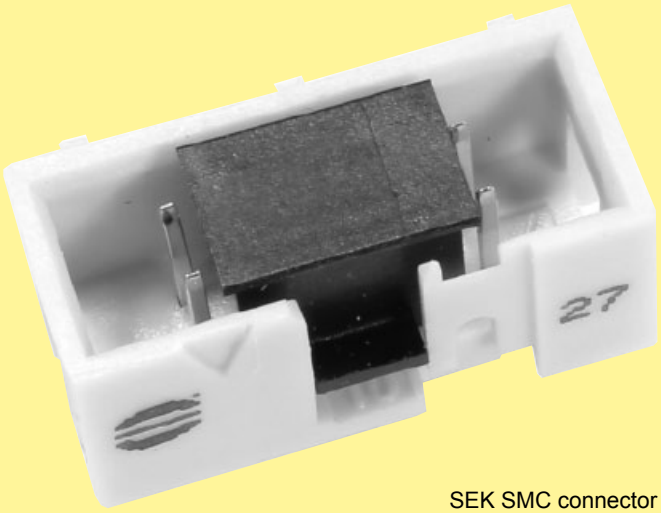
SMC* – Technology and board connectors

SMC technology

* Also known as Pin-in-Paste or Through Hole Reflow (THR)

The continuing trend towards miniaturisation has revolutionised the assembly of electronic components. For the past 15 years, most components have been secured directly to the pcb surface by means of Surface Mount Technology (SMT). By dispensing with drilled holes on the pcb, a space saving of up to 70 percent is achieved.

Today, typical components such as ICs, resistors, capacitors, inductors, and connectors with straight terminal pins are almost exclusively fitted using SMD (Surface Mount Device) technology in mass production. In contrast, angled SMD connectors at the edge of the board have not been successful because of tolerance problems (co-planarity) and stresses during mating.



SEK SMC connector

“Pin in Hole Intrusive Reflow*”

In this process, the connector is inserted into plated through holes in a comparable way to conventional component mounting. All other components can be assembled on the pcb surface.

The components are positioned using pick-and-place machines. These automatic assembly machines differ according to whether the components are small, lightweight or bulky. Connectors, compared to ICs, are considered bulky (odd form). They are more difficult to grip, due to their comparatively heavy weight and larger size. But machines for odd form components, provide the higher insertion power, necessary to fit the components into pcb holes, which are filled with solder paste. Generally modern SMC production lines are equipped with both types of machine. Therefore the "Pin in Hole Intrusive Reflow" process entails no extra investment costs for the user.

Conventional assembly process:

1. Application of solder paste
2. Positioning the components
3. Positioning odd form components
4. Reflow soldering
5. Pressing in or partially dip soldering the connector at the board edge
6. Quality inspection

“Pin in Hole Intrusive Reflow” assembly:

1. Application of solder paste
2. Positioning the components
3. Positioning odd form components
4. Reflow soldering
5. ~~Pressing in or partially dip soldering the connector at the board edge~~
6. Quality inspection

* Also known as Pin-in-Paste or Through Hole Reflow (THR)

Interface connectors were designed for Pin in Hole Intrusive Reflow with features like an inspection friendly black colour, tape and reel packaging for automated handling and it is self retaining on pcb via kinked pin. The open design – moulded from high temperature resistant material – ensures good heat distribution, so that current solder temperature profiles can be used. The special material of the insulation body withstands also the higher temperatures of lead free soldering.

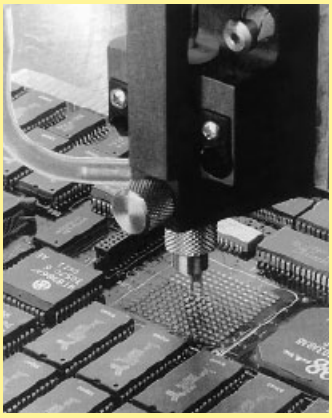
Advantages for using interface connectors are:

- Partial dip soldering or press-in is no longer required
- High mechanical stability
- Complete compatibility with Surface Mount Technology
- Savings through integration into the automated assembly process
- Reduced floor space in the production plant

Application of solder paste

Before the components are assembled, solder paste is applied to all the solder pads and the plated through holes. Usually a screen printing process is used for this purpose. A squeegee moves across the pcb, which is masked with screens and presses the solder paste into all unmasked areas. A good solder joint is basically determined by the amount of the applied solder paste. Only a few parameters (illustrated on the right) will lead to the right quantity.

As an alternative to screen printing, the solder paste can be applied by means of a dispenser. A high-precision robot moves the dispenser to all required positions on the pcb. The dispensing method is particularly suitable for small pcb's or applications which demand high precision and flexibility in dispensing volumes.



Dispenser in operation

Solder paste volume

There are numerous scientific studies dealing with calculation of the required quantity of solder paste. These studies use various parameters, e.g. the shrinking factor of the paste during soldering or the thickness of the screens used for masking the pcb. Since such calculation methods are complicated to apply, the following rule of thumb has proved valuable in practice:

$$V_{Paste} = 2(V_H - V_P)$$

in which:

V_{Paste} = Required volume of solder paste

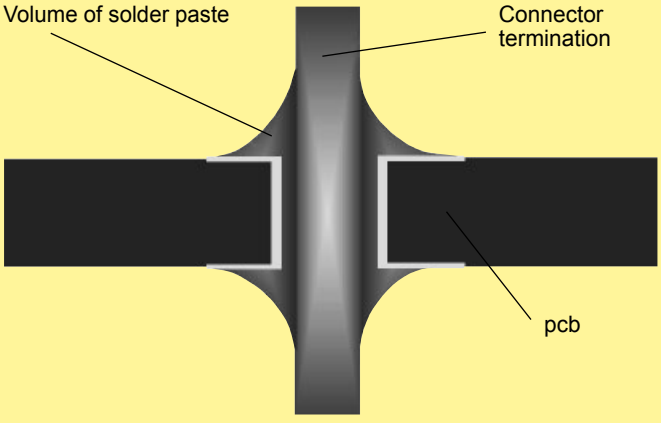
V_H = Volume of the plated through hole

V_P = Volume of the connector termination in the hole

Comment: the multiplier "2" compensates for solder paste shrinkage during soldering. For this purpose, it was assumed that 50 % of the paste consists of the actual solder, the other 50 % being soldering aids.

Requirements for the solder connection

At the beginning of a new production batch, the process parameters, such as quantity of solder paste and soldering temperature, can be set by interpreting simple cross-sections of the soldered connection. A reliable measure for achieving optimum parameters is the quantity of solder required to fill the hole. In soldered connections of high quality, the holes are filled to between 75 % and 100 %.



Plated through hole with connector termination

SMC connectors

SMC (Surface Mount Compatible) connectors have to withstand temperatures of up to 225°C in the reflow oven for 10 to 15 seconds. Therefore, the moulding must be made from a dimensionally stable plastic which expands at the same rate as the pcb material when subjected to heat.

The length of the connector contacts should be such that they protrude by no more than 1.5 millimetres after insertion to the pcb. Each contact collects solder on its tip as it penetrates the solder paste in the hole. So if the contact was too long, this solder would no longer be able to reflow back into the plated through hole by capillary action during the soldering process, therefore the quality of the soldered connection would suffer as a result.

Connector design must permit both automatic assembly with pick-and-place machines and manual positioning for test and pre-production batches. It is also important for the packaging of the connectors to be suitable for automated assembly. Experience shows that deep-drawn film and reel packaging fed into the pick-and-place machines with the aid of a conveyor system is particularly suitable.

