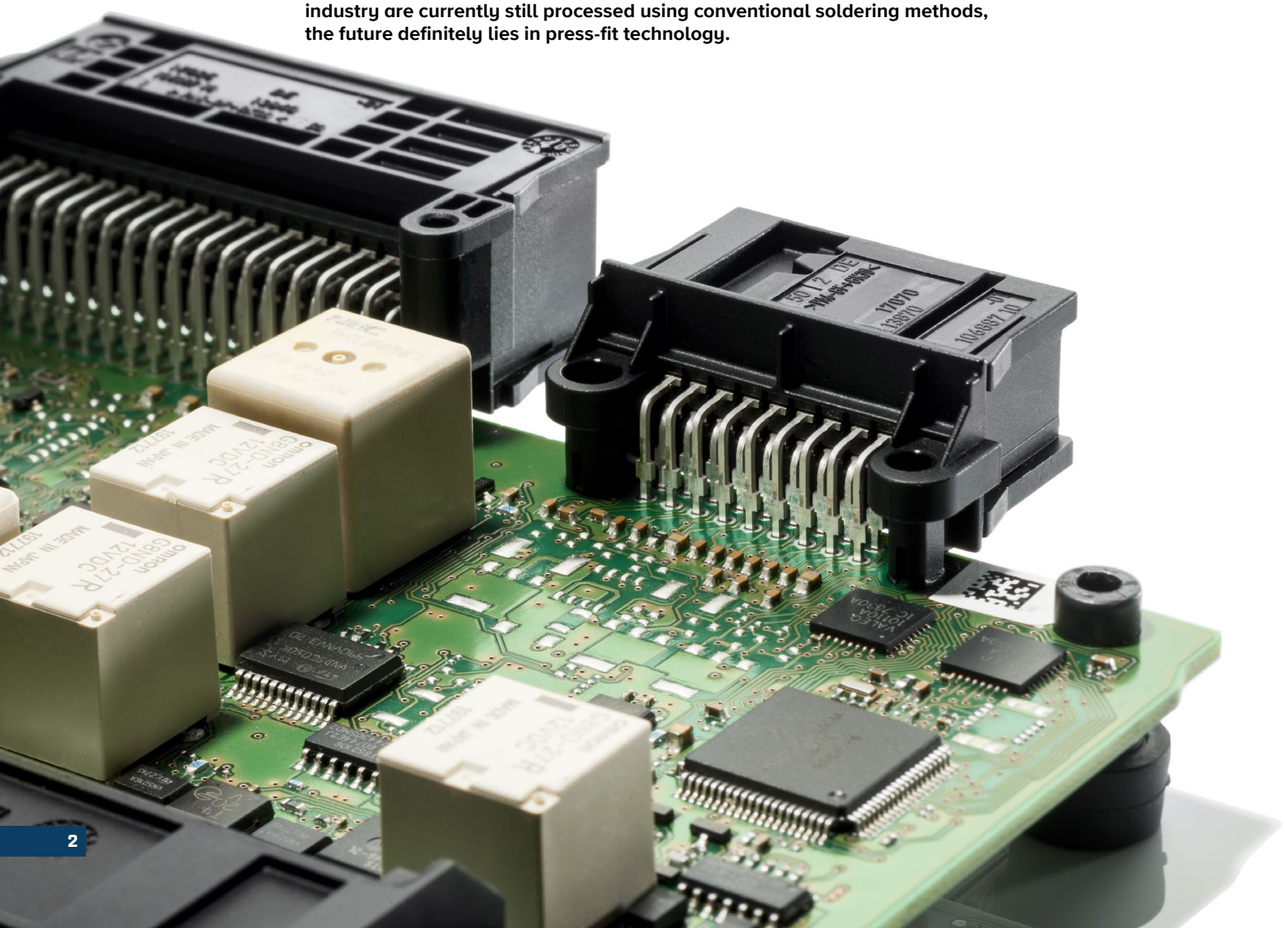
DIEHL
Metal Applications

PRESS-FIT ZONES

PRESS-FIT TECHNOLOGY

With press-fit zones, Diehl Metal Applications provides an innovative, solder-free connection technology for meeting the demands of the automotive supply industry. While the majority of the components in this industry are currently still processed using conventional soldering methods, the future definitely lies in press-fit technology.



What is press-fit technology?

Press-fit technology is the insertion of component connection pins (especially from connectors or single contacts) into the metallized holes of a printed circuit board (PCB). The contact between the press-fit pin and the wall of the hole is gas-tight and characterized by good conductivity. The prerequisite for this is that the press-fit pin has a larger diagonal than the hole diameter on the PCB. The spring-force behavior of the press-fit pin and the printed circuit board creates a positive connection.

