

What is the “right size” for Press-Fit?

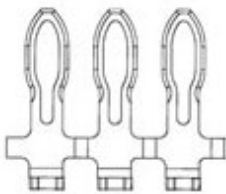
New Micro, Mini and Macro Press-Fits Support Applications in the Wearable, Medical and Industrial Markets

Compliant press-fit interconnects have already become a key enabling technology that is widely used in the automobile industry, power module designs and other applications. The ability to eliminate soldering hassles while providing high-reliability interconnects with excellent thermal characteristics and high-current carrying capacity has made press-fit a preferred solution in these arenas.

The inherent adaptability, configuration flexibility and cost-effectiveness of press-fit technology is now spurring its adoption in a widening array of applications, including wearable tech products, medical monitoring devices, and industrial systems.

To support these application arenas, currently available press-fit technology is expanding beyond the industry standard sizes, such as .64mm and .80mm, which have gained widespread usage in many automotive and power applications. A key new development is the availability of customizable Micro, Mini and Macro press-fit configurations.

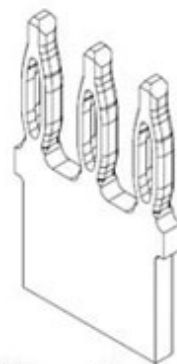
This Press-Fit Tech Bulletin provides an overview of requirements in the new application areas and description of how the Micro, Mini and Macro press-fit configurations address these needs.



Micro Press-fit
0.20mm Thick
**Wearable
Electronics**



Mini Press-fit
0.25mm Thick
**Mobile Medical
Monitoring Devices**

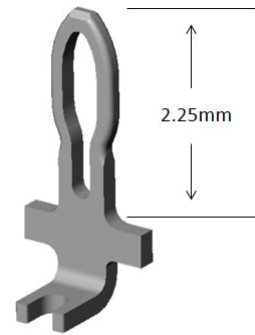


Macro Press-fit
1.2mm Thick
**Busbar Termination
to PCB**

Micro Press-Fit and Wearable Devices

Micro Press-Fit interconnects are specifically designed to meet the requirements of micro technology, such as wearable technology and mobile medical monitoring devices. Press-fit offers solder-free, high-normal-force interconnects that are resistant to temperature cycling, shock/vibration, and provide extended lifecycle performance, which has been proven in harsh automotive markets.

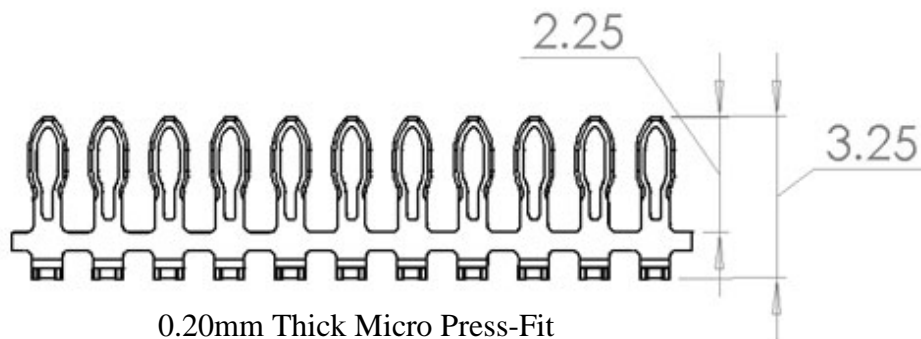
Press-fit also reduces weight and size as compared to solder-joints and offers greater flexibility for tight fit constraints and/or unconventional form factor requirements.



0.20mm Thick Micro Press-Fit

Conventional solder connections add risk as a primary point-of-failure because the repeated stresses can eventually cause cracks or breakage at the solder joint. Press-fit technology with its residual spring solderless connection provides an inherently reliable interface that flexes during thermal cycling without degrading the current carrying capability or incurring long-term damage.

Press-fit is also an inherently automation-friendly technology, which has been proven over years of deployment as an industry-standard in the demanding automotive and power module markets. Micro press-fit stamped interconnects can be provided in a range of automation-ready formats for smooth integration into virtually any production environment.



0.20mm Thick Micro Press-Fit

Today's smart-watches, wristband monitors and connected glasses are just the start of a wearable computing sector where global revenues are expected to triple in the next few years.

The keys to successful implementation of wearable technology devices include:

- Ultra-small integration of capabilities in light-weight miniaturized form factors
- Flexibility to meet a variety of deployment scenarios (wristbands, glasses, fabric, shoes, etc.)
- Ability to withstand shock, vibration, temperature cycling, moisture and other rigors of rugged consumer environments
- Automation-friendly to conform with high-volume production requirements
- High reliability and lifecycle performance – “reputation is everything in consumer technology”

Conventional soldering methods are incompatible with all of the requirements on the above list.

While Micro Press-Fit works best for wearable technologies, one size does not fit all. That's why Interplex has also developed Mini and Macro Press Fits - to meet the needs of diverse applications.

Mini Press-Fit and Mobile Medical Monitoring Devices

Mobile medical monitoring devices are another important growth segment where solder-free press-fit technologies are enabling the efficient design and deployment of new devices.