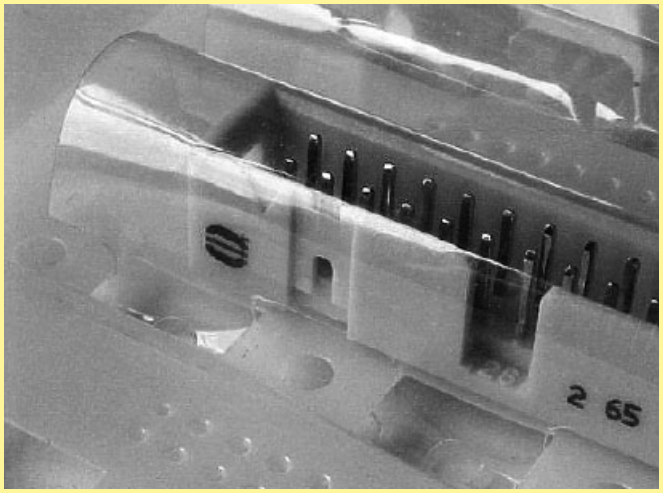
HARTING SMC technology

HARTING offers its customers a complete system concept for integrating SMC technology into existing production lines. We manufacture a wide range of SMC connectors (3 and 5 row) in compliance with IEC 60 603-2, D-Sub connectors in compliance with CECC 75 301-802 and connectors from the har-mik® series with contact spacing of 1.27 millimetres. In addition, HARTING supports the market with packaging and processing concepts, which have been developed in collaboration with renowned manufacturers of SMC soldering and assembly plants.

You will find more detailed information in our SMC catalogue, as well as in our hard metric connectors catalogue.

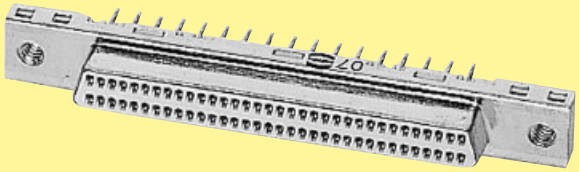
Advantages of the “Pin in Hole Intrusive Reflow” process:

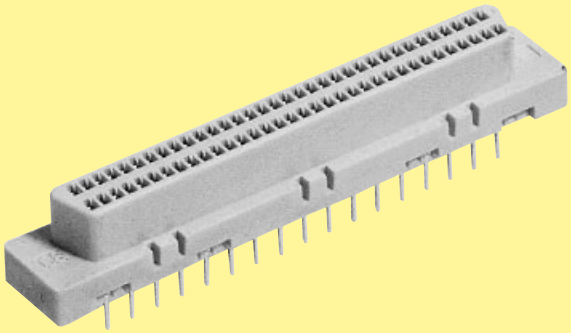
- Partial dip soldering or press-in is no longer required
- Complete compatibility with Surface Mount Technology
- Complete integration into the automated assembly process
- Reduced floor space in the production plant
- As a rule, no additional investment costs



SEK connector mounted in a tape ready for placement using an odd form assembly station.

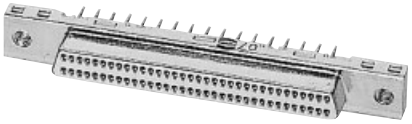
Number of contacts	68
Pitch	1.27 mm
Working current	1 A
Working voltage	240 V ~
Test voltage $U_{r.m.s.}$	750 V
Contact resistance	≤ 30 mΩ
Insulation resistance	≥ 10^3 MΩ
Temperature range during reflow soldering	-55 °C … + 105 °C max. + 240 °C for 60 s
Terminations	
Solder pins	Straight for pcb holes min. Ø 0.74 mm
Materials	
Moulding	Thermoplastic resin glass-fibre filled UL 94-V0 Liquid Christal Polymer (LCP)
Contacts	Copper alloy
Contact surface	
Contact zone	Selectively gold plated according to performance level
Metal shell	Die cast zamac or stamped steel, nickel-plated





Number of contacts

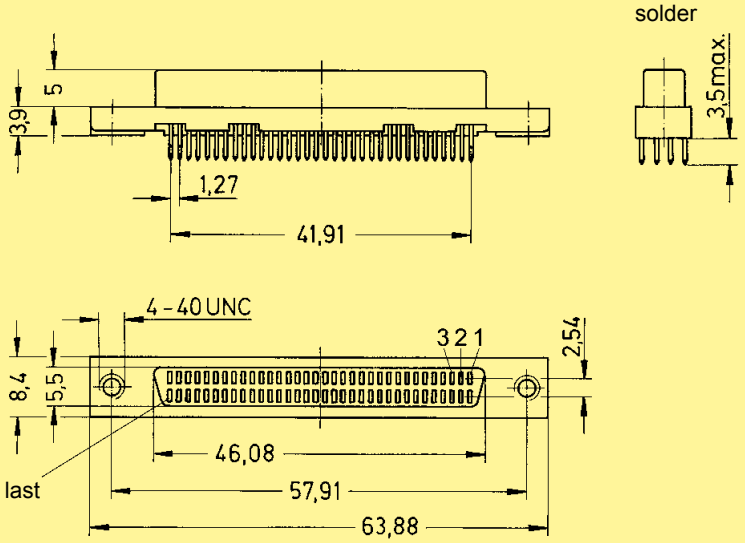
68



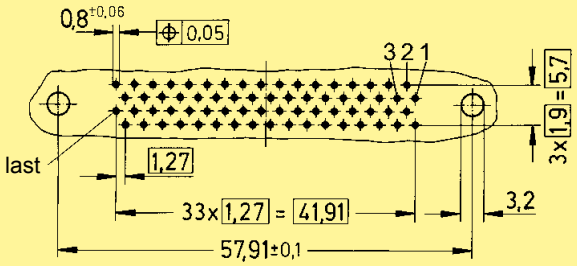
SMC female connectors, straight

Identification	No. of contacts	Part No.
SMC female connector with straight solder pins	68	60 02 068 5120

Dimensions



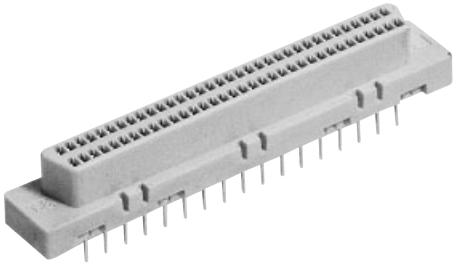
Board drillings
(Components side)



Dimensions in mm

Number of contacts

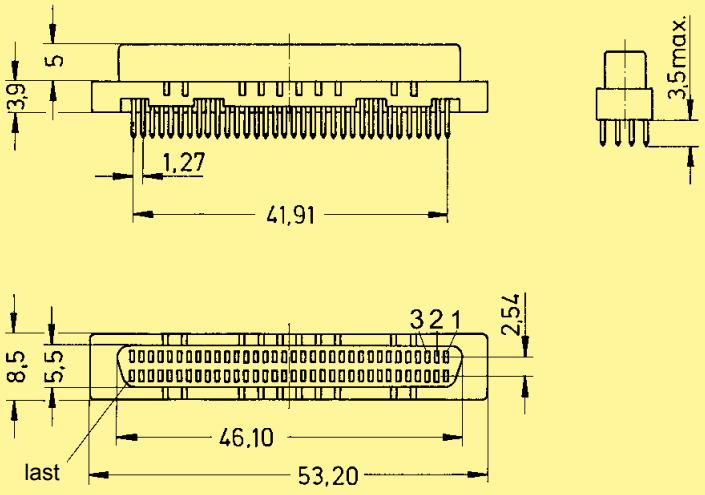
68



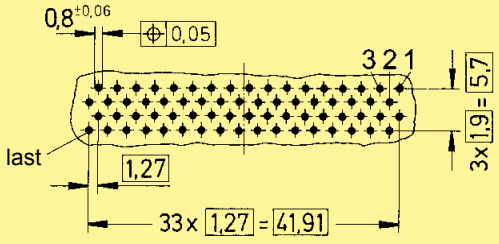
SMC female connectors, straight

Identification	No. of contacts	Part No.
SMC female connector with straight solder pins	68	60 05 068 5100

