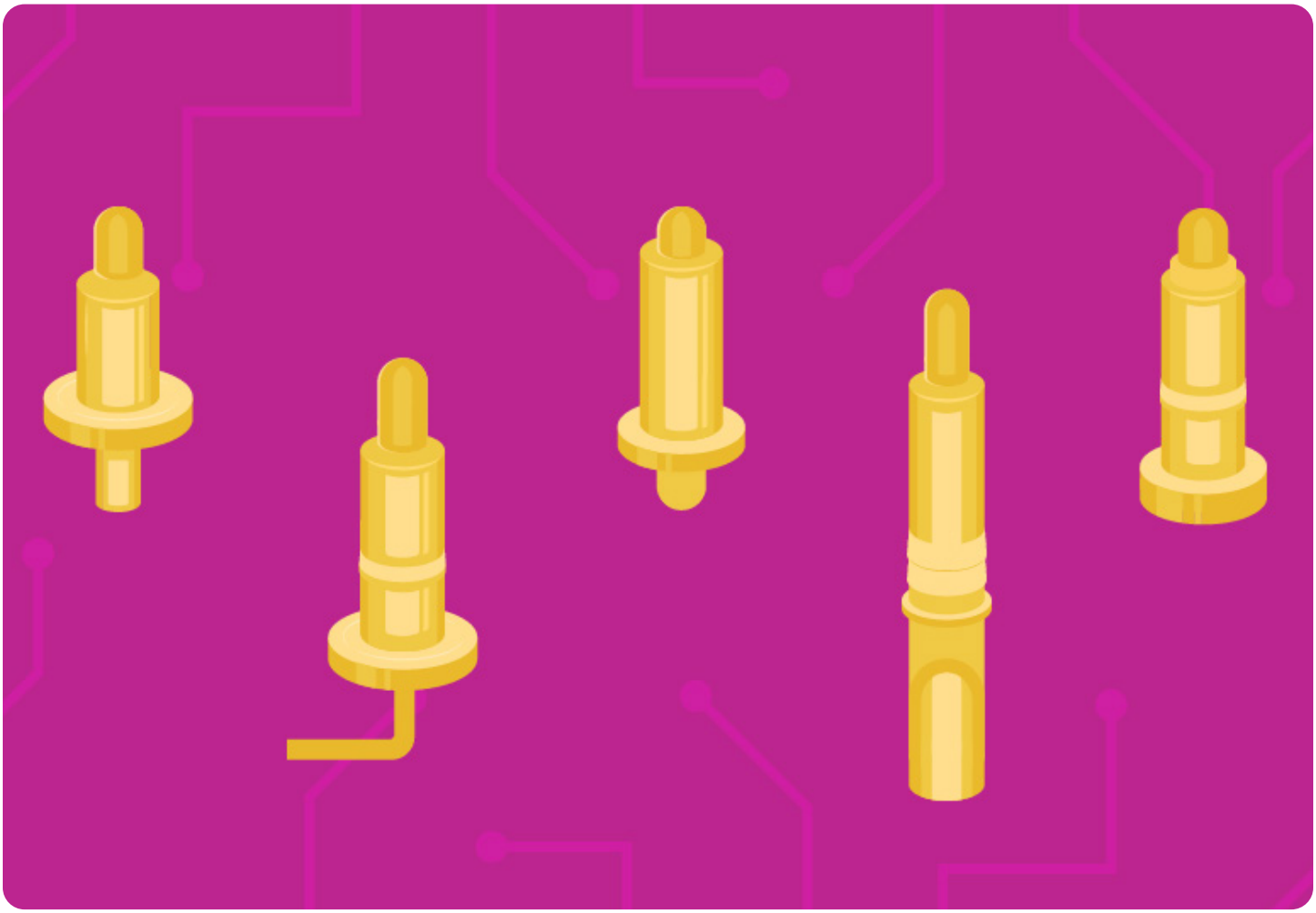
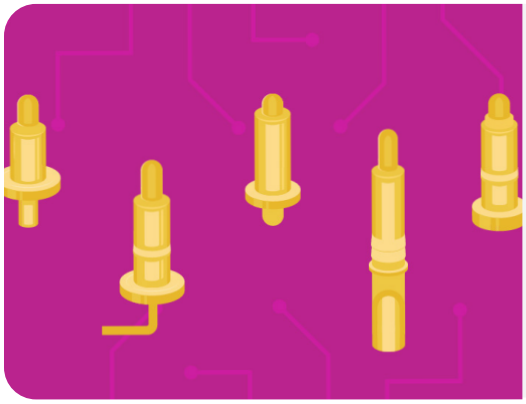
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Pogo Pins

The Ultimate Guide to Spring-Loaded Connectors



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Pogo pins are small, spring-loaded metal connector devices that are used in many electronic products and systems to establish and maintain a secure electrical connection through their contact points. They are tubular, with an internal spring mechanism making them look somewhat like a miniature pogo stick, thus their name.

