
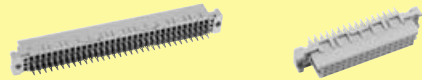


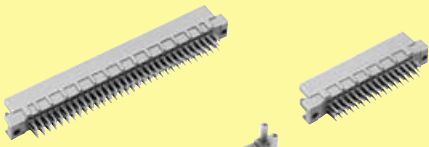
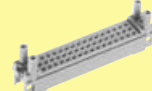
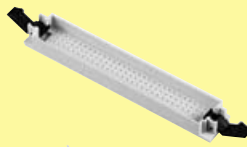
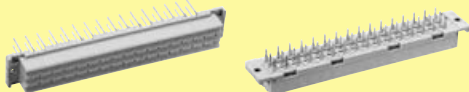
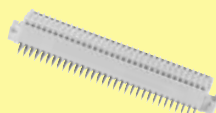
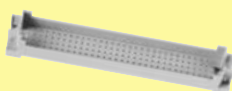


Connectors with press-in termination

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Recommended configuration of plated through holes		04.04
Technical characteristics types B, 2B, C, 2C, 3C, M, Q, 2Q, R, 2R and RM . .		04.10
Type B, 2B female connectors		04.11
Type C, 2C, 3C female connectors		04.12
Type M, M-flat female connectors		04.13
Type Q, 2Q male connectors		04.15
Type R, 2R, RM male connectors		04.16
Type C, 2C, R, 2R pin shroud		04.18
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Solderless termination for connectors has proven to be reliable for decades. Today the use of press-in connectors encompasses all fields of electrical and electronical applications.

Pressing of electrical components, mainly connectors, is characterised through the matching of the connector pin and the plated through hole of the pcb. Whereas the desired electrical characteristics can be attained relatively independant from the design of the press-in zone, the mechanical characteristics of the press-in zone are crucial for the reliable assembly of connectors where pcb's have different surfaces.

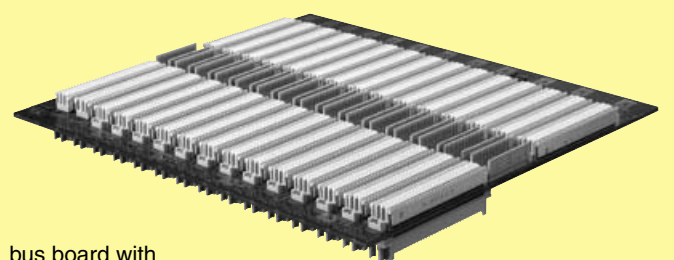
Although the scope of requirements at the press-in process is generally defined in time-tested specifications, the novel press-in zones should offer an optimal handling and a reliable termination. Essentially, this is guaranteed through the design of the press-in zone and the meticulous observance of tolerances. HARTING has been using FEM simulations for the calculation and optimisation of press-in zones for a long period of time. This expertise allows us to simulate various pcb configurations very accurate.

The processing of press-in connectors can be divided into 3 phases, containing both mechanical and metallurgical operations:

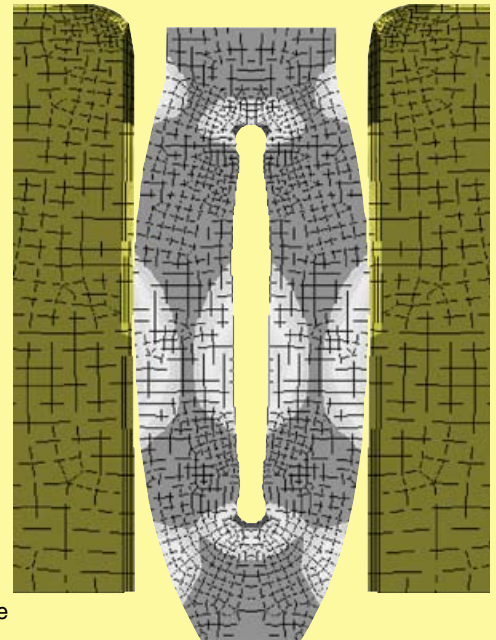
1. Centering and placing of the termination pins

The centering of connectors before pressing is important in order to prevent damage to the pcb and the termination pins. Centering can be omitted when connectors are pressed using a flat rock die.

HARTING offers insert blocks for male connectors to make the centering of connectors unnecessary.

