

Press-in – Technology and board connectors

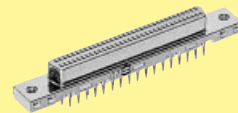
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General information ..... **20.02**

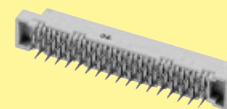
**harmik®**

Technical characteristics ..... **20.05**

I/O connectors, straight ..... **20.06**



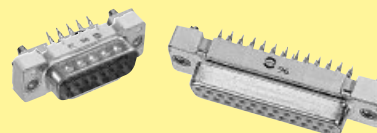
Intra cabinet connectors, straight ..... **20.07**



**D-Sub – S**

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**SEK**

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Press-in  
technology

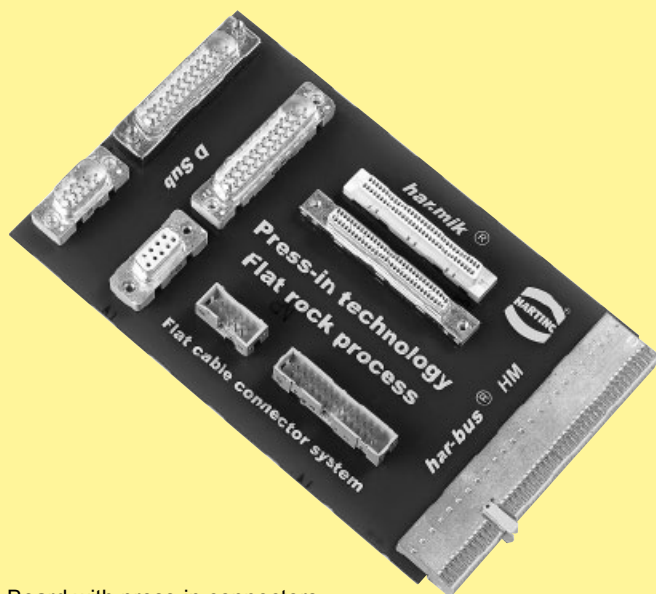
**20  
01**

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.

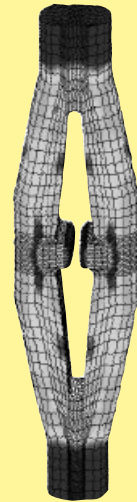
Due to variety of different connector contact designs, the press-in zone has been designed to fit perfectly to the contact metal thickness and the plated through hole dimensions and tolerances.



Board with press-in connectors

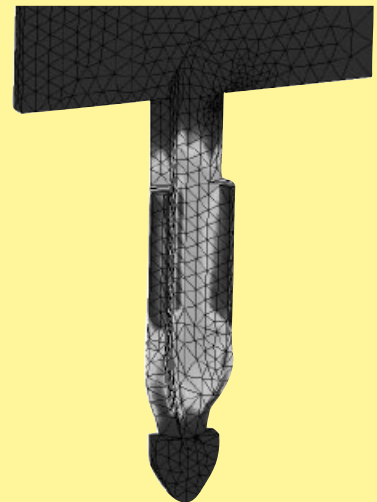
## har-mik®

The patented contact design allows 20 % more tolerance on the plated through hole of 0.6 mm than the standard tolerance of  $0.6^{+0.07}_{-0.05}$  mm.



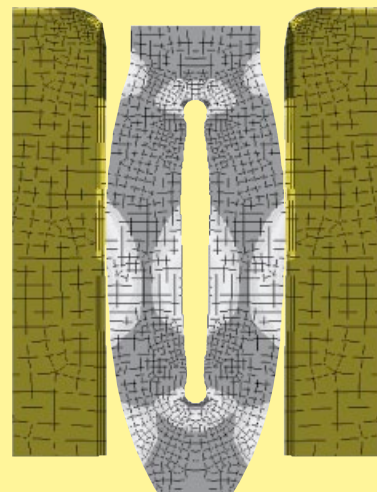
## D-Sub

The terminating spoon shape of the contact provides a reliable vertical position of the connector for better alignment during insertion.



## SEK

The renowned needle eye allows for compensation of tolerances of pcb surface properties. The excessive material is displaced within the plated through hole whereby a gastight connection is assured.



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.

Today tinned surfaces are widely used as a standard, the pcb technology trends are moving to low tin or tin free surfaces. Cu, Pd, Au and Ag are the important alternatives. Specific parameters and particularly different friction factors of these surfaces make high demands on press-in zones.

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

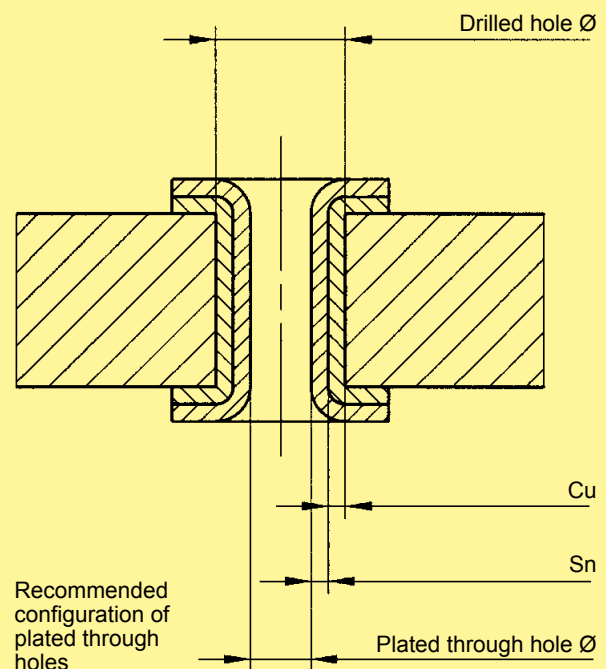
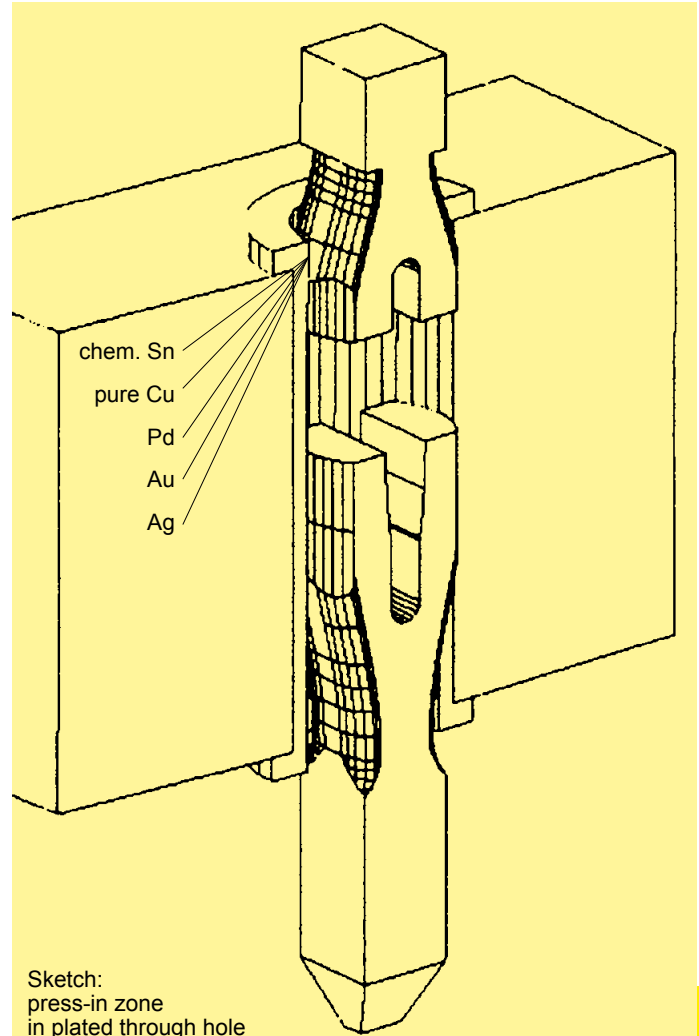
Please contact us for detailed test reports.