Dimensions

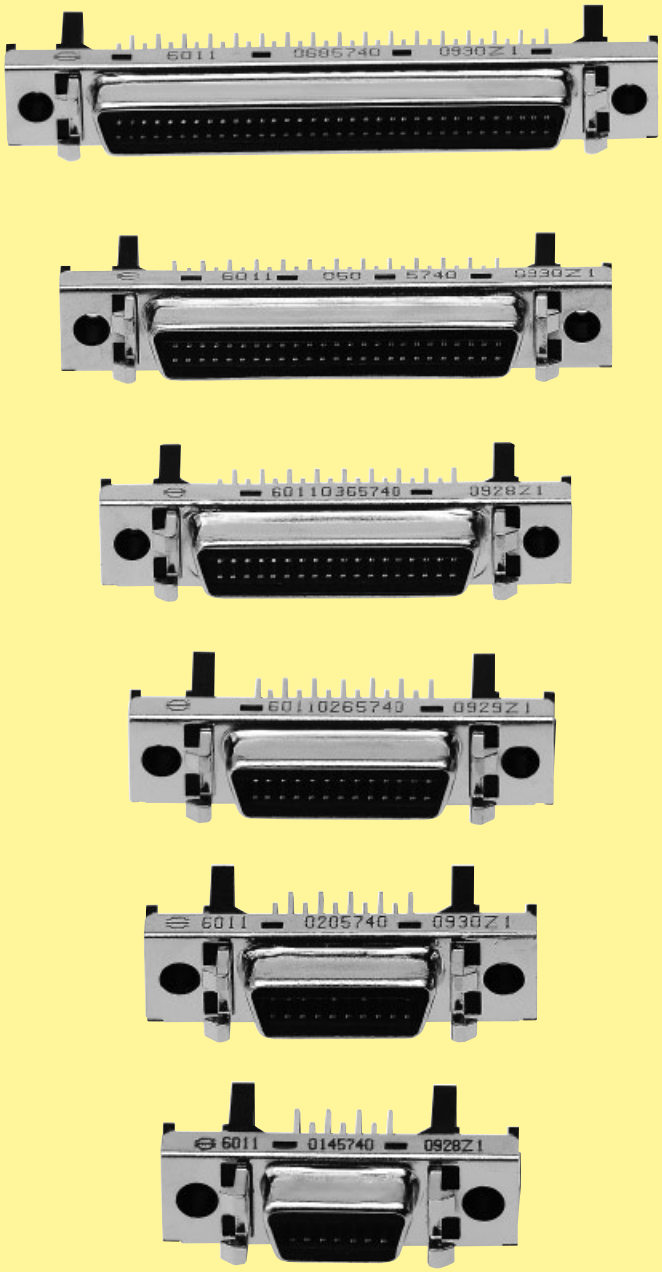


Board drillings
(Components side)



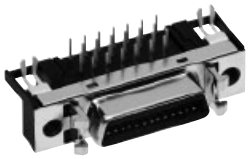
Dimensions in mm

Number of contacts	14, 20, 26, 36, 50, 68
Pitch	1.27 mm
Working current	1 A
Working voltage	240 V ~
Test voltage $U_{r.m.s.}$	500 V
Contact resistance	≤ 45 mΩ
Insulation resistance	≥ 10^3 MΩ
Temperature range reflow soldering	-55 °C … + 105 °C according to ICP/JEDEC J-STD-020 Revision D
Terminations	
Solder pins	Angled for pcb holes min. Ø 0.62 mm
Materials	
Moulding	Thermoplastic resin glass-fibre filled UL 94-V0 Liquid Christal Polymer (LCP)
Contacts	Copper alloy
Contact surface	
Contact zone	Selectively gold plated according to performance level
Metal shell	Die cast zamac or stamped steel, nickel-plated



Number of contacts

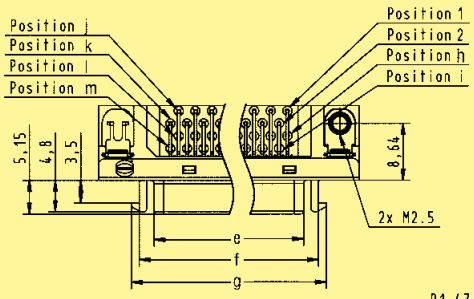
14–68

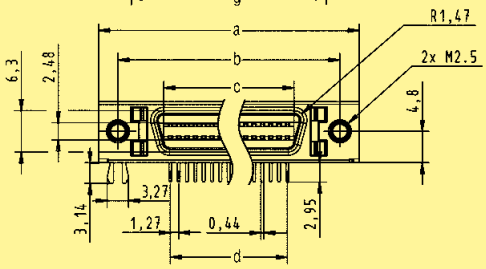


SMC female connectors, angled

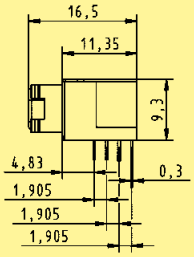
Identification	No. of contacts	Part No. for one reel (300 pieces)	Part No. standard tray packaging
SMC female connectors with angled solder pins			
	14	60 11 014 57 . . 710	60 11 014 57 . .
	20	60 11 020 57 . . 710	60 11 020 57 . .
	26	60 11 026 57 . . 710	60 11 026 57 . .
	36	60 11 036 57 . . 710	60 11 036 57 . .
	50	60 11 050 57 . . 710	60 11 050 57 . .
	68	60 11 068 57 . . 710	60 11 068 57 . .
Without board lock	32		
With board lock	40		

Dimensions





with board lock

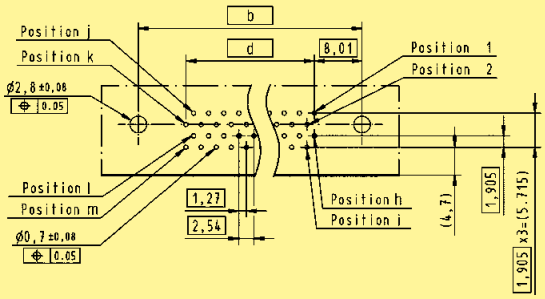


without board lock

	a	b	c	d	e	f	g	h	i	j	k	l	m	n
14	29.54	23.64	9.62	7.62	12.62	17.14	19.54	8	9	7	6	14	13	44.0
20	33.35	27.45	13.43	11.43	16.43	20.95	23.35	11	12	9	10	19	20	56.5
26	37.16	31.26	17.24	15.24	20.24	24.76	27.16	14	15	13	12	26	25	56.0
36	43.51	37.61	23.59	21.59	26.59	31.11	33.51	19	20	17	18	35	36	56.0
50	52.40	46.50	32.48	30.48	35.48	40.00	42.40	26	27	25	24	50	49	72.5
68	63.83	57.93	43.91	41.91	46.91	51.43	53.83	35	36	33	34	67	68	88.5

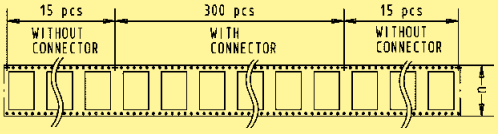
Board drillings

(Components side)



Packaging

(1 reel = 300 pieces)
Reel diameter = 380 mm



Dimensions in mm

Number of contacts

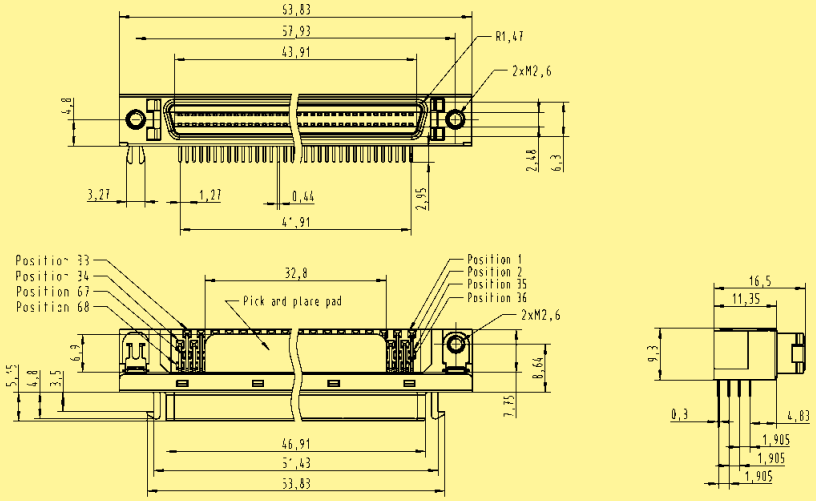
68

SMC female connectors, angled

Identification	No. of contacts	Part No.
SMC female connectors with angled solder pins and pick & place pad	68 68	60 11 068 5739 60 11 068 5749