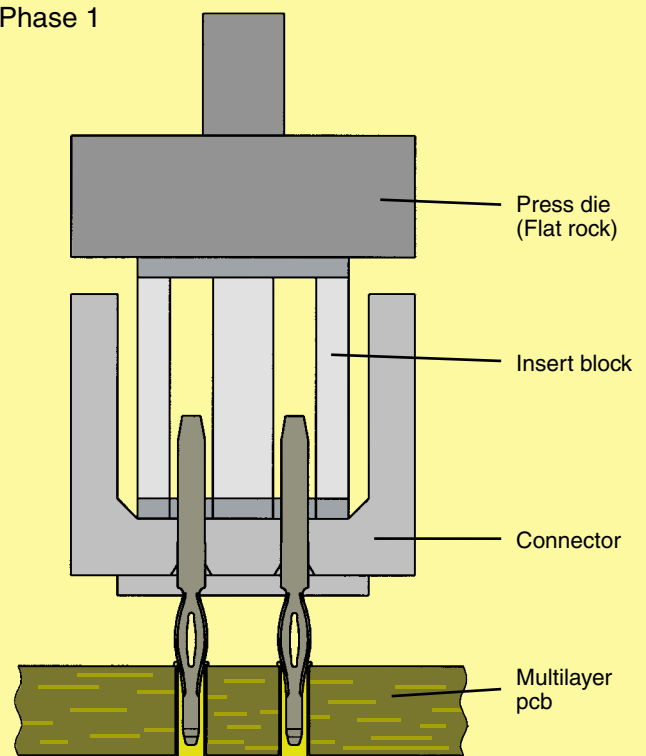


bus board with
press-in connectors



FEM simulation
of the needle eye
press-in zone

Phase 1



2. Pressing in the pins

In the press-in process the insertion force is continuously transformed into compression force. The resulting friction frees the contacting bars of insulating films. Superfluous plating (tin) is transferred within the plated through hole. A gas-tight connection of fresh non-oxidised metal surfaces is obtained.

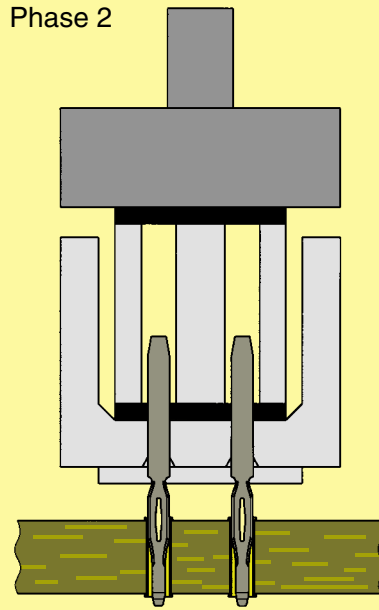
3. Obtaining the final position

The press-in operation should be terminated as soon as the connector obtains its final position on the pcb to avoid unnecessary compressive stress. The press-in machines of HARTING feature automatic termination of the press-in operation independent of pcb thickness and surface properties.

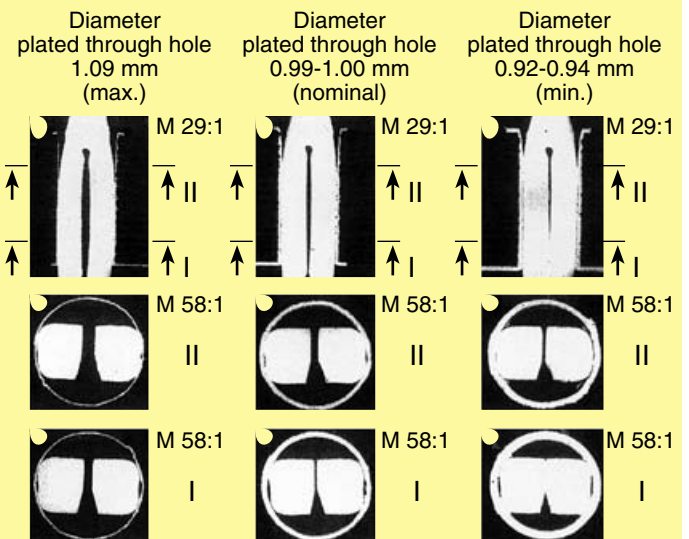
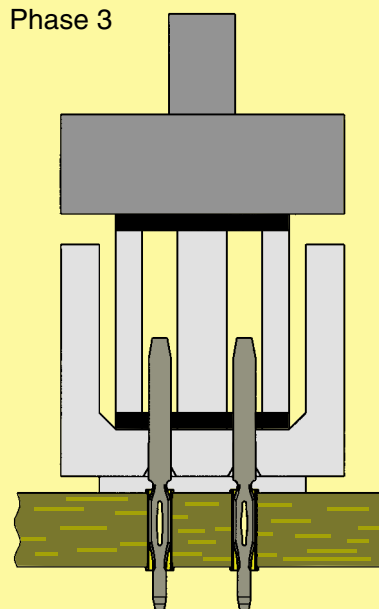
The entire dynamic press-in process is characterised through changes of the press-in force that can be statistically evaluated. HARTING records the changes of force with the help of special software. This is an important step towards permanent process control and documented manufacturing data.