## 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

## Recommended configuration chart for tinned plated through holes

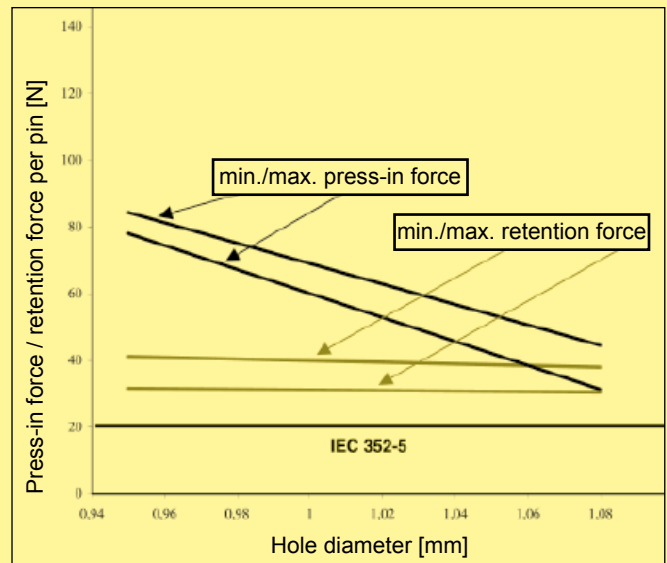
	Plated through hole	
	0.6 mm	1 mm
Drilled hole Ø [mm]	0.71 - 0.74	1.12 - 1.15
Cu thickness [µm]	30 - 60	25 - 75
Sn thickness [µm]	5 - 20	5 - 15
Plated hole Ø [mm]	0.55 - 0.67	0.94 - 1.09
Board thickness [mm]	1.6 - 3.2	1.6 - 3.2
Connector range	har-mik	SEK and D-Sub



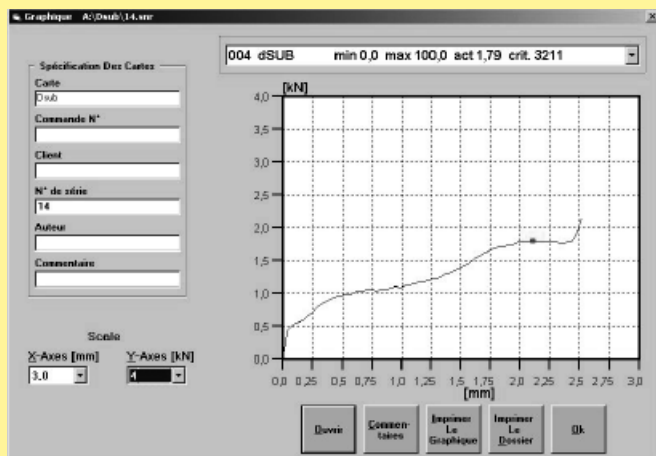
## Quality control of the press-in termination

The press-in force correlates with the diameter of the plated through hole and with the friction coefficient of the surface; therefore it can be used for a continuous monitoring of the process.

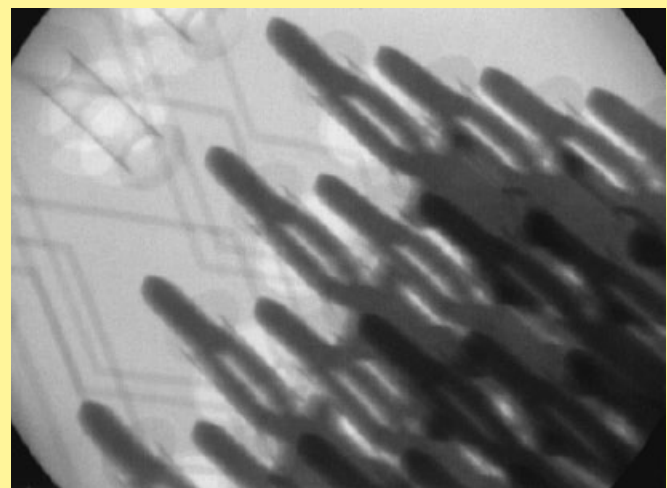
The retention force, as an indirect measure of the normal force, serves to qualify the process or random tests



Typical press-in and retention forces for the D-Sub press-in zone

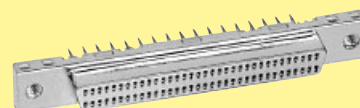
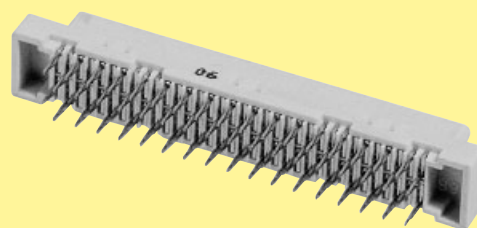


The automatic press-in machines of HARTING feature a graphical user interface for monitoring the process and the quality of the press-in termination (see chapter 30).



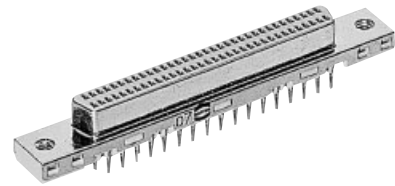
X-ray photo of a pressed-in connector

Number of contacts	68
Pitch	1.27 mm
Working current	1 A
Working voltage	240 V ~
Test voltage $U_{r.m.s.}$	750 V
Contact resistance	$\leq 30 \text{ m}\Omega$
Insulation resistance	$\geq 10^3 \text{ M}\Omega$
Temperature range	-55 °C ... + 105 °C
<b>Materials</b>	
Moulding	Thermoplastic resin glass-fibre filled UL 94-V0
Contacts	Copper alloy
<b>Contact surface</b>	
Contact zone	selectively gold-plated acc. to performance level
Metal shell	Die cast zamac or stamped steel, nickel-plated
<b>Press-in</b>	
Insertion process	Flat rock
Maximum press-in force per contact	100 N
Minimum push out force per contact	15 N
Number of repairs	2
Diameter of pcb plated through holes	$\varnothing 0.6^{+0.07}_{-0.05} \text{ mm}$
Recommended pcb holes for press-in process	Hole : $\varnothing 0.71 - 0.74 \text{ mm}$ Cu : 30 – 60 $\mu\text{m}$ Sn : 5 – 20 $\mu\text{m}$
Pcb thickness	1.6 – 3.2 mm