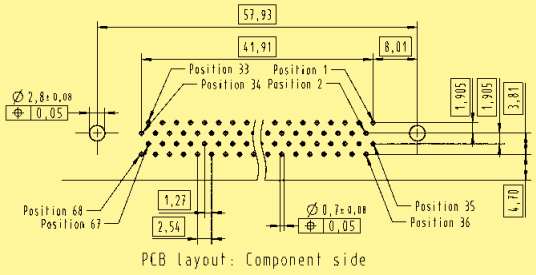
Dimensions

with board lock without board lock



Board drillings

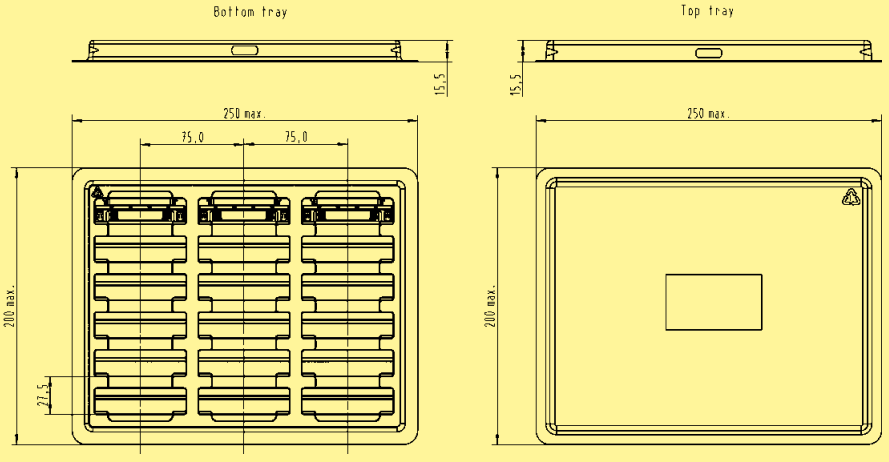
(Components side)



PCB layout: Component side

Packaging

(1 tray = 18 pieces)



Dimensions in mm

Number of contacts	9, 15, 25, 37 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	≥ 1.0 mm
Contact resistance **Insulation resistance**	≤ 10 mΩ ≥ 10^{10} Ω
Temperature range during reflow soldering	-55 °C … + 125 °C max. + 240 °C for 15 s

The higher temperature limit includes the local ambient and heating effect of the contacts under load. All connectors are suitable for standard reflow processes.

Terminations	a) Solder pins Ø 0.6 mm for P.C.B. holes Ø 0.8/1 mm b) Solder pins, angled 90° Ø 0.6 mm for P.C.B. holes Ø 1 mm
Materials Mouldings	 Thermoplastic resin, glass-fibre filled (PCT), UL 94-V0
Contacts	Copper alloy
Contact surface Contact zone	 selectively plated according to performance level[1)]
Metal shell	Plated steel

Insertion and withdrawal force
Connector on P.C.B.
Solder, straight with clips
– insertion max. per connector: 60 N
– withdrawal min. per connector: 10 N

Mating force

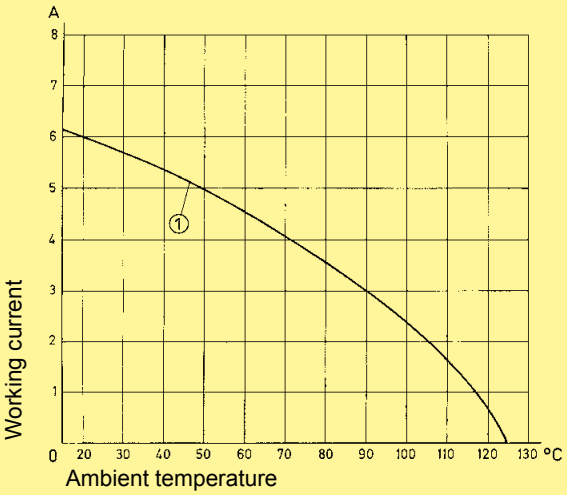
9 way	≤ 30 N
15 way	≤ 50 N
25 way	≤ 83 N
37 way	≤ 123 N

Current carrying capacity

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals.

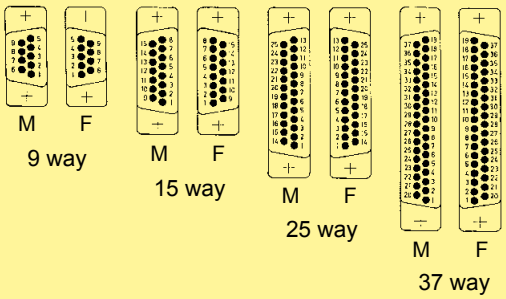
The current capacity-curve is valid for continuous, not interrupted current-loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Control and test procedures according to DIN IEC 60 512.



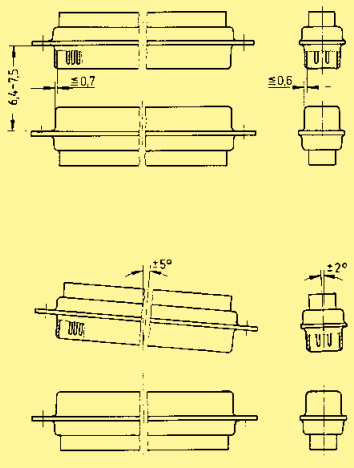
Example: 25 way connector
① Stamped contacts

Contact arrangement View from termination side



M = Male connector
F = Female connector

Mating conditions as per DIN 41 652



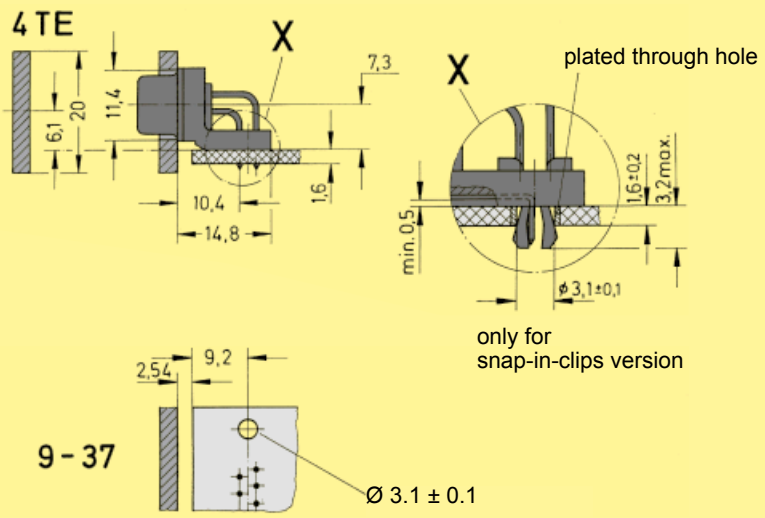
[1)] Performance level 3, 50 mating cycles, no gas test
Performance level 2 as per CECC 75 301-802, 250 mating cycles, 4 days 4 mixed gas test – IEC 60 512
Performance level 1 as per CECC 75 301-802, 500 mating cycles, 10 days 4 mixed gas test – IEC 60 512

Identification | Drawing | Dimensions in mm

Standard Versions

Mounting height 7.3 mm

9-37 way
for front panel
4 units of width (TE)

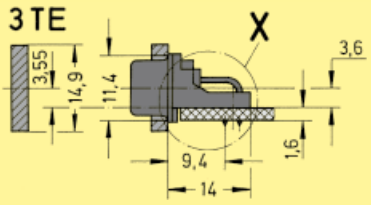


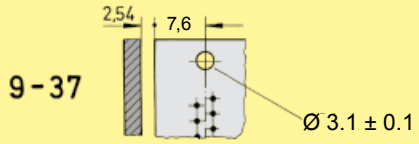
for connectors see pages 22.14 – 22.15

Low-Profile Versions

Mounting height 3.6 mm

9-37 way
for front panel
3 units of width (TE)

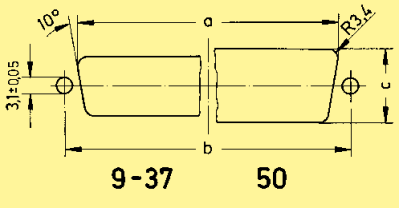




for connectors see pages 22.16 – 22.17

Panel cut out
for front/rear mount

Values are taken from the
CECC 75 301-802



Front mount

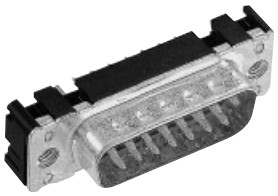
	$a_{\pm 0.2}$	$b_{\pm 0.13}$	$c_{\pm 0.2}$
9	22.2	25.0	12.3
15	30.5	33.3	12.3
25	44.3	47.0	12.3
37	60.7	63.5	12.3
50	58.3	61.1	15.1