Some of the key market drivers for Tele-health and consumer medical devices include:

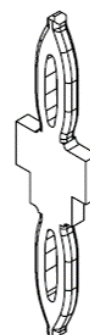
- Rising average life expectancy and higher ratio of seniors with chronic health issues
- Larger proportion of patients requiring long-term care and monitoring
- Need to decrease length and costs of hospital in-patient care

By increasing preventative care and providing residential monitoring, it is possible to decrease the length of in-patient stays and also decrease readmission rates, thereby improving both costs and patient outcomes. IHS forecasts that the number of patients using a residential gateway to transmit physiological information to clinicians will grow to nearly 2 million users by 2018.

While the size constraints are typically not as tight with these specialized medical monitoring devices and the volumes may not be as high as consumer wearable tech, the need for harsh environmental robustness, production efficiency, and high-reliability are still very important. In fact, with fundamental health issues at the core of these applications, the need for high-reliability and consistent availability of the devices is even more critical.

The Mini Press-fit brings together a small form factor that is optimized for medical monitoring devices and eliminates the risks associated with solder along with a high degree of flexibility for implementing specialized functionality.

Custom stamping capabilities enable the mini press-fit zone to be easily integrated with a variety of sensors, LEDs, Insulation Displacement Connectors (IDCs) or other specialized modules used in medical monitoring devices.



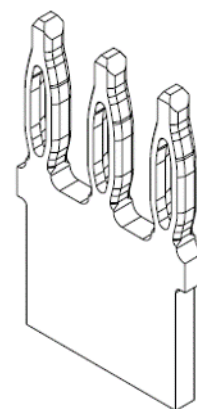
Dual-eye
Mini Press-Fit

Macro Press-Fit and Industrial Busbar Applications

At the other end of the spectrum, Macro Press-Fit configurations are addressing the need for very high-current solderless interconnects in a wide range of industrial applications.

The choice of a variety of alloys and the solder-free nature of press-fit zone components allows engineers to optimize manufacturing processes, even if the product includes large heat sinks, multiple internal substrates, and complex control circuitry, all with different thermal coefficient of expansion (CTE) characteristics. Special material options for press-fit also exist with high thermal dissipation performance that can aid in overall thermal efficiency for the whole assembly.

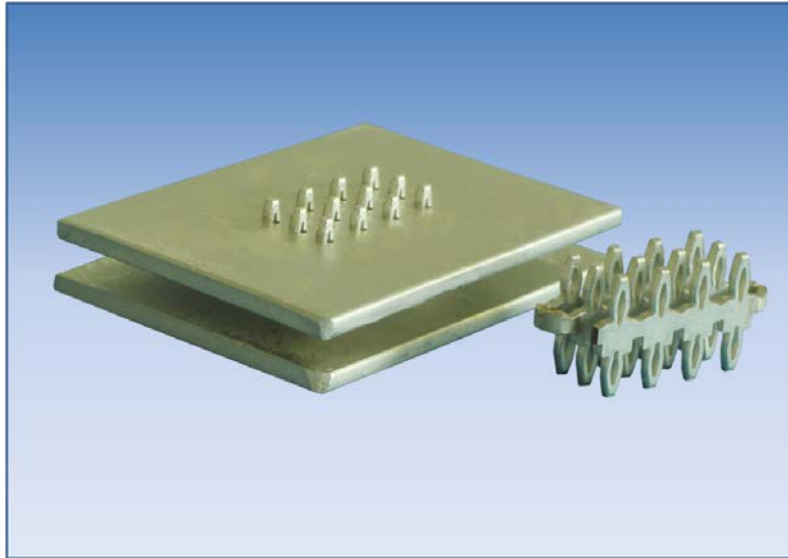
Application-specific design and custom stamping capabilities enable the Macro Press-Fit technology to be readily adapted for any specific set of busbar requirements, including multiple press-fit “eye of the needle” interfaces incorporated within a single stamped component.



1.2mm Thick

Macro Press-Fit

For example, shown below is a bus-bar interconnect that leverages a custom-stamped press-fit configuration to provide a solder-free, high-current, multi-point interface that greatly streamlines the assembly process, while improving performance.



Concept to Creation

It's important to keep in mind that press-fit technology today is about much more than just the interconnects themselves. Because the use of press-fit can open up new and innovative design approaches, it is important to consider the possibilities for leveraging the benefits of press-fit from the initial product concept whenever possible. This enables designers and the press-fit supplier to collaborate from the outset in order to optimize functionality, cost, manufacturing efficiency, product reliability and overall profitability.

Summary

Press-Fit interconnects have already proven effective for implementing a wide range of applications that can benefit from the ability to provide robust solderless interconnects while streamlining assembly processes. Performance testing has demonstrated that Press-Fit pins satisfy stringent operational requirements as defined by IEC, EIA and SAE specifications and they have been qualified to 150° C temperatures. Depending on the pin configuration, Press-Fit interconnects can provide retention force of up to 14 lbs and enhance long-term product reliability.

Press-Fit technology has now moved beyond just a focus on compliant pins and has become an important factor for fueling innovation and helping create fundamentally new approaches that are opening up an ever-expanding range of applications and design scenarios.

With the introduction of new Micro, Mini and Macro Press-fit configurations, compliant technology is now also becoming a key enabling technology for the wearable electronics, medical monitoring and high-current busbar industrial markets.

More information regarding Press-Fit technologies and products can be found on the web by visiting www.interplex.com/pressfit or by calling (718) 961-6212.