Number of contacts

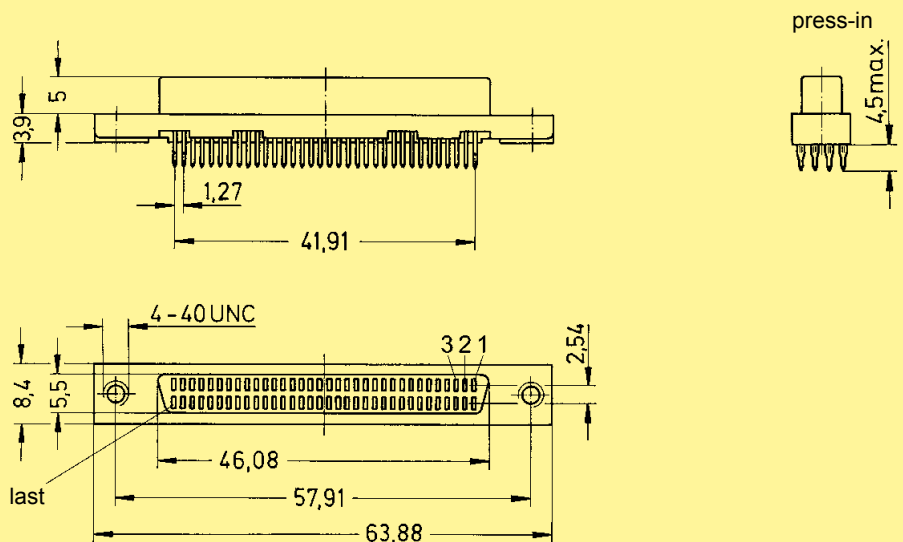
**68**



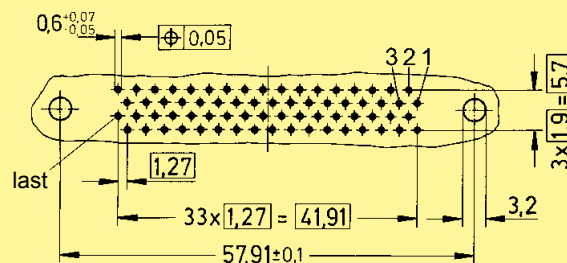
Female connectors, straight

Identification	No. of contacts	Part No.
Female connector with straight press-in pins	68	60 02 068 5322

Dimensions



Board drillings  
(Components side)

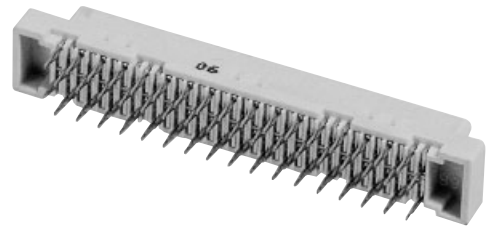


Dimensions in mm

Press-in  
technology

Number of contacts

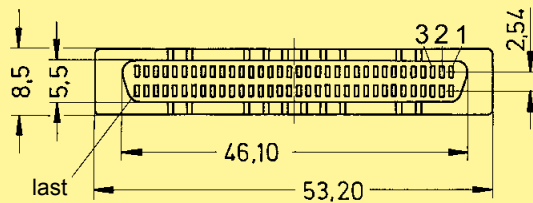
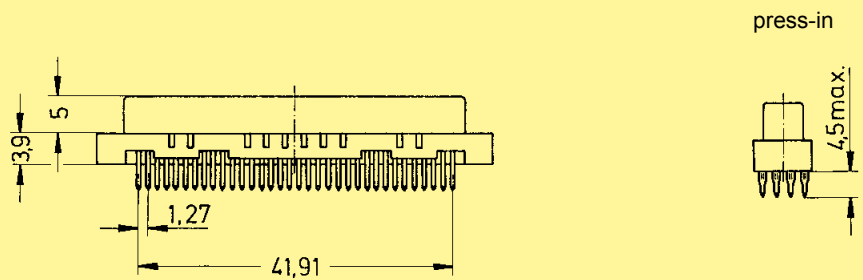
68



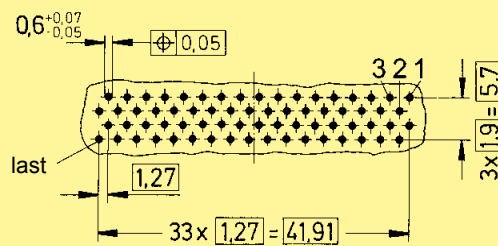
Female connectors, straight

Identification	No. of contacts	Part No.
Female connector with straight press-in pins	68	60 05 068 5322

Dimensions



Board drillings  
(Components side)



Dimensions in mm

Press-in technology



Number of contacts 9, 15, 25, 37, 50  
UL recognized

Working current  
see current carrying capacity chart  
Stamped contacts 6.5 A max.

Test voltage  $U_{r.m.s.}$  1 kV

Clearance and creepage  $\geq 1.0$  mm

Contact resistance  $\leq 10$  m $\Omega$   
Insulation resistance  $\geq 10^{10}$   $\Omega$

Temperature range -55 °C ... + 125 °C  
The higher temperature limit includes the local ambient and heating effect of the contacts under load

Terminations Recommended PCB through holes

		Signal pin		Grounding pin	
Tin-lead plated PCB	Hole	1.15 <sup>-0.03</sup>	3.15 <sup>±0.025</sup>		
	Cu	25-75 $\mu$ m	25-75 $\mu$ m		
	Sn	5-15 $\mu$ m	4-10 $\mu$ m		
	Plated hole	0.94-1.09 mm	3.0-3.15 mm		

Chemical tin-plated PCB	Hole	1.05 <sup>-0.03</sup>	3.15 <sup>±0.025</sup>		
	Cu	25-50 $\mu$ m	25-50 $\mu$ m		
	Sn	0.8-1.0 $\mu$ m	0.8-1.0 $\mu$ m		
	Plated hole	1.00-1.10 mm	3.0-3.15 mm		

Au / Ni plated PCB	Hole	1.15 <sup>-0.03</sup>	3.15 <sup>±0.025</sup>		
	Cu	25-50 $\mu$ m	25-50 $\mu$ m		
	Ni	3-7 $\mu$ m	4-7 $\mu$ m		
	Au	0.05-0.12 $\mu$ m	0.05-0.12 $\mu$ m		
	Plated hole	1.00-1.10 mm	3.0-3.15 mm		

Silver plated PCB	Hole	1.15 <sup>-0.03</sup>	3.15 <sup>±0.025</sup>		
	Cu	25-50 $\mu$ m	25-50 $\mu$ m		
	Ag	0.1-0.3 $\mu$ m	0.1-0.3 $\mu$ m		
	Plated hole	1.00-1.10 mm	3.0-3.15 mm		

OSP copper plated PCB	Hole	1.15 <sup>-0.03</sup>	3.15 <sup>±0.025</sup>		
	Cu	25-50 $\mu$ m	25-50 $\mu$ m		
	Plated hole	1.00-1.10 mm	3.0-3.15 mm		

PCB board thickness:  $\geq 1.6$  mm

Materials  
Mouldings and hoods Liquid Crystal Polymer (LCP)  
UL 94-V0

Contacts Copper alloy

Contact surface  
Contact zone selectively plated  
acc. to performance level<sup>1)</sup>

Metal shell Plated steel

### Insertion and withdrawal force

Connector on P.C.B.