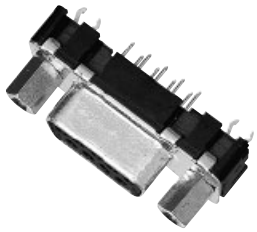
Rear mount

	$a_{\pm 0.2}$	$b_{\pm 0.13}$	$c_{\pm 0.2}$
9	20.5	25.0	11.4
15	28.8	33.3	11.4
25	42.5	47.0	11.4
37	59.1	63.5	11.4
50	56.3	61.1	14.1

Number of contacts

9–37





SMC stamped solder pins, straight with/without grounding board locks

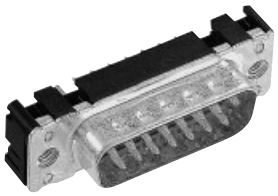
Identification	No. of contacts	Part No.		Part No.	
Performance levels ▶ Explanations see page 22.10 Other performance levels on request		Performance level 3		Performance level 2	
Male connector metal shell with dimples					
Without grounding board locks	9	09 65 129 770	.	09 65 129 670	.
	15	09 65 229 770	.	09 65 229 670	.
	25	09 65 329 770	.	09 65 329 670	.
	37	09 65 429 770	.	09 65 429 670	.
With grounding board locks	9	09 65 169 771	.	09 65 169 671	.
	15	09 65 269 771	.	09 65 269 671	.
	25	09 65 369 771	.	09 65 369 671	.
	37	09 65 469 771	.	09 65 469 671	.
Female connector metal shell					
Without grounding board locks	9	09 66 115 750	.	09 66 115 650	.
	15	09 66 215 750	.	09 66 215 650	.
	25	09 66 315 750	.	09 66 315 650	.
	37	09 66 415 750	.	09 66 415 650	.
With grounding board locks	9	09 66 155 751	.	09 66 155 651	.
	15	09 66 255 751	.	09 66 255 651	.
	25	09 66 355 751	.	09 66 355 651	.
	37	09 66 455 751	.	09 66 455 651	.
Please insert digit for flange thread or fitted female screw locks					
M3 ▶ 1					
4-40 UNC ▶ 2					
fitted screw locks 4-40 UNC ▶ 3[1)]					

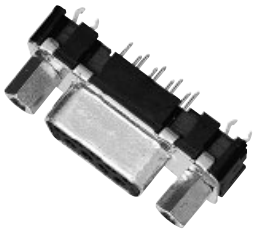
[1)] Fitted screw locks 4-40 UNC not normally kept in stock for performance level 3

Connector dimensions see page 22.13. Mating conditions see page 22.10.

Number of contacts

9–37

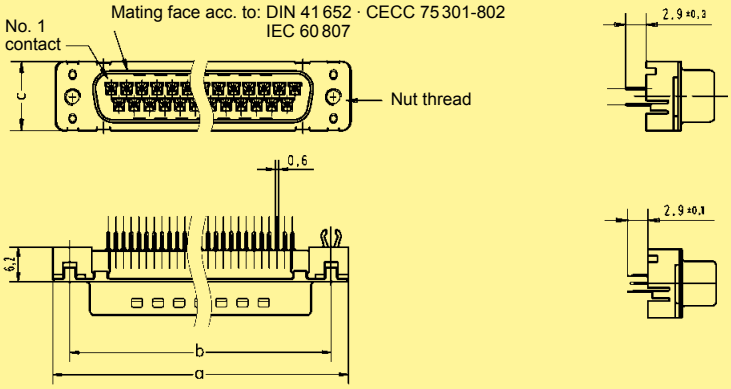




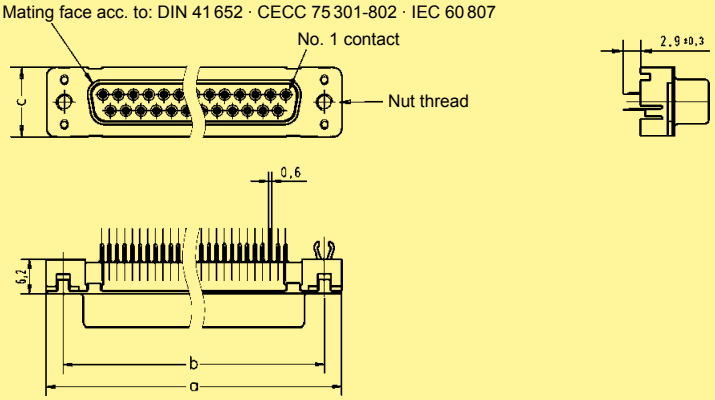
SMC stamped solder pins, straight with/without grounding board locks

Identification | Drawing | Dimensions in mm

Male connector

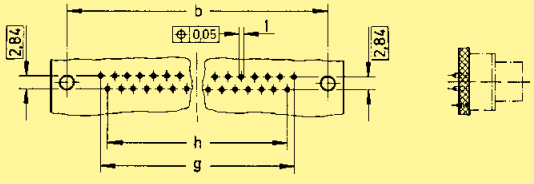


Female connector



	a	$b_{\pm 0.1}$	c	g	h
9	30.9	25.0	12.5	4 x 2.74 = 10.96	3 x 2.74 = 8.22
15	39.2	33.3	12.5	7 x 2.74 = 19.18	6 x 2.74 = 16.44
25	53.1	47.0	12.5	12 x 2.76 = 33.12	11 x 2.76 = 30.36
37	69.4	63.5	12.5	18 x 2.76 = 49.68	17 x 2.76 = 46.92

Board drillings

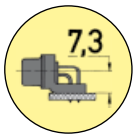


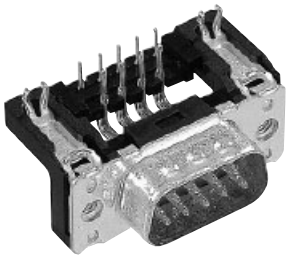
Standard Versions

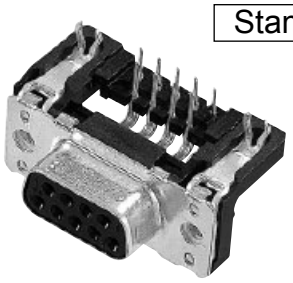
Number of contacts

9–37

Mounting height







SMC stamped solder pins, angled with grounding board locks

Identification	No. of contacts	Part No.		Part No.	
Performance levels ▶ Explanations see page 22.10 Other performance levels on request		Performance level 3		Performance level 2	
Male connector metal shell with dimples					
		2.84 mm pitch		2.84 mm pitch	
	9	09 65 167 781 .	1)	09 65 167 681 .	1)
	15	09 65 267 781 .	1)	09 65 267 681 .	1)
	25	09 65 367 781 .	1)	09 65 367 681 .	1)
	37	09 65 467 781 .	1)	09 65 467 681 .	1)
		2.54 mm pitch		2.54 mm pitch	
	9	09 65 166 781 .		09 65 166 681 .	
	15	09 65 266 781 .		09 65 266 681 .	
	25	09 65 366 781 .		09 65 366 681 .	
	37	09 65 466 781 .		09 65 466 681 .	
Female connector metal shell					
		2.84 mm pitch		2.84 mm pitch	
	9	09 66 157 761 .	1)	09 66 157 661 .	1)
	15	09 66 257 761 .	1)	09 66 257 661 .	1)
	25	09 66 357 761 .	1)	09 66 357 661 .	1)
	37	09 66 457 761 .	1)	09 66 457 661 .	1)
		2.54 mm pitch		2.54 mm pitch	
	9	09 66 156 761 .		09 66 156 661 .	
	15	09 66 256 761 .		09 66 256 661 .	
	25	09 66 356 761 .		09 66 356 661 .	
	37	09 66 456 761 .		09 66 456 661 .	
Please insert digit for flange thread or fitted female screw locks					
Ø 3.1 mm hole ▶ 0					
M3 ▶ 1					
4-40 UNC ▶ 2					
fitted screw locks 4-40 UNC ▶ 3					