The **har:press**-zone is based on the industry renowned needle eye technology. Its special design allows for compensation of tolerances of pcb surface properties (eg. superfluous tin plating). The excessive material is displaced within the plated through hole, whereby a gas-tight and corrosion resistant electrical connection is assured.

Phase 2



Phase 3



Cross section of a pcb 2.4 mm thick with various hole diameters

Due to the high deformation resistance and resilience of **harpress** contacts, they can be easily and repeatedly removed in case of repairs without impairment to their functioning.

harpress is extremely versatile and offers a reliable electrical contact, therefore it is especially well suited for applications with these surfaces.

Please contact us for detailed test reports.

Benefits of the press-in technology

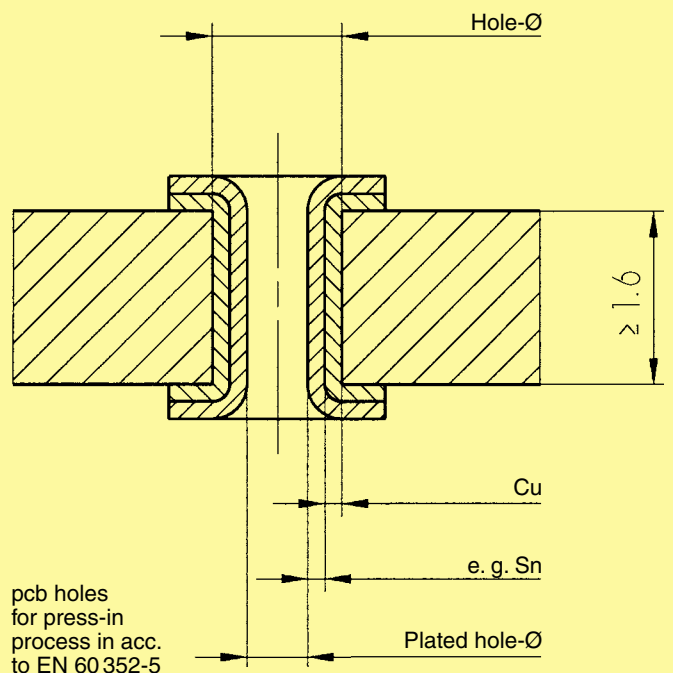
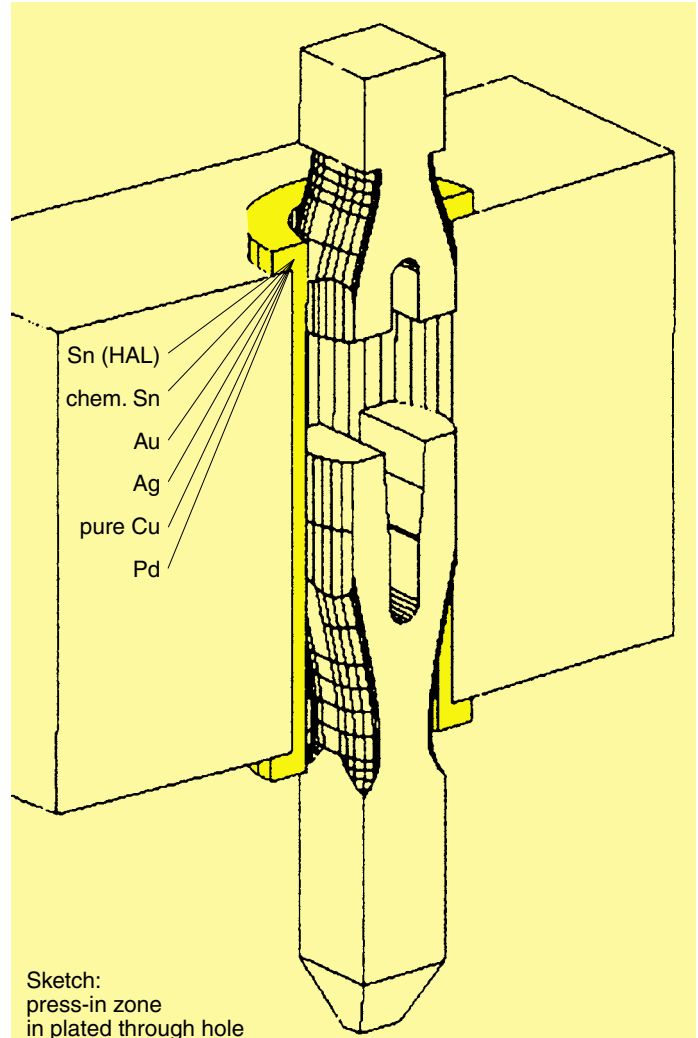
- Thermal shocks associated with the soldering process and the risk of the board malfunction are avoided.
- No need for the subsequent cleaning of the assembled pcb's
- Additional wrap connections are made possible by using connectors with long pins
- Unlimited and efficient processing of partially gold-plated pins for rear I/O - manual soldering is no longer necessary!