Advantages of press-fit technology compared to soldering:

- No soldering errors, no flux problems
- No need for additional washing
- No thermal loads on the PCB or electronic components
- Quick and cost-efficient PCB assembly
- Double-sided PCB assembly possible
- Recycling simply by pressing out the pins

Innovations for the automotive industry

For applications in the automotive industry we manufacture press-fit zones with material thicknesses of 0.4mm, 0.6mm, 0.8mm, 1,0mm and 1.2mm. Depending on the requirements regarding ambient temperature and electrical conductivity, either standard surfaces or our special surfaces for press-fit zones may be used.

Our flexible press-fit zone types EPZ EE and EPZ EloPin can be used in PCBs with metallized holes according to DIN EN 60352-5 and according to customer specifications. Prior to serial production, we can manufacture the press-fit zone in near-series quality in our in-house prototyping department, allowing us to take the specific requirements of our customers into account at this early stage.

TYPICAL VALUES

Component

Material (Standard):	CuSn6, CuNiSi alloys
Material thickness:	0.4 mm, 0.6 mm, 0.8 mm, 1.0 mm and 1.2 mm
Press-fit zone plating:	Sn, SnPb, DMA Advanced Indium or DMA Advanced AgSn over Ni

PCB

Material:	FR4, FR4 with Tg > 150 °C
Thickness:	1.6 mm (Standard)
PCB type:	Double and multi layer
Sleeve design:	Specified for press-fit technology
Plating:	iSn, OSP

Press-fit contact EE (embossed form)

	EE04	EE06	EE08
L1*	> 2.1 mm	≥ 4.0 mm	≥ 4.4 mm
L2	> 0.5 mm	> 0.45 mm	> 1.0 mm
X (Width of press-fit zone)	0.75 mm	1.2 mm	1.65 mm
Nominal hole PCB	Ø (0.6 mm)	Ø (1.0 mm)	Ø (1.45 mm)

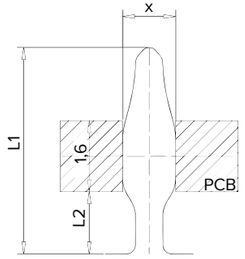
*On demand

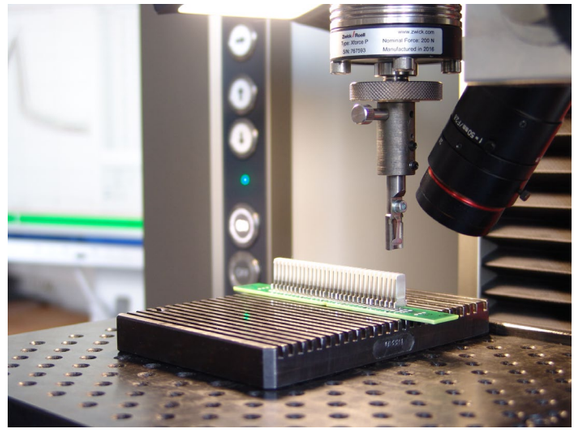
Press-fit contact EloPin (needle eye)

	EloPin06	EloPin08-145	EloPin08-16
L1	≥ 3.6 mm	≥ 4.2 mm	≥ 4.2 mm
L2	> 0.85 mm	> 1.2 mm	> 1.2 mm
X (Width of press-fit zone)	> 1.24 mm	> 1.63 mm	> 1.78 mm
Nominal hole PCB	Ø (1.0 mm)	Ø (1.45 mm)	Ø (1.6 mm)

For our embossed press-in zones we can also offer you a camera-compatible press-in zone tip.

Please contact us!





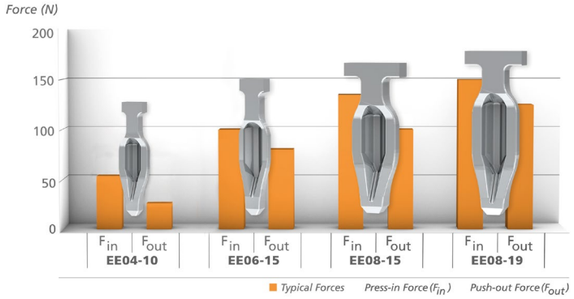
Press-fit connection (reference values per press-fit zone)*

The characteristic values may vary depending on the PCB type, the sleeve design, the press-fit contact and the process parameters, and thus deviate from the reference values.