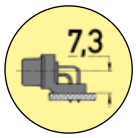
1) Not normally kept in stock

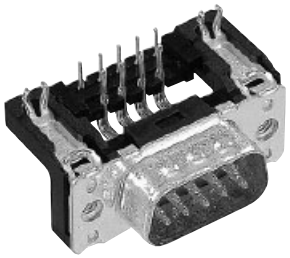
Standard Versions

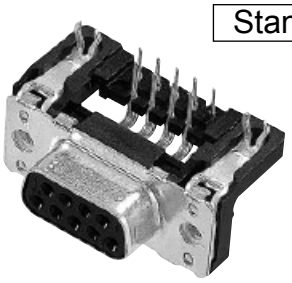
Number of contacts

9–37

Mounting height



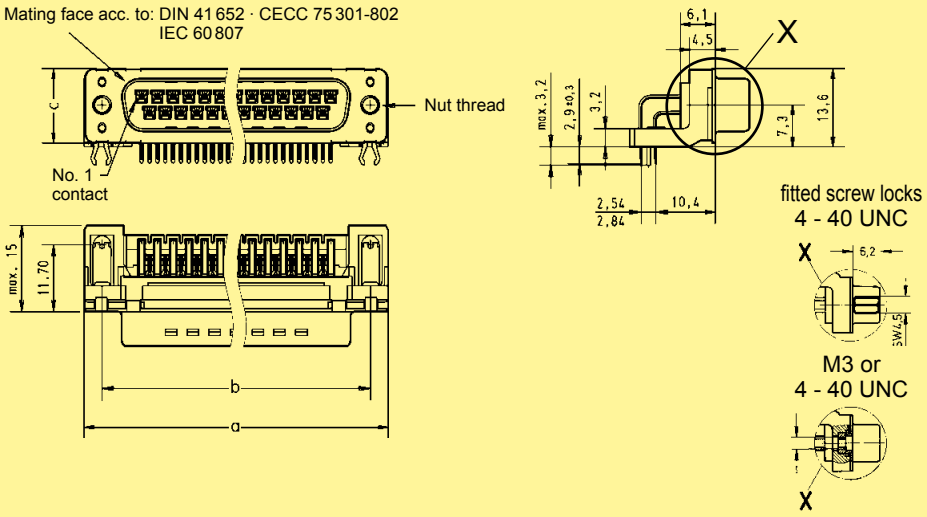




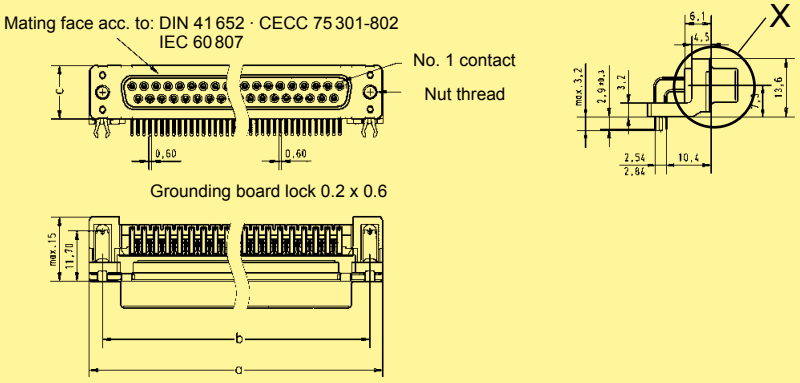
SMC stamped solder pins, angled with grounding board locks

Identification	Drawing	Dimensions in mm

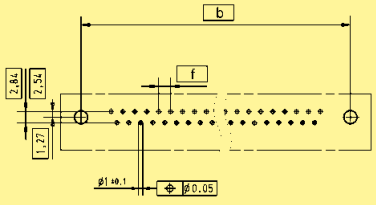
Male connector



Female connector



Board drillings



	a	$b_{\pm 0.1}$	c	f
9	30.90	25.00	12.50	2.74
15	39.20	33.30	12.50	2.74
25	53.10	47.00	12.50	2.76
37	69.40	63.50	12.50	2.76

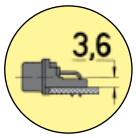
Mating conditions see page 22.10
Mounting details see page 22.11

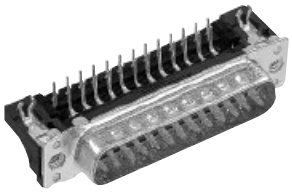
Low-Profile Versions

Number of contacts

9–37

Mounting height





SMC stamped solder pins, angled with grounding board locks

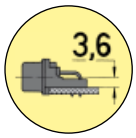
Identification	No. of contacts	Part No.		Part No.	
Performance levels Explanations see page 22.10 Other contact surfaces on request ▶		Performance level 3		Performance level 2	
Male connector metal shell with dimples	9	09 65 166 781 .		09 65 166 681 .	
	15	09 65 266 781 .		09 65 266 681 .	
	25	09 65 366 781 .		09 65 366 681 .	
	37	09 65 466 781 .		09 65 466 681 .	
Female connector metal shell	9	09 66 156 761 .		09 66 156 661 .	
	15	09 66 256 761 .		09 66 256 661 .	
	25	09 66 356 761 .		09 66 356 661 .	
	37	09 66 456 761 .		09 66 456 661 .	
Please insert digit for flange thread or fitted female screw locks					
M3 ▶ 5					
4-40 UNC ▶ 6					
fitted screw locks 4-40 UNC ▶ 7					

Low-Profile Versions

Number of contacts

9–37

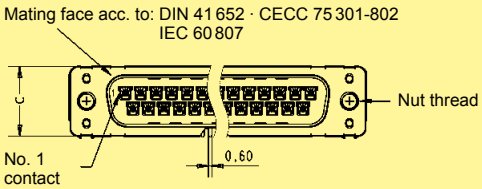
Mounting height

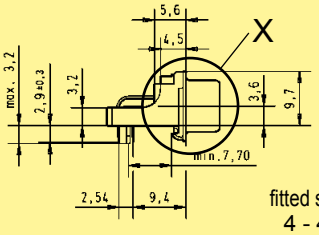


SMC stamped solder pins, angled with grounding board locks

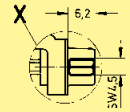
Identification	Drawing	Dimensions in mm

Male connector

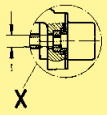


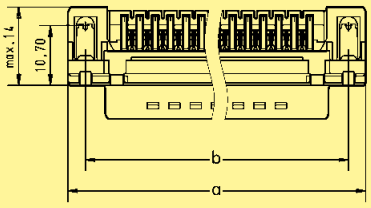


fitted screw locks
4 - 40 UNC

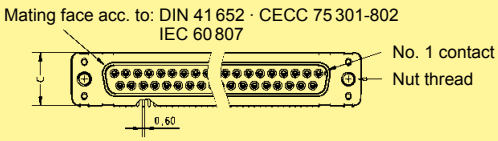


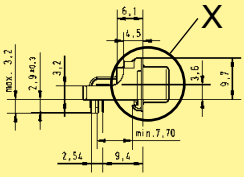
M3 or
4 - 40 UNC



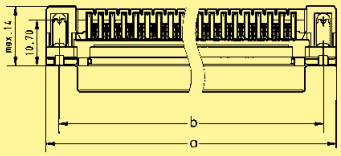


Female connector

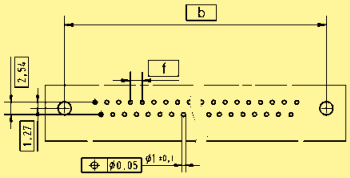




Grounding board lock 0.2 x 0.6



Board drillings



	a	$b_{\pm 0.1}$	c	f
9	30.90	25.00	12.50	2.74
15	39.20	33.30	12.50	2.74
25	53.10	47.00	12.50	2.76
37	69.40	63.50	12.50	2.76

