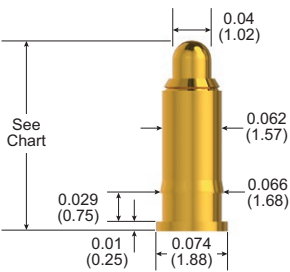
## RECOMMENDATIONS?

<b>Mounting Hole</b>	0.064/0.065 (1.62/1.65)
<b>Surface Mount Pad Size</b>	0.085 (2.20)
<b>Solder Cup Wire Gage</b>	20 gage max.
<b>Thru Hole Drill Size</b>	0.035 (0.89)

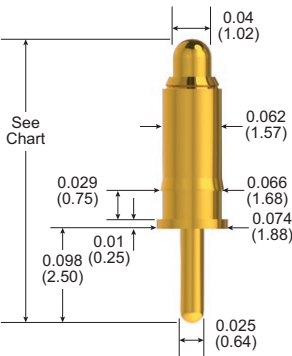
DIMENSIONS

C SERIES SPRING PROBES

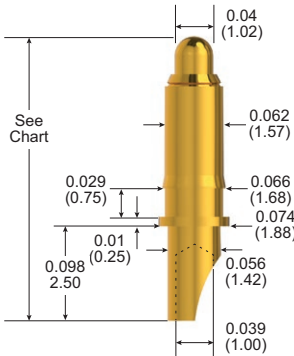
SURFACE MOUNT



THRU HOLE



SOLDER CUP



OVERALL LENGTHS

PROBE	CURRENT	SURFACE MOUNT	THRU HOLE	SOLDER CUP
4mm	Ground	0.197 (5.00)	0.295 (7.50)	0.295 (7.50)
6mm	Ground	0.335 (8.50)	0.433 (11.00)	0.433 (11.00)
6mm BIAS BALL	Ground	0.314 (7.98)	0.412 (10.48)	0.412 (10.48)
4mm	Power	0.185 (4.70)	0.283 (7.20)	0.283 (7.20)
6mm	Power	0.315 (8.00)	0.413 (10.50)	0.413 (10.50)
6mm BIAS BALL	Power	0.296 (7.52)	0.394 (10.02)	0.394 (10.02)



# HOW TO ORDER



**1** ▶ **C SERIES PROBE** *[Fixed]*

**2** ▶ **CURRENT**

**G** GROUND

**P** POWER

**3** ▶ **2.5mm (0.100") PITCH** *[Fixed]*

**4** ▶ **COMPRESSED HEIGHT**

**4** 4mm

**6** 6mm

**5** ▶ **TERMINATIONS**

**SM** SURFACE MOUNT

**TH** THRU HOLE

**SC** SOLDER CUP

**6** ▶ **BIASING TECHNIQUE**

**BB** BIAS BALL *[6mm option only]*



# MARKETS & APPLICATIONS

## Medical



- ▶ MRI and CT scanning equipment
- ▶ Patient monitors
- ▶ Portable applications
- ▶ Catheters
- ▶ Therapeutic devices

## Commercial Aviation



- ▶ Avionics and radar equipment
- ▶ Power distributions systems
- ▶ Engine, landing gear and braking control systems
- ▶ In-flight entertainment and cabin equipmen

## Defense



- ▶ Military aircraft and ground vehicles
- ▶ Land communications
- ▶ Naval systems
- ▶ UAVs/missiles/torpedoes
- ▶ Public safety communications

## Industrial



- ▶ Heavy equipment/machinery
- ▶ Servo drivers and encoders
- ▶ Robotics
- ▶ Factory automation
- ▶ Power supplies

## Rail



- ▶ High speed trains
- ▶ Main lines
- ▶ Inter-cities/metros
- ▶ Signaling equipment
- ▶ Infrastructures

## Oil & Gas



- ▶ Well-head logging recorders
- ▶ Smart PIGs
- ▶ Down hole monitoring systems
- ▶ Offshore exploration
- ▶ Seismic instrumentation

## Alternative Energy



- ▶ Wind turbines
- ▶ Solar panels
- ▶ Power systems
- ▶ Energy storage systems

## Test & Measurement



- ▶ Telecommunications
- ▶ Electronics testing
- ▶ Automotive testing

## Space



- ▶ Spacecraft / satellites
- ▶ Launchers
- ▶ Navigational systems
- ▶ Communications equipment

# SMITHS CONNECTORS

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