Press-in without grounding pins

- insertion max. per contact: 120 N  
- withdrawal min. per contact: 20 N

Press-in with grounding pins

- insertion max. per grounding pin: 250 N  
- withdrawal min. per grounding pin: 30 N

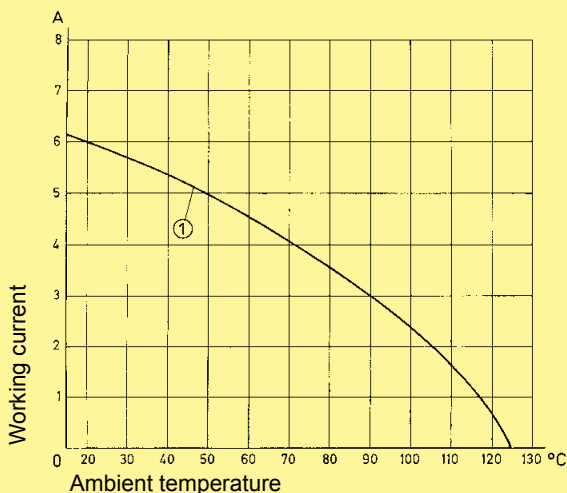
Mating force  
9 way  $\leq 30$  N  
15 way  $\leq 50$  N  
25 way  $\leq 83$  N  
37 way  $\leq 123$  N  
50 way  $\leq 167$  N

### 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, not interrupted current-loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

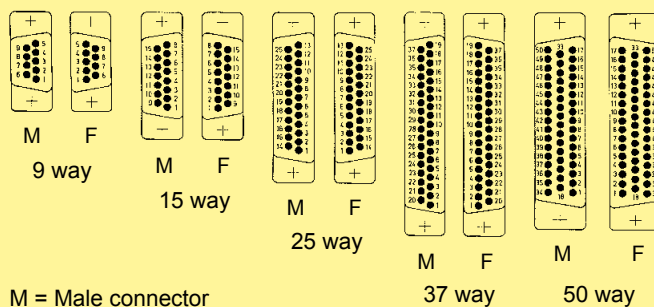
Control and test procedures according to DIN IEC 60 512.



Example: 25 way connector

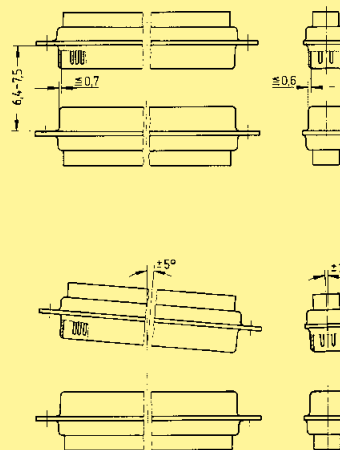
① Stamped contacts

### Contact arrangement View from termination side



M = Male connector  
F = Female connector

### Mating conditions as per DIN 41 652

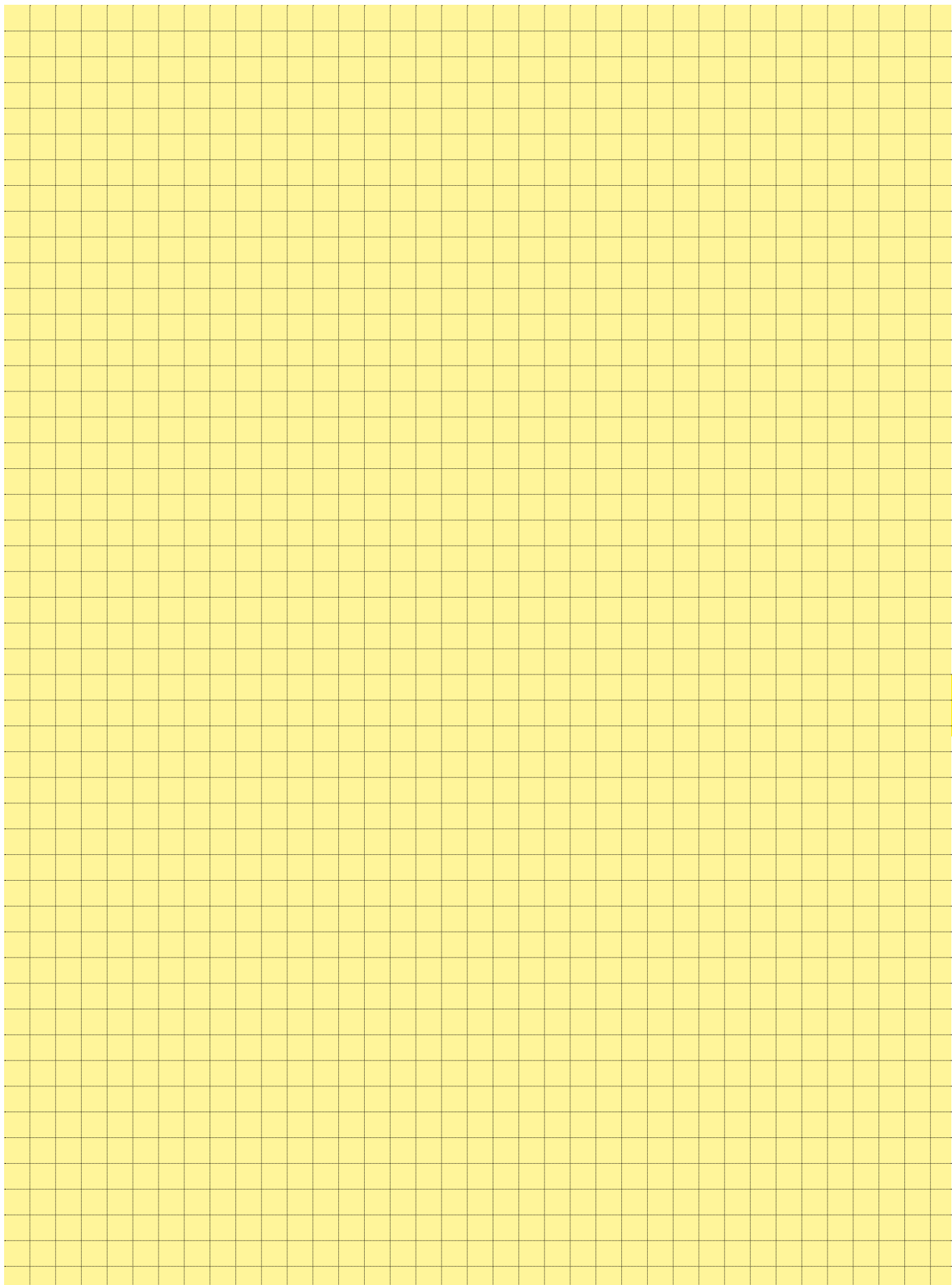


<sup>1)</sup> Performance level 3, 50 mating cycles, no gas test

Performance level 2 as per CECC 75 301-802, 250 mating cycles, 4 days 4 mixed gas test – IEC 60 512