Mating conditions see page 22.10
Mounting details see page 22.11

Number of contacts	6, 10, 14, 16, 20, 24, 26, 30, 34, 40, 50, 60, 64
Contact arrangement	straight, angled
Contact length	2.9 mm
Approvals	IEC 60 603-13 DIN EN 60 603-13 D 2632 BT 224 NFC 93-428 (HE 10)
Pitch	2.54 mm [0.100"]
Working current	1 A
Working voltage	500 V for pollution degree 1
Test voltage $U_{r.m.s.}$	1 kV
Contact resistance Insulation resistance	≤ 20 mΩ ≥ 10^9 Ω
Temperature range	-55 °C … + 125 °C
during reflow soldering	max. + 240 °C for 60 s
The higher temperature limit includes the local ambient and heating effect of the contacts under load	
Terminations	For pcb hole Ø 1 ± 0.1 mm DIN IEC 52 141 Diagonal: 0.79 mm
Materials	
Moulding	Thermoplastic resin (PCT) UL 94-V0
Contact surface	
Contact zone	gold-plated according to performance level[1)]
Options on request	
Colour of connectors	black
For pick & place process	Tape & Reel packaging with/without vacuum plate Tube packaging with/without vacuum plate

New

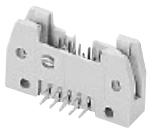
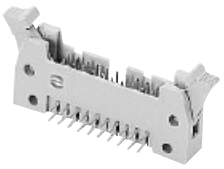
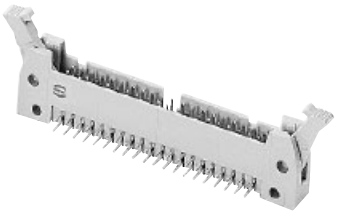
Insertion and withdrawal forces

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
24	48	72
26	52	78
30	60	90
34	68	102
40	80	120
50	100	150
60	120	180
64	128	192

[1)] Performance level 3 as per IEC 60 603-13, ≥ 50 mating cycles, no gas test
Performance level 2 as per IEC 60 603-13, ≥ 250 mating cycles, 4 days gas test
S4, plating = 0.76 µm (30 µinch) Au or PdNi eqivalent

Number of contacts

6–64

SMC male header with angled solder pins

Identification	No. of contacts	Part No. Without levers	With short levers	With long levers
SMC male header with angled solder pins Length: 2.9 mm	6	09 19 506 ⌴ 923	09 19 506 ⌴ 913	09 19 506 ⌴ 903
	10	09 19 510 ⌴ 923	09 19 510 ⌴ 913	09 19 510 ⌴ 903
	14	09 19 514 ⌴ 923	09 19 514 ⌴ 913	09 19 514 ⌴ 903
	16	09 19 516 ⌴ 923	09 19 516 ⌴ 913	09 19 516 ⌴ 903
	20	09 19 520 ⌴ 923	09 19 520 ⌴ 913	09 19 520 ⌴ 903
	24	09 19 524 ⌴ 923	09 19 524 ⌴ 913	09 19 524 ⌴ 903
	26	09 19 526 ⌴ 923	09 19 526 ⌴ 913	09 19 526 ⌴ 903
	30	09 19 530 ⌴ 923	09 19 530 ⌴ 913	09 19 530 ⌴ 903
	34	09 19 534 ⌴ 923	09 19 534 ⌴ 913	09 19 534 ⌴ 903
	40	09 19 540 ⌴ 923	09 19 540 ⌴ 913	09 19 540 ⌴ 903
	50	09 19 550 ⌴ 923	09 19 550 ⌴ 913	09 19 550 ⌴ 903
	60	09 19 560 ⌴ 923	09 19 560 ⌴ 913	09 19 560 ⌴ 903
	64	09 19 564 ⌴ 923	09 19 564 ⌴ 913	09 19 564 ⌴ 903

Kinked version on request

* Not normally kept in stock
For accessories see page 22.30
For dimensions see page 22.21

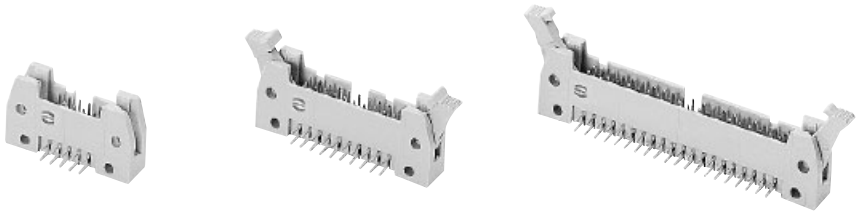
For performance level 3 please specify digit 7 *
For performance level 2 please specify digit 6
S4 = 0.76 µm (30 µinch) Au or PdNi eqivalent 5 *

7 * 6 5 *

7 6 5 *

Number of contacts

6–64

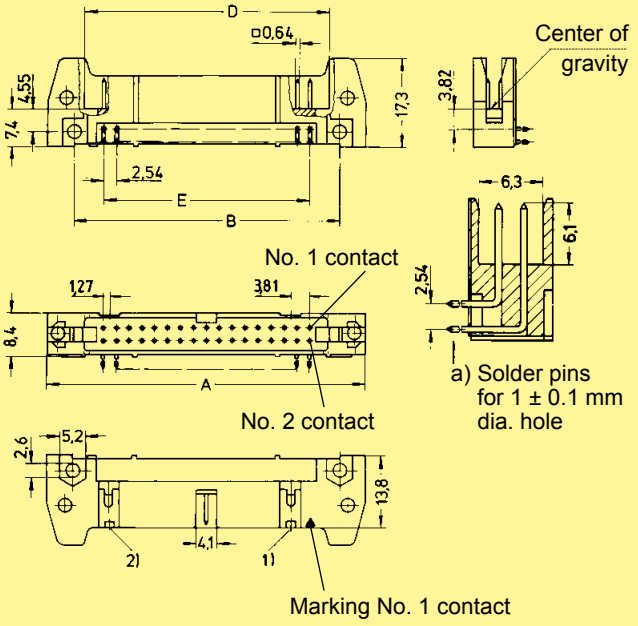


SMC male header with angled solder pins

Identification | Drawing | Dimensions in mm

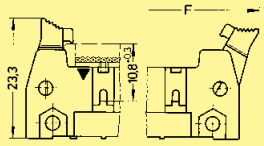
SMC male header

No. of contacts	A	B	D	E	F	G
6	26.9	16.76	12.45	2.54 x 2 = 5.08	36.9	40.3
10	32.0	21.84	17.53	2.54 x 4 = 10.16	42.0	45.4
14	37.1	26.92	22.61	2.54 x 6 = 15.24	47.1	50.4
16	39.6	29.46	25.15	2.54 x 7 = 17.78	49.6	53.0
20	44.7	34.54	30.23	2.54 x 9 = 22.86	54.7	58.1
24	49.8	39.62	35.91	2.54 x 11 = 27.94	59.8	63.2
26	52.3	42.16	37.85	2.54 x 12 = 30.48	62.3	65.7
30	57.7	47.24	43.83	2.54 x 14 = 35.56	68.2	68.6
34	62.5	52.32	48.01	2.54 x 16 = 40.64	72.5	75.8
40	70.1	59.94	55.63	2.54 x 19 = 48.26	80.1	83.5
50	82.8	72.64	68.33	2.54 x 24 = 60.96	92.8	96.2
60	95.5	85.34	81.03	2.54 x 29 = 73.66	105.5	108.9
64	100.6	90.42	86.11	2.54 x 31 = 78.74	110.6	113.9



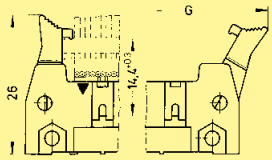
Short levers

for use with female connector without strain relief clamp

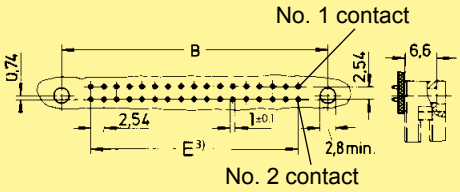


Long levers

for use with female connector with strain relief clamp



Board drillings



SMC technology

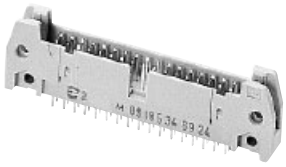
1) No polarization slot for 6, 10 or 14 way male header

