

Delphi Compliant Pin Technology

Delphi, a worldwide leader in automotive connection systems, has integrated Compliant Pin Technology into several of its automotive connection products. This advanced technology is utilized in device connectors and integrated connector/module housings to press-fit solderless electrical contacts onto printed circuit board (PCB) assemblies. When a compliant pin is inserted into a plated-through-hole (PTH) of a PCB, it creates a reliable, gas-tight contact.

Delphi's compliant pin technology will interface with the following circuit board hole sizes:

- 1.0 mm
- 1.2 mm

► Benefits

- Environmental compliance—easily adaptable to lead-free construction
- No separate soldering process necessary
- Low thermal stress—no heat to affect other board components
- Suitable for multilayer and double-sided PCBs
- Reliable gas-tight connection—no corrosion
- Reliable performance in vibration and shock
- Low PTH distortion and damage
- Connector can use standard plastic material
- Connectors and contacts are easier to repair than soldered pins
- Available in two circuit board hole sizes for application flexibility
 - 1.0 mm
 - 1.2 mm

► Typical Applications

Delphi's Compliant Pin Technology can be adapted to a wide range of sealed and unsealed automotive systems, including telematics, infotainment, body, powertrain, and safety and security. Applications include:

- United States Council for Automotive Research (USCAR) headers
- Engine and transmission control modules
- Airbag control modules and ABS modules
- Key fobs, impact sensors, and passive occupant detection systems (PODS)
- Bussed electrical centers (BECs) and bus bars
- Single pins

► Performance Advantages

Solderless, lead-free compliant pins help OEMs to conform to global environmental initiatives. Additionally, solderless PCB production eliminates thermal stress and other issues created by soldered-joints and flux residue. Building with compliant pins reduces device costs by simplifying BOM (build of material) and the number of mechanical components needed. High-speed, low-cost assembly of the connectors improves



Compliant 0.64 mm USCAR sealed 10-way/18-way combo

productivity and helps to reduce overall processing costs. Compliant pin connectors and modules, press-fit on PCBs, provide reliable electrical performance. Because the compliant pins absorb any deformation during insertion, the plated throughhole remains completely intact allowing the individual pin or header to be removed and replaced to facilitate device rework.

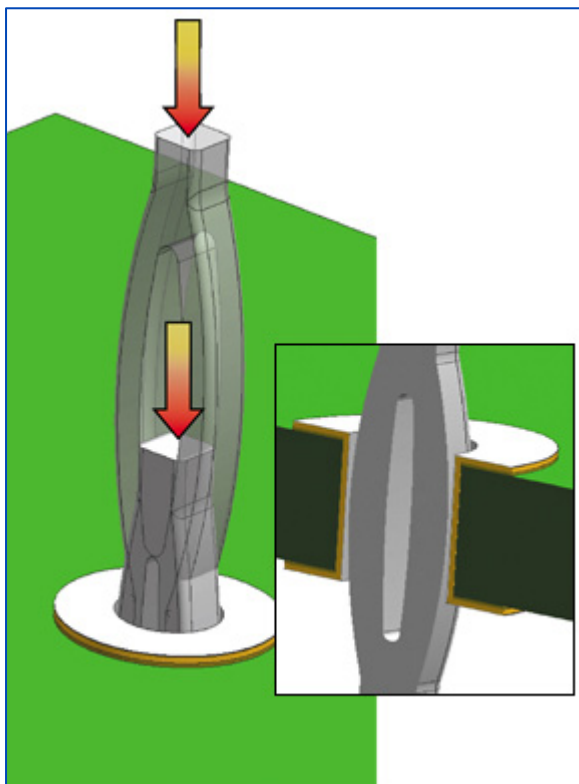
▶ **Automotive Standards**

With its global engineering and manufacturing capabilities, Delphi has implemented a standard automotive compliant pin design. Eye-of-needle (EON) technology was selected as the key automotive pin type due to its performance, reliability, manufacturability, and cost.

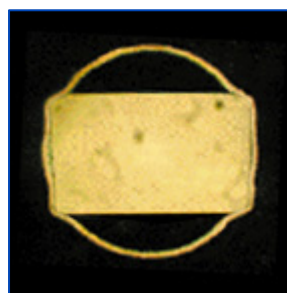
EON design has been used in the aerospace and communication industries for more than 20 years. First introduced in the 1970s to replace soldering and solid pins, EON is one of the most cost effective ways to make consistent quality products.

▶ **EON Compliant Pin Cross Sections**

The key to EON compliant pin technology is that the cross-section of the pin is initially greater than the diameter of the hole. The result is an overlapping of material at the contact area, whereby the pin tightly conforms with spring-like tension to the diameter of the hole.



Compliant pin eye-of-needle (EON) design



Solid pin design is not compliant and can damage PCB