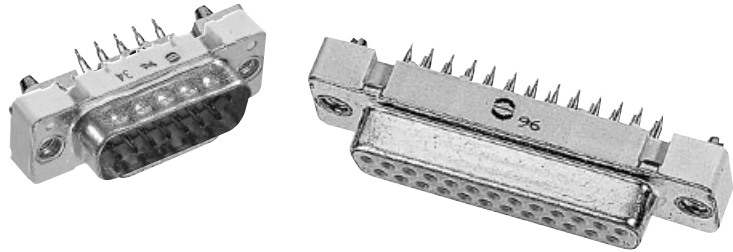
Performance level 1 as per CECC 75 301-802, 500 mating cycles, 10 days 4 mixed gas test – IEC 60 512





Number of contacts

# 9-50



Press-in, straight with grounding press-in board locks

Identification	No. of contacts	Part No.	
<b>Performance levels</b> Explanations see page 20.08 Other performance levels on request		Performance level <b>3</b>	Performance level <b>2</b>
<b>Male connector</b> Flange height x = 5.7 mm			
metal shell with dimples	9 15 25	09 66 164 771 09 66 264 771 09 66 364 771	09 66 164 671 09 66 264 671 09 66 364 671
Please insert digit for flange thread or fitted female screw locks			
M3 ▶ 5 4-40 UNC ▶ 6 fitted screw locks 4-40 UNC ▶ 7 <sup>1)</sup>			
<b>Female connector</b> Flange height x = 5.7 mm			
metal shell	9 15 25 37	09 66 154 751 09 66 254 751 09 66 354 751 09 66 454 751	09 66 154 651 09 66 254 651 09 66 354 651 09 66 454 651
Please insert digit for flange thread or fitted female screw locks			
M3 ▶ 5 4-40 UNC ▶ 6 fitted screw locks 4-40 UNC ▶ 7 <sup>1)</sup>			
<b>Female connector</b> Flange height x = 6 mm			
metal shell	9 15 25 37 50	09 66 154 751 09 66 254 751 09 66 354 751 09 66 454 751 09 66 554 751	09 66 154 651 09 66 254 651 09 66 354 651 09 66 454 651 09 66 554 651
Please insert digit for flange thread or fitted female screw locks			
M3 ▶ 1 4-40 UNC ▶ 2 fitted screw locks 4-40 UNC ▶ 3 <sup>1)</sup>			

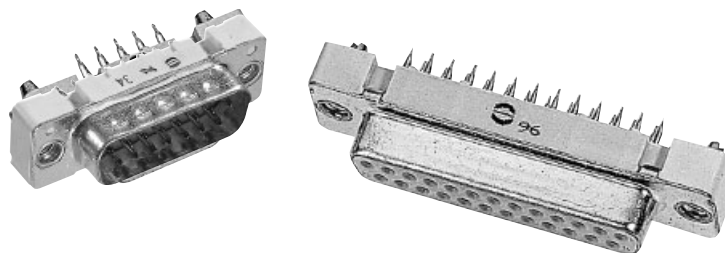
Press-in technology

20  
10

<sup>1)</sup> Fitted screw locks 4-40 UNC not normally kept in stock for performance level 3  
 Connector dimensions see page 20.11. Mating conditions see page 20.08.

Number of contacts

# 9-50



Press-in, straight with grounding press-in board locks

Identification

Drawing

Dimensions in mm

Male connector  
9 – 25 contacts

M3 or  
4 - 40 UNC

fitted screw locks  
4 - 40 UNC

X	Y	Z
6.0 ± 0.2	4.20 ± 0.2	3.5 max.
5.7 ± 0.2	4.35 ± 0.2	3.9 max.

Female connector  
9 – 37 contacts

M3 or  
4 - 40 UNC

fitted screw locks  
4 - 40 UNC

Mating face acc. to: DIN 41 652 · CECC 75 301-802 · IEC 60 807

	a	b	g	h
9	31.00	24.90	4 x [2.74] = 10.96	3 x [2.74] = 8.22
15	39.30	33.20	7 x [2.74] = 19.18	6 x [2.74] = 16.44
25	53.10	47.00	12 x [2.76] = 33.12	11 x [2.76] = 30.36
37	69.65	63.55	18 x [2.76] = 49.68	17 x [2.76] = 46.92
50	67.00	61.10	16 x [2.76] = 44.16	15 x [2.76] = 41.40

Female connector  
50 contacts

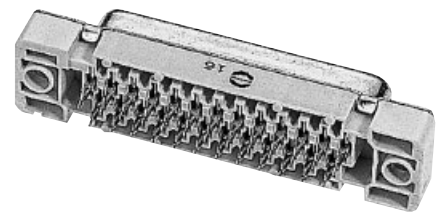
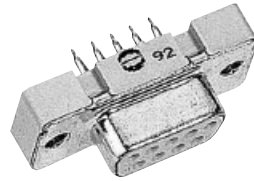
M3 or  
4 - 40 UNC

fitted screw locks  
4 - 40 UNC

Board drillings

Number of contacts

# 9-50



Press-in, straight without grounding press-in board locks

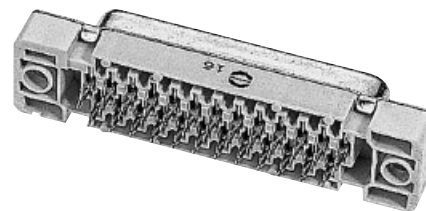
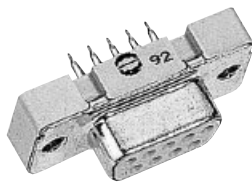
Identification	No. of contacts	Part No.	
		Performance level 3	Performance level 2
<b>Performance levels</b> Explanations see page 20.08 Other performance levels on request			
<b>Male connector</b> Flange height x = 5.7 mm			
metal shell with dimples	9 15 25	09 66 124 770 . 09 66 224 770 . 09 66 324 770 .	09 66 124 670 . 09 66 224 670 . 09 66 324 670 .
Please insert digit for flange thread or fitted female screw locks			
ø 3.1 mm hole ▶ 4 <sup>1)</sup> M3 ▶ 5 4-40 UNC ▶ 6 fitted screw locks 4-40 UNC ▶ 7 <sup>2)</sup>			
<b>Female connector</b> Flange height x = 5.7 mm			
metal shell	9 15 25 37	09 66 114 750 . 09 66 214 750 . 09 66 314 750 . 09 66 414 750 .	09 66 114 650 . 09 66 214 650 . 09 66 314 650 . 09 66 414 650 .
Please insert digit for flange thread or fitted female screw locks			
ø 3.1 mm hole ▶ 4 <sup>1)</sup> M3 ▶ 5 4-40 UNC ▶ 6 fitted screw locks 4-40 UNC ▶ 7 <sup>2)</sup>			
<b>Female connector</b> Flange height x = 6 mm			
metal shell	9 15 25 37 50	09 66 114 750 . 09 66 214 750 . 09 66 314 750 . 09 66 414 750 . 09 66 514 750 .	09 66 114 650 . 09 66 214 650 . 09 66 314 650 . 09 66 414 650 . 09 66 514 650 .
Please insert digit for flange thread or fitted female screw locks			
ø 3.1 mm hole ▶ 0 <sup>1)</sup> M3 ▶ 1 4-40 UNC ▶ 2 fitted screw locks 4-40 UNC ▶ 3 <sup>2)</sup>			

Press-in technology

<sup>1)</sup> Not normally kept in stock  
<sup>2)</sup> Fitted screw locks 4-40 UNC not normally kept in stock for performance level 3  
 Connector dimensions see page 20.13. Mating conditions see page 20.08.