And just in case you're wondering, the original pogo stick toy was created by Max Pohlig and Ernst Gottschall, using the first two letters of each of their last names for the product. As you might imagine, the similarity between pogo sticks and pogo pins ends with their name and similar mechanical motion. Shop Same Sky's range of pogo pins and PCB pins.

WHEN WERE POGO PINS INVENTED?

Pogo pins used in the electronics industry were invented at Bell Labs in the early 1970s and found acceptance for use in semiconductor test equipment and its requirement for miniaturized, precise, and repeatable performance. Continued enhancements in stability, current capacity, and size continue to make them suitable for use in a broad range of electronic devices in the consumer, industrial, and medical markets.

HOW ARE POGO PINS CONSTRUCTED?

Pogo pins consist of a barrel, a plunger, and an internal coil spring. They are usually made out of brass or copper alloys, often with a coating of nickel. Gold and other plating metals are also offered to improve contact resistance. They are usually grouped densely together in a fixture to enable multiple contact points on a circuit board or in a connector that is meant to be frequently mated and unmated.

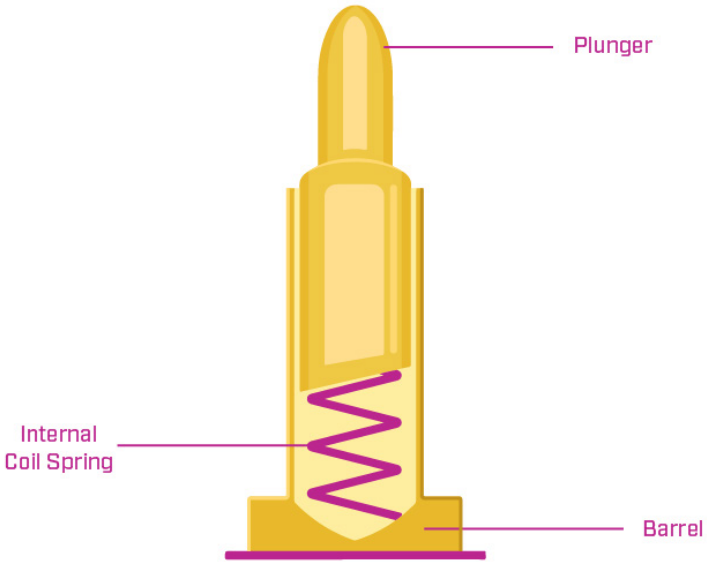


Figure 1
Typical pogo pin structure

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WHAT ARE THE BENEFITS OF DESIGNING WITH POGO PINS?

As we have mentioned, using pogo pins in a design may be more cost-effective than other mechanical connection devices. Beyond pricing, they also offer a significant number of other engineering benefits, including:

- Board space and height savings
- Robust design for extended use that is resilient to mechanical shock and vibration over many mating cycles
- High contact travel for reliable connections allowing for board expansion/contraction
- Machine mounting for precision assembly
- Convenience of automatic alignment
- Constant force against mating receptacle to prevent connection loss
- Easily adapted to suit various board configurations
- Accommodate various manufacturing processes

Pogo pins are also available in a broad variety of sizes (length & diameter), materials, operating forces, current capabilities, pad layouts, and plunger types to suit both challenging and everyday electronics applications.