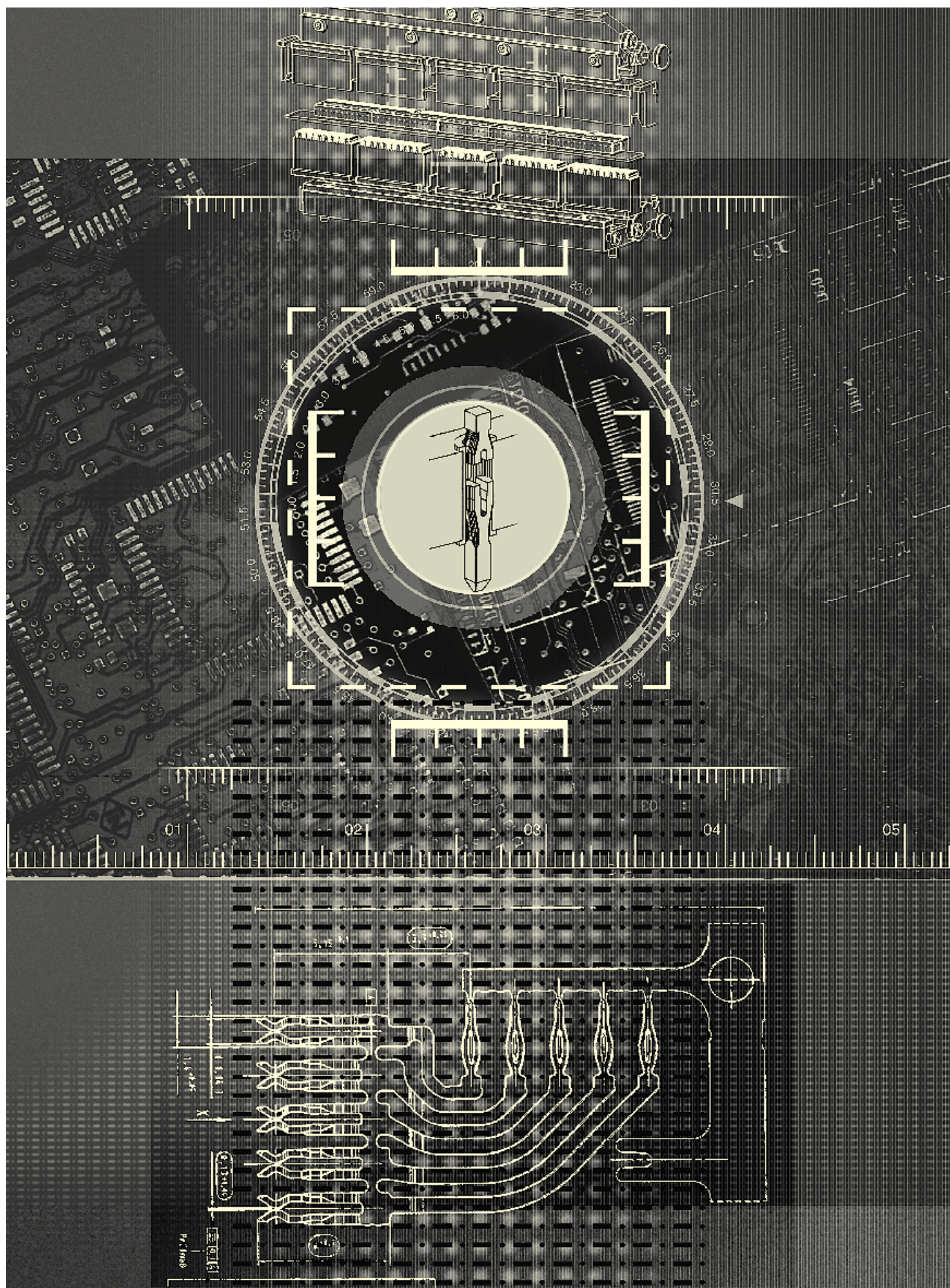
Recommended configuration of plated through holes