Number of contacts

# 9-50



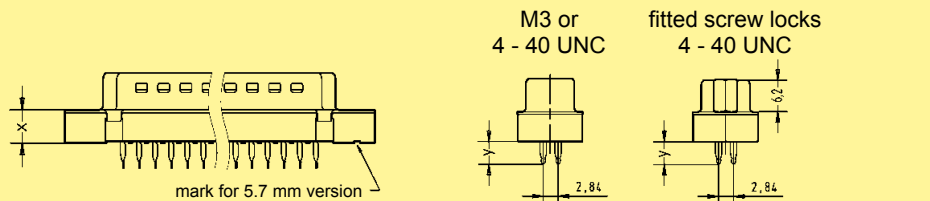
Press-in, straight without grounding press-in board locks

Identification

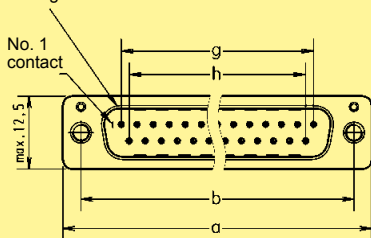
Drawing

Dimensions in mm

Male connector  
9 – 25 contacts

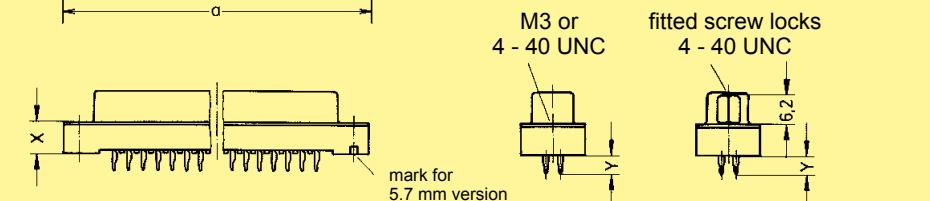


Mating face acc. to: DIN 41 652 · CECC 75 301-802 · IEC 60 807

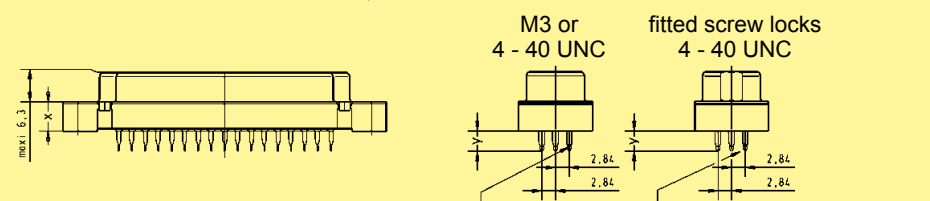


X	Y
6.0 ± 0.2	4.20 ± 0.2
5.7 ± 0.2	4.35 ± 0.2

Female connector  
9 – 37 contacts

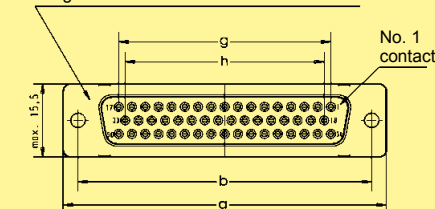


Female connector  
50 contacts



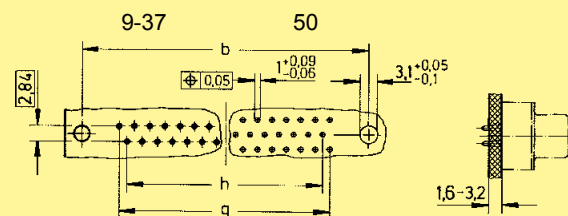
Press-in pins from position 34 to 50 are reversed 180 degrees

Mating face acc. to: DIN 41 652 · CECC 75 301-802 · IEC 60 807



	a	b	g	h
9	31.00	24.90	4 x [2.74] = 10.96	3 x [2.74] = 8.22
15	39.30	33.20	7 x [2.74] = 19.18	6 x [2.74] = 16.44
25	53.10	47.00	12 x [2.76] = 33.12	11 x [2.76] = 30.36
37	69.65	63.55	18 x [2.76] = 49.68	17 x [2.76] = 46.92
50	67.00	61.10	16 x [2.76] = 44.16	15 x [2.76] = 41.40

Board drillings



Number of contacts 10, 14, 16, 20, 26, 34, 40, 50, 60, 64

Contact arrangement straight

Contact length 4.5 mm

Approvals IEC 60603-13

Design acc. to D 2632  
BT 224  
BS 9525  
NFC 93-428 (HE 10)

Pitch 2.54 mm [0.100"]

Working current 1 A

Working voltage 350 V DC or AC peak

Test voltage  $U_{r.m.s.}$  1 kV

Contact resistance  $\leq 20 \text{ m}\Omega$   
Insulation resistance  $\geq 10^9 \Omega$

Temperature range  $-55 \text{ }^\circ\text{C} \dots + 125 \text{ }^\circ\text{C}$   
The maximum temperature includes heating of contacts and ambient temperature

Materials  
Moulding PBT  
UL 94-V0  
Contacts Phosphor bronze

Contact surface  
Contact zone plated according to performance level<sup>1)</sup>

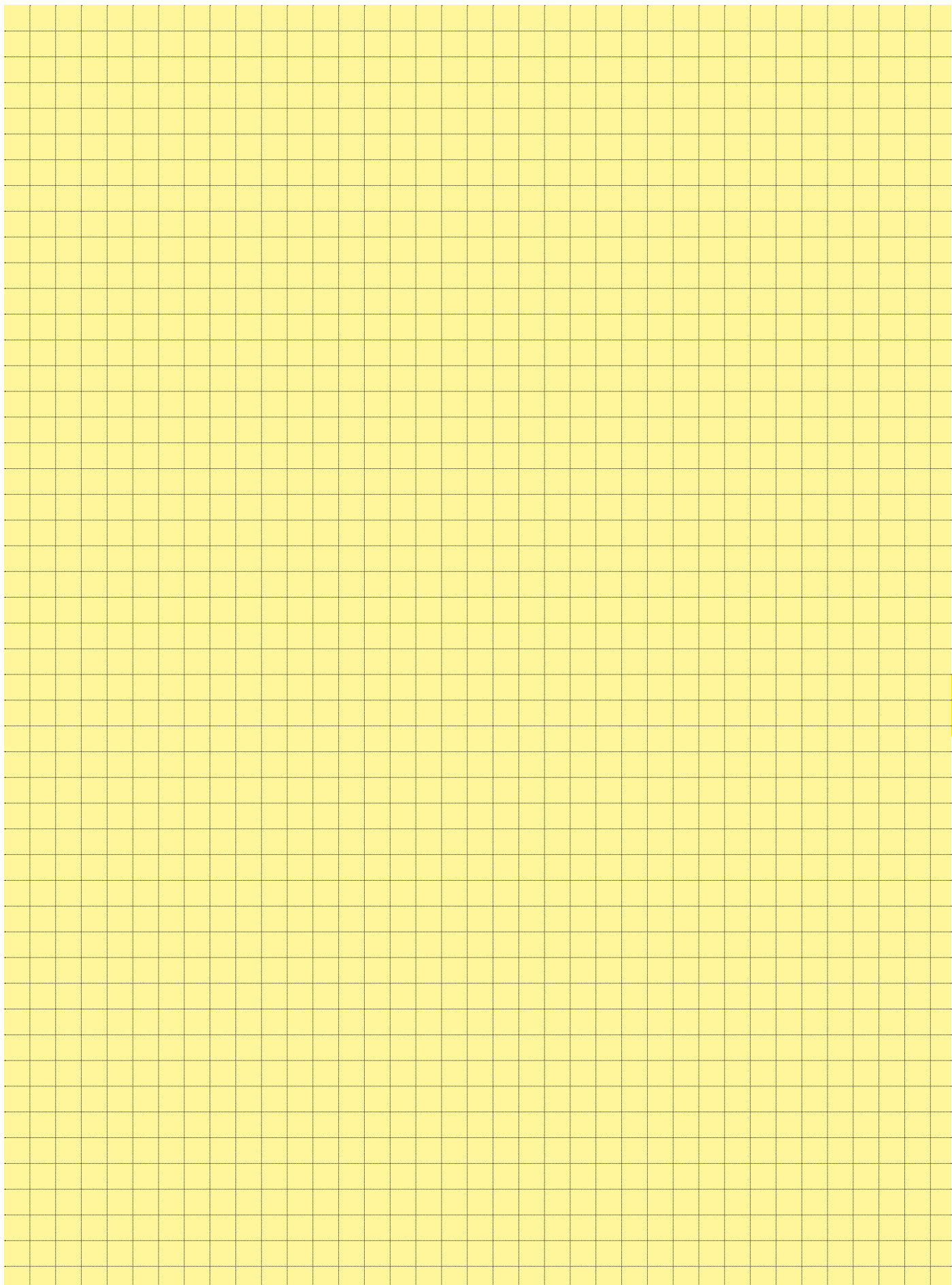
#### Terminations Recommended PCB through holes