POGO PIN STYLES

There are many different types of pogo pin connection solutions from which you can choose, offering features that depend on your application, lifecycle requirements, and customization needs. Here is a list of the more popular pogo features that are available for your design:

- **High Current**: usually 2 to 8 amps but higher ratings are available from Same Sky
- **High Frequency**: able to handle up to 10 Gbps
- **Waterproof**: incorporate effective sealing mechanisms to withstand water and moisture
- **Magnetic**: use a magnetic force to make and maintain connection and polarization
- **Low Spring Force**: exert a smaller than normal spring force on the contacts
- **Roller Ball Contact**: employ a ball at the end of the spring probe to ensure a continuous signal when contacts are subject to movement
- **Thread Screw**: feature a threaded design on the plunger or barrel allowing them to securely fasten to boards or devices
- **Solder Cup**: provides a small solder cup on the back of the pin for mounting a cable
- **Double-Ended**: incorporate spring-loaded contacts at each end of the pin

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- **Vertical or Flat-Bottom**: pins that rise vertically from the circuit board to allow board-to-board connections
- **Right Angle (Horizontal)**: offer a 90° pin orientation relative to the circuit board to allow for horizontal device mounting on a circuit board
- **Floating**: employs a standard spring contact at one end and a curved surface at the other end allowing both sides to be used as contacts but preventing over-compression

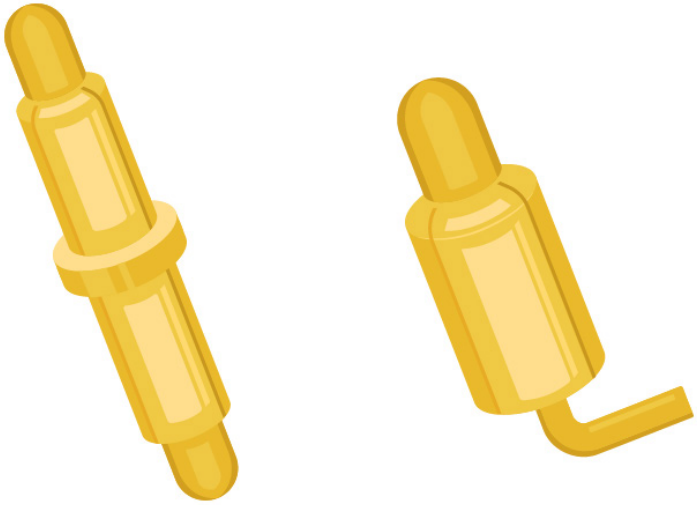


Figure 2
Double-ended and right-angle pogo pin connectors

HOW ARE POGO PINS MOUNTED?

Pogo pins are typically sourced as individual pins to be mounted on a board or fixture in a particular application. As such, they are an individual part of a custom interconnect solution to fit your needs. However, depending on your design, you may be able to use off-the-shelf individual connector arrays using pogo pins that are mounted in insulating material and available with mounting hardware.

If you are building your own boards or fixtures using pogo pins, there are various insertion types available, including pins that can be press fit, swaged, crimped, soldered, or solderless. Available mounting technologies include surface mount, through hole, wire mount, and free hanging.

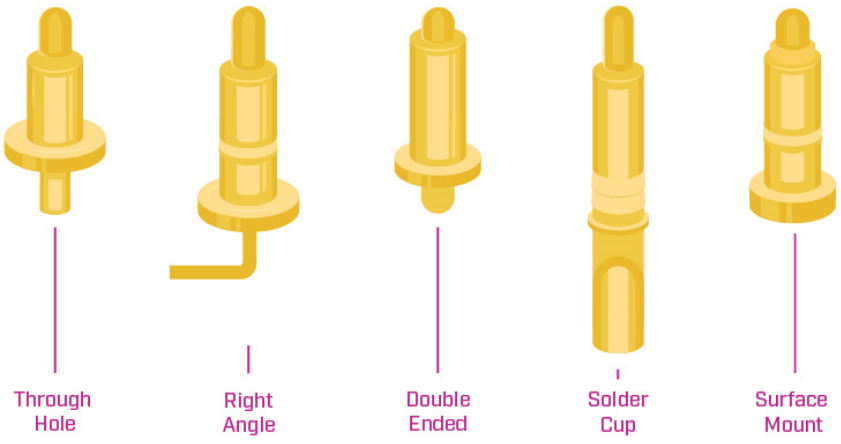


Figure 3
Common pogo pin types

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WHAT ARE POGO PIN RECEPTACLES OR TARGETS?

The basic function of an electrical connector is the joining or mating of two or more devices. As such, a connector needs a compatible fixture with which it can connect. Pogo pins are a bit different in that they can either mate with a receptacle or socket, or they can land on a specific target on a circuit board. The target can be a designated component, a plated area of a circuit board, or a custom chip receptacle used to test computer chips.

The function of a target is to provide a reliable electrical connection where the pogo pins can land and remain stable until the connection is removed. Most manufacturers of pogo pins also supply many different styles of receptacles or targets.