* with a PCB thickness of ≥ 1.6 mm | ** ≥ 24 h (after storage at room temperature)

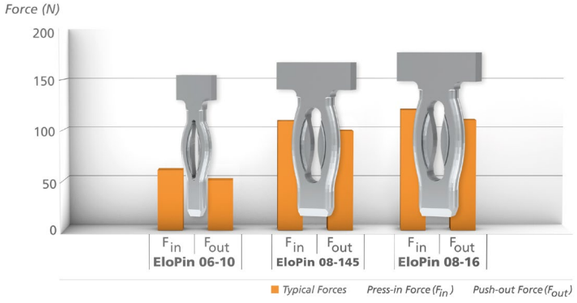
Press-fit contact EE (embossed form)

Press-fit zone	Insertion force F_{in}	Push-out force** F_{out}
EE04-10	≤ 70 N	≥ 20 N
EE06-15	≤ 120 N	≥ 40 N
EE08-15	≤ 160 N	≥ 50 N
EE08-19	≤ 180 N	≥ 50 N



Press-fit contact EloPin (needle eye)

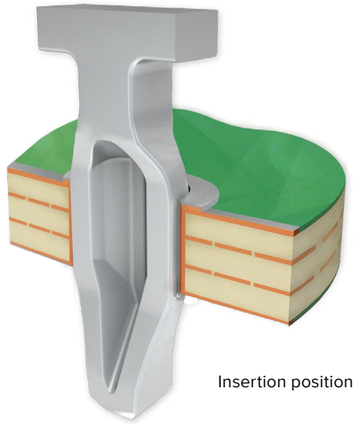
Press-fit zone	Insertion force F_{in}	Push-out force** F_{out}
EloPin06-10	≤ 100 N	≥ 30 N
EloPin08-145	≤ 130 N	≥ 40 N
EloPin08-16	≤ 160 N	≥ 50 N



QUALITY

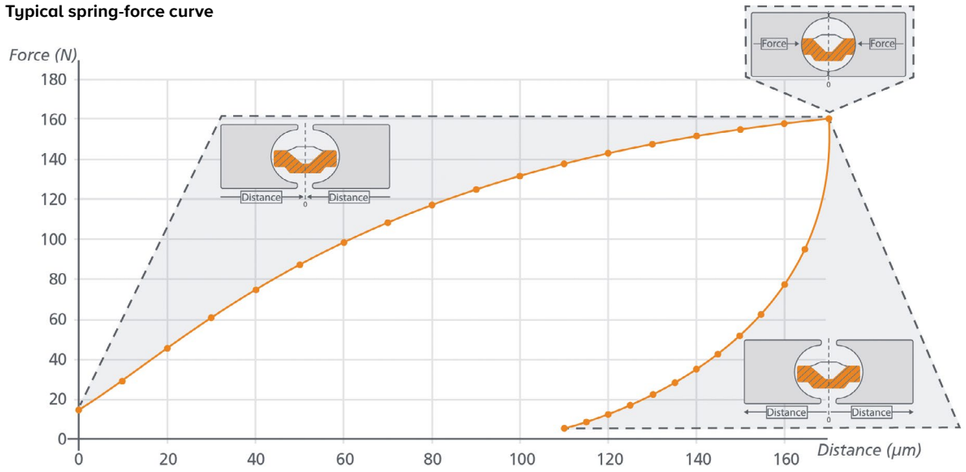
We are committed to ensurig the quality of the press-fit zones. During serial production, continuous process monitoring is carried out using cutting-edge camera systems and 3D measuring machines.

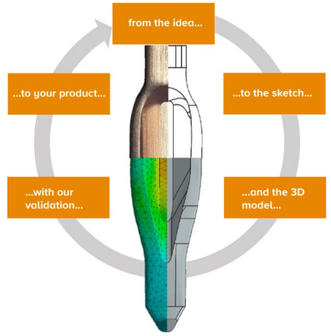
One of the most important characteristics of a press-fit area is the spring-force behaviour during the insertion process and the resulting force exerted on the hole wall of the PCB. The spring-force curve is determined and analyzed during production.
The normal force, which is mainly determined by the base material used and the geometry, can be determined via the deformation characteristic curve.



Insertion position

Typical spring-force curve



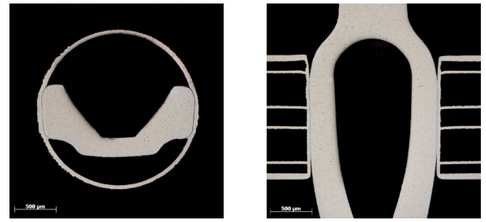


DEVELOPMENT AND QUALIFICATIONS

In our testing laboratory, all appropriate tests are carried out to assess the press-fit connection. The laboratory works according to DIN EN 60352-5 / IPC-9797 as well as to customer specifications. The scope of the tests, the procedure and the characteristic values are agreed upon with the customer based on the application.

We provide the following tests in our laboratory:

- Visual and dimensional inspection
- 3D image recording
- Insertion and push-out force
- Micro sectioning and analysis
- Contact resistance
- Rapid temperature change (temperature shock)
- Climate sequence (cold, dry and humid heat, cyclical)
- Whisker analysis
- Etching



Longitudinal and transverse micro section (EE08)

We are working on the development of new press-fit zones as well as on the continuous improvement of existing designs. For this purpose we use modern technologies such as FEM and 3D printing.

We support you in the development of your products - just contact us!

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