<i>Tin-lead plated PCB</i>	Hole	$1.15^{+0.025}$
	Cu	min. 25 $\mu\text{m}$
	Sn	max. 15 $\mu\text{m}$
	Plated hole	0.94-1.09 mm
<i>Chemical tin-plated PCB</i>	Hole	$1.15^{+0.025}$
	Cu	min. 25 $\mu\text{m}$
	Sn	min. 0.8 $\mu\text{m}$
	Plated hole	1.00-1.10 mm
<i>Au / Ni plated PCB</i>	Hole	$1.15^{+0.025}$
	Cu	min. 25 $\mu\text{m}$
	Ni	3-7 $\mu\text{m}$
	Au	0.05-0.12 $\mu\text{m}$
	Plated hole	1.00-1.10 mm
<i>Silver plated PCB</i>	Hole	$1.15^{+0.025}$
	Cu	min. 25 $\mu\text{m}$
	Ag	0.1-0.3 $\mu\text{m}$
	Plated hole	1.00-1.10 mm
<i>OSP copper plated PCB</i>	Hole	$1.15^{+0.025}$
	Cu	min. 25 $\mu\text{m}$
	Plated hole	1.00-1.10 mm
PCB board thickness: $\geq 1.6 \text{ mm}$		

#### Insertion and withdrawal forces

Number of contacts	Maximum force [N]
	Performance level 1
10	20
14	28
16	32
20	40
26	52
34	68
40	80
50	100
60	120
64	128

<sup>1)</sup> Performance level 1 as per IEC 60603-13,  $\geq 500$  mating cycles, 10 days gas test

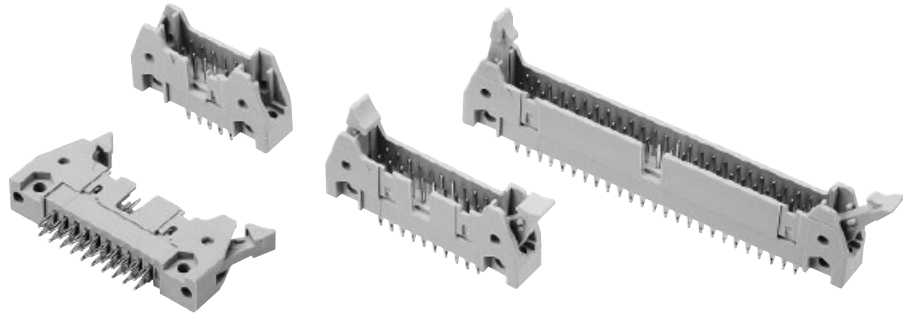




Number of contacts

# 10-64

Male header,  
straight press-in pins



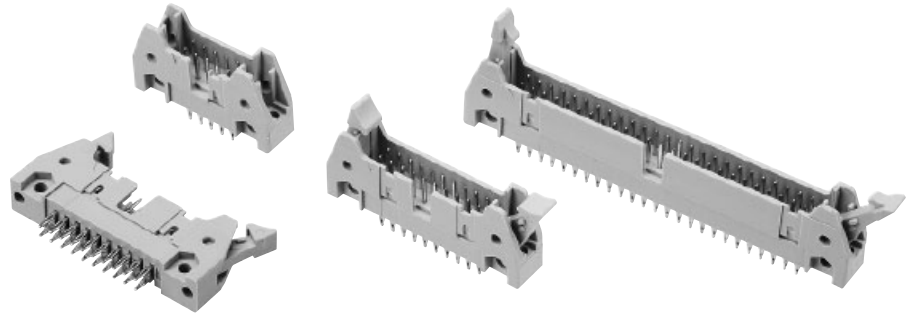
Identification	No. of contacts	Part No.		
		Without levers	With short levers	With long levers
Male header with straight press-in terminations Length: 4.5 mm				
	10	09 18 510 5929	09 18 510 5919	09 18 510 5909
	14	09 18 514 5929	09 18 514 5919	09 18 514 5909
	16	09 18 516 5929	09 18 516 5919	09 18 516 5909
	20	09 18 520 5929	09 18 520 5919	09 18 520 5909
	26	09 18 526 5929	09 18 526 5919	09 18 526 5909
	34	09 18 534 5929	09 18 534 5919	09 18 534 5909
	40	09 18 540 5929	09 18 540 5919	09 18 540 5909
	50	09 18 550 5929	09 18 550 5919	09 18 550 5909
	60	09 18 560 5929	09 18 560 5919	09 18 560 5909
	64	09 18 564 5929	09 18 564 5919	09 18 564 5909

Press-in technology

Number of contacts

# 10-64

Male header,  
straight press-in pins



Identification

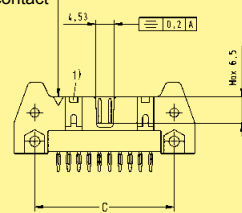
Drawing

Dimensions in mm

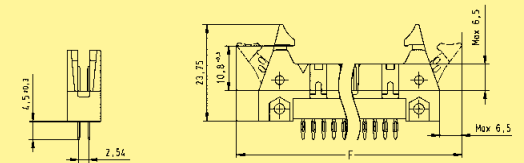
Male header

No. of contacts	A	C	D	E	F	G
10	32.11	21.84	17.91	2.54 x 4 = 10.16	45.11	50.11
14	37.19	26.92	22.99	2.54 x 6 = 15.24	50.19	55.19
16	39.73	29.46	25.53	2.54 x 7 = 17.78	52.73	57.73
20	44.81	34.54	30.61	2.54 x 9 = 22.86	57.81	62.81
26	52.43	42.16	38.23	2.54 x 12 = 30.48	65.43	70.43
34	62.59	52.32	48.39	2.54 x 16 = 40.64	75.59	80.59
40	70.21	59.94	56.01	2.54 x 19 = 48.26	83.21	88.21
50	82.91	72.64	68.71	2.54 x 24 = 60.96	95.91	100.91
60	95.61	85.34	81.41	2.54 x 29 = 73.66	108.61	113.61
64	100.69	90.42	86.49	2.54 x 31 = 78.74	113.69	118.69