In addition to the hot-air-level (HAL) other pcb surfaces are getting more important. Due to their different properties, such as mechanical strength and coefficient of friction we recommend the following configuration of pcb through holes.

<i>Tin-lead plated PCB (HAL)</i> <i>acc. EN 60352-5</i>	Hole-Ø	1.15±0.025 mm
	Cu	min. 25 µm
	Sn	max. 15 µm
	Plated hole-Ø	0.94-1.09 mm
<i>Chemical tin-plated PCB</i>	Hole-Ø	1.15±0.025 mm
	Cu	min. 25 µm
	Sn	min. 0.8 µm
	Plated hole-Ø	1.00-1.10 mm
<i>Au / Ni plated PCB</i>	Hole-Ø	1.15±0.025 mm
	Cu	min. 25 µm
	Ni	3-7 µm
	Au	0.05-0.12 µm
	Plated hole-Ø	1.00-1.10 mm
<i>Silver plated PCB</i>	Hole-Ø	1.15±0.025 mm
	Cu	min. 25 µm
	Ag	0.1-0.3 µm
	Plated hole-Ø	1.00-1.10 mm
<i>OSP copper plated PCB</i>	Hole-Ø	1.15±0.025 mm
	Cu	min. 25 µm
	Plated hole-Ø	1.00-1.10 mm

PCB board thickness: ≥ 1.6 mm



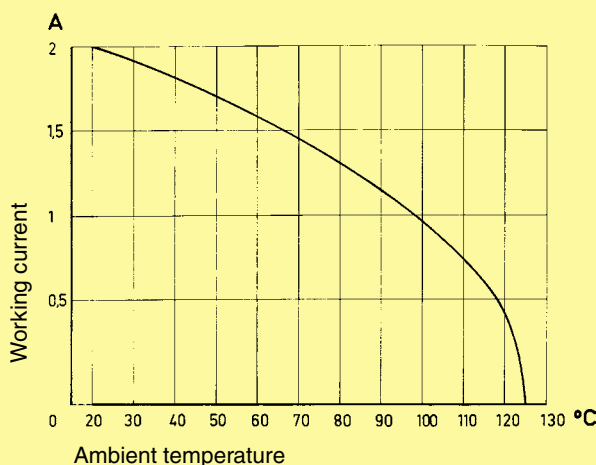


Number of contacts	30-96
Contact spacing (mm)	2.54
Working current see current carrying capacity chart	2 A max.
Clearance	≥ 1.2 mm
Creepage	≥ 1.2 mm
Working voltage The working voltage also depends on the clearance and creepage dimensions of the pcb itself and the associated wiring	according to the safety regulations of the equipment Explanations see chapter 00
Test voltage $U_{r.m.s.}$	1 kV
Contact resistance	≤ 15 m Ω
Insulation resistance	$\geq 10^{12}$ Ω
Temperature range The upper temperature is limited by the property of the pcb material	- 40 °C ... + 105 °C
Electrical termination Male and female connectors Diameter of pcb plated through holes pcb thickness Recommended pcb holes for press-in process in acc. to EN 60 352-5 ²⁾	Compliant press-in terminations See table on page 04.04 ≥ 1.6 mm
Insertion and withdrawal force	30pol. ≤ 30 N 32pol. ≤ 30 N 48pol. ≤ 45 N 64pol. ≤ 60 N 96pol. ≤ 90 N
Materials Mouldings Contacts	Thermoplastic resin, glass-fibre filled, UL 94-V0 Copper alloy
Contact surface Contact zone	Plated according to performance level ¹⁾

Current carrying capacity

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals. The current capacity curve is valid for continuous, non interrupted current loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Control and test procedures according to DIN IEC 60 512



¹⁾ Explanation of performance levels see chapter 00
²⁾ for details see page 04.04