POGO PIN DESIGN CONSIDERATIONS

As with many other connectors, in order to determine the exact pogo pins you need to use in your design, you will have to set some engineering specifications. Here is what you will need to consider:

- **Size & Format**: lead size, pin diameter, pin format (round, square, rectangular)
- **Contact Material**: brass, copper, nickel, bronze
- **Contact Plating**: gold, silver, nickel, palladium, zinc, tin, lead
- **Electrical Metrics**: contact resistance, current rating
- **Movement**: Plunger size and working height (for plunger travel) and dimensional accuracy (tolerances)
- **Physical Metrics**: initial contact operating force and mid-compression operating force
- **Other Factors**: exposure to heat, cold, shock, vibration, corrosive atmospheres, moisture or other severe environmental conditions

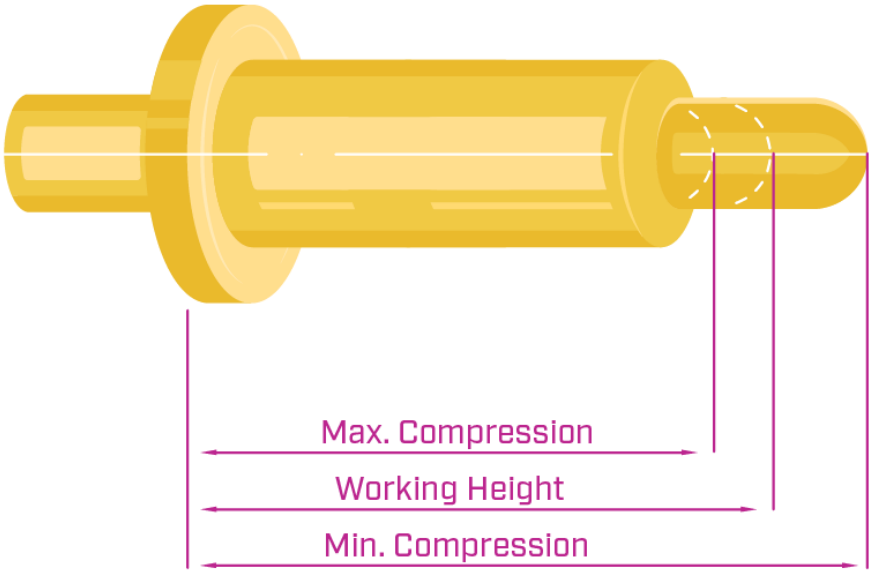


Figure 4
Maximum and minimum compression as well as recommended working height typically found on a pogo pin schematic

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WHAT ARE COMMON POGO PIN APPLICATIONS?

Like many other devices used in electronics, pogo pins seem to spawn new applications overnight. Some of the more obvious uses include anywhere an electrical connection needs to be made where constant pressure from the contact ensures a robust connection. This includes board-to-board connections, consumer products where data or power connections are needed, battery docks and chargers, portable medical devices, PCB and IC testing, and other machine products. Almost any device that requires a temporary connection or docking for the flow of data signals or charging current can find a design solution using pogo pins.

SUMMARY

Pogo pins allow for a consistent and reliable electrical connection between devices. Their simple design and function ensure their durability through thousands of mating and unmating cycles and can compensate for minor connection misalignments. They are also cost effective and space efficient, which makes them an ideal connection solution for many modern electronic applications.

KEY TAKEAWAYS

- Pogo pins are spring-loaded contact pins used to create reliable, temporary electrical connections between two devices or circuit boards.
- Pogo pins consist of three main components: plunger, barrel, and internal spring—designed to maintain consistent contact under compression.
- Pogo pins are ideal for testing, charging, or modular connections where repeated mating cycles are required.
- They provide high durability, with life cycles often exceeding tens of thousands of compressions.
- Common pogo pin configurations include single pins, pin blocks, and custom arrays, with options for surface mount, through hole, or panel mounting.
- Pogo pins offer excellent mechanical resilience and stable electrical performance, including low contact resistance.
- Applications for pogo pins include battery charging docks, test fixtures, wearables, medical devices, and telecom systems.
- Key pogo pin selection criteria include stroke length, current rating, plating material, and mechanical tolerance.
- Gold-plated pogo pins are often used to enhance conductivity and corrosion resistance in harsh



View Same Sky's full line of pogo pins

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