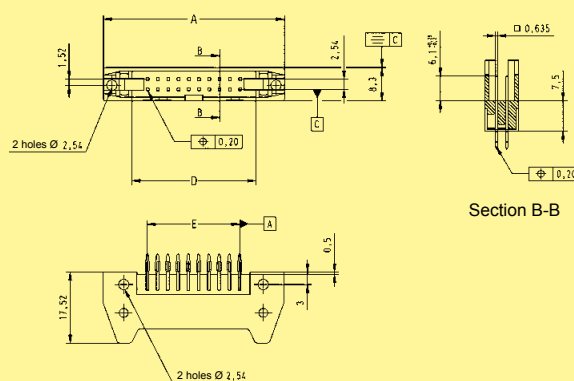
Marking  
No. 1 contact



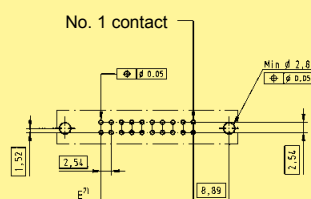
Short levers



Long levers



Board drillings



1) No polarization slot for 10 or 14 way male header

2) Pitch tolerance: ± 0.1

Number of contacts 6, 10, 14, 16, 20, 26, 34, 40, 50, 60, 64

Contact arrangement straight

Contact length 5.5 mm

Approvals IEC 60 603-13  
DIN EN 60 603-13  
D 2632  
BT 224  
NFC 93-428 (HE 10)  
UL recognized: E102079



Pitch 2.54 mm [0.100"]

Working current 1 A

Test voltage  $U_{r.m.s.}$  1 kV

Contact resistance  $\leq 20 \text{ m}\Omega$   
Insulation resistance  $\geq 10^9 \Omega$

Temperature range -55 °C ... + 105 °C  
The maximum temperature includes heating of contacts and ambient temperature

#### Press-in

Diameter of pcb plated through holes  $\varnothing 1.0^{+0.09}_{-0.06} \text{ mm}$

Recommended pcb holes for press-in process  
Hole:  $\varnothing 1.12 - 1.15 \text{ mm}$   
Cu : 25 – 75  $\mu\text{m}$   
Sn : 5 – 15  $\mu\text{m}$

Pcb thickness 1.6 – 3.2 mm

#### Materials

Moulding Thermoplastic resin (PBT)  
UL 94-V0

#### Contact surface

Contact zone plated according to performance level<sup>1)</sup>

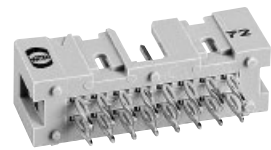
#### Insertion and withdrawal forces

Number of contacts	Maximum force [N]	
	Performance level 1 and 2	Performance level 3
6	12	18
10	20	30
14	28	42
16	32	48
20	40	60
26	52	78
34	68	102
40	80	120
50	100	150
60	120	180
64	128	192

<sup>1)</sup> Performance level 3 as per IEC 60 603-13,  $\geq 50$  mating cycles, no gas test  
Performance level 2 as per IEC 60 603-13,  $\geq 250$  mating cycles, 4 days gas test  
S4, plating = 0.76  $\mu\text{m}$  (30  $\mu\text{inch}$ ) Au or PdNi equivalent

Number of contacts

# 6-64



Low-profile male header, straight press-in pins

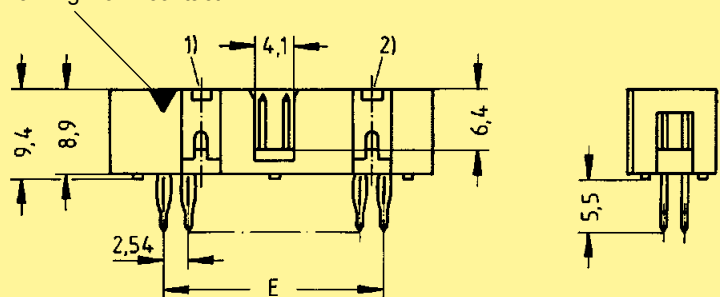
Identification      No. of contacts      Part No.      Drawing      Dimensions in mm

Low-profile male header with straight press-in terminations  
Length: 5.5 mm

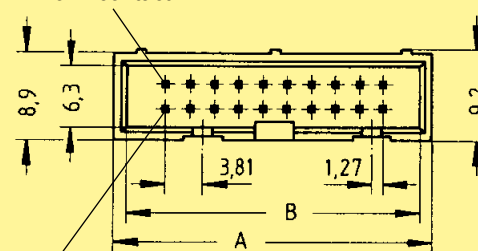
No. of contacts	Part No.	Drawing
6	09 18 506	329
10	09 18 510	329
14	09 18 514	329
16	09 18 516	329
20	09 18 520	329
26	09 18 526	329
34	09 18 534	329
40	09 18 540	329
50	09 18 550	329
60	09 18 560	329
64	09 18 564	329

No. of contacts	A	B	E
6	15.2	12.78	2.54 x 2 = 5.08
10	20.3	17.86	2.54 x 4 = 10.16
14	25.4	22.94	2.54 x 6 = 15.24
16	27.9	25.48	2.54 x 7 = 17.78
20	33.0	30.56	2.54 x 9 = 22.86
26	40.6	38.18	2.54 x 12 = 30.48
34	50.8	48.34	2.54 x 16 = 40.64
40	58.4	55.96	2.54 x 19 = 48.26
50	71.3	68.66	2.54 x 24 = 60.96
60	84.0	81.36	2.54 x 29 = 73.66
64	89.1	86.44	2.54 x 31 = 78.74

Marking No. 1 contact

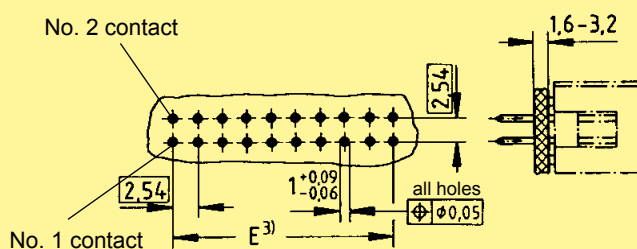


No. 2 contact



No. 1 contact

No. 2 contact

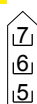


Board drillings

Press-in technology

20  
19

For Performance Level 3 please specify digit 7  
For Performance Level 2 please specify digit 6  
S4 = 0.76 μm (30 μinch) Au or PdNi equivalent



Not normally kept in stock

- 1) No polarization slot for 6, 10 or 14 way
- 2) No polarization slot for 6 way
- 3) Pitch tolerance: ± 0.1