2) No polarization slot for 6 way male header

3) Pitch tolerance: ± 0.1

Number of contacts

6–64



SMC male header with straight solder pins

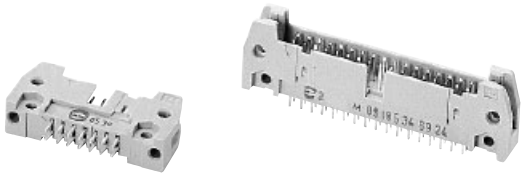
Identification	No. of contacts	Part No. Without levers	With short levers	With long levers
SMC male header with straight solder pins Length: 2.9 mm	6	09 19 506 ⌴ 924	09 19 506 ⌴ 914	09 19 506 ⌴ 904
	10	09 19 510 ⌴ 924	09 19 510 ⌴ 914	09 19 510 ⌴ 904
	14	09 19 514 ⌴ 924	09 19 514 ⌴ 914	09 19 514 ⌴ 904
	16	09 19 516 ⌴ 924	09 19 516 ⌴ 914	09 19 516 ⌴ 904
	20	09 19 520 ⌴ 924	09 19 520 ⌴ 914	09 19 520 ⌴ 904
	24	09 19 524 ⌴ 924	09 19 524 ⌴ 914	09 19 524 ⌴ 904
	26	09 19 526 ⌴ 924	09 19 526 ⌴ 914	09 19 526 ⌴ 904
	30	09 19 530 ⌴ 924	09 19 530 ⌴ 914	09 19 530 ⌴ 904
	34	09 19 534 ⌴ 924	09 19 534 ⌴ 914	09 19 534 ⌴ 904
	40	09 19 540 ⌴ 924	09 19 540 ⌴ 914	09 19 540 ⌴ 904
	50	09 19 550 ⌴ 924	09 19 550 ⌴ 914	09 19 550 ⌴ 904
	60	09 19 560 ⌴ 924	09 19 560 ⌴ 914	09 19 560 ⌴ 904
	64	09 19 564 ⌴ 924	09 19 564 ⌴ 914	09 19 564 ⌴ 904

* Not normally kept in stock
For accessories see page 22.30
For dimensions see page 22.23

For performance level 3 please specify digit [7] * [7] * [7] *
For performance level 2 please specify digit [6] [6] [6]
S4 = 0.76 µm (30 µinch) Au or PdNi eqivalent [5] * [5] * [5] *

Number of contacts

6–64



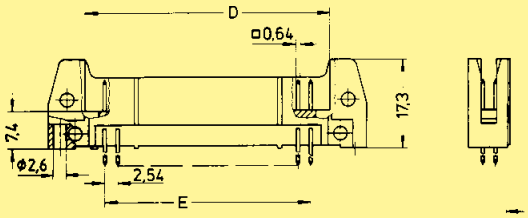
SMC male header with straight solder pins

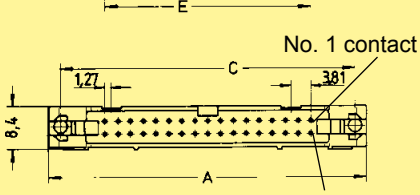
Identification: SMC male header

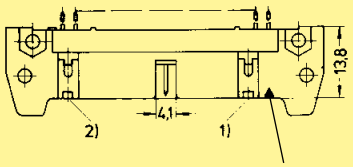
Drawing

Dimensions in mm

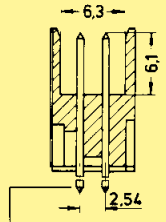
No. of contacts	A	C	D	E	F	G
6	26.9	22.86	12.45	2.54 x 2 = 5.08	36.9	40.3
10	32.0	27.94	17.53	2.54 x 4 = 10.16	42.0	45.4
14	37.1	33.02	22.61	2.54 x 6 = 15.24	47.1	50.4
16	39.6	35.56	25.15	2.54 x 7 = 17.78	49.6	53.0
20	44.7	40.64	30.23	2.54 x 9 = 22.86	54.7	58.1
24	49.8	45.72	35.91	2.54 x 11 = 27.94	59.8	63.2
26	52.3	48.26	37.85	2.54 x 12 = 30.48	62.3	65.7
30	57.7	53.34	43.83	2.54 x 14 = 35.56	68.2	68.6
34	62.5	58.42	48.01	2.54 x 16 = 40.64	72.5	75.8
40	70.1	66.04	55.63	2.54 x 19 = 48.26	80.1	83.5
50	82.8	78.74	68.33	2.54 x 24 = 60.96	92.8	96.2
60	95.5	91.44	81.03	2.54 x 29 = 73.66	105.5	108.9
64	100.6	96.52	86.11	2.54 x 31 = 78.74	110.6	113.9







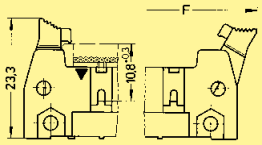
Marking No. 1 contact



a) Solder pins for 1 ± 0.1 mm dia. hole

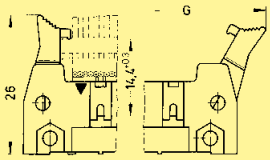
Short levers

for use with female connector without strain relief clamp

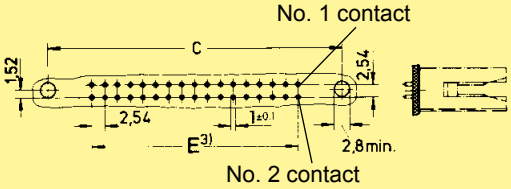


Long levers

for use with female connector with strain relief clamp



Board drillings



1) No polarization slot for 6, 10 or 14 way male header

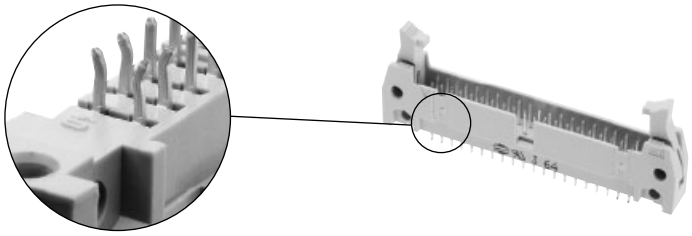
2) No polarization slot for 6 way male header

3) Pitch tolerance: ± 0.1

SMC technology

Number of contacts

6–64



SMC male header with straight solder pins, kinked

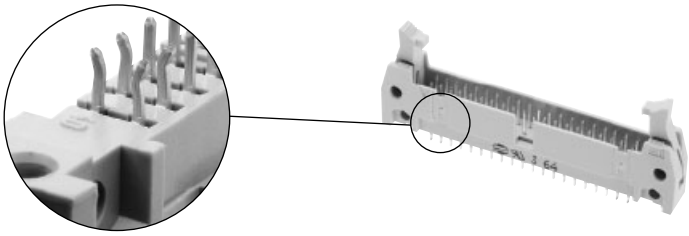
Identification	No. of contacts	Part No. Without levers	With short levers	With long levers
SMC male header with straight solder pins, kinked Length: 2.9 mm	6	09 19 506 ⌴ 024	09 19 506 ⌴ 014	09 19 506 ⌴ 004
	10	09 19 510 ⌴ 024	09 19 510 ⌴ 014	09 19 510 ⌴ 004
	14	09 19 514 ⌴ 024	09 19 514 ⌴ 014	09 19 514 ⌴ 004
	16	09 19 516 ⌴ 024	09 19 516 ⌴ 014	09 19 516 ⌴ 004
	20	09 19 520 ⌴ 024	09 19 520 ⌴ 014	09 19 520 ⌴ 004
	24	09 19 524 ⌴ 024	09 19 524 ⌴ 014	09 19 524 ⌴ 004
	26	09 19 526 ⌴ 024	09 19 526 ⌴ 014	09 19 526 ⌴ 004
	30	09 19 530 ⌴ 024	09 19 530 ⌴ 014	09 19 530 ⌴ 004
	34	09 19 534 ⌴ 024	09 19 534 ⌴ 014	09 19 534 ⌴ 004
	40	09 19 540 ⌴ 024	09 19 540 ⌴ 014	09 19 540 ⌴ 004
	50	09 19 550 ⌴ 024	09 19 550 ⌴ 014	09 19 550 ⌴ 004
	60	09 19 560 ⌴ 024	09 19 560 ⌴ 014	09 19 560 ⌴ 004
	64	09 19 564 ⌴ 024	09 19 564 ⌴ 014	09 19 564 ⌴ 004

* Not normally kept in stock
For accessories see page 22.30
For dimensions see page 22.25

For performance level 3 please specify digit 7 6 5 *
For performance level 2 please specify digit 7 6 5 *
S4 = 0.76 µm (30 µinch) Au or PdNi eqivalent 7 6 5 *

Number of contacts

6–64



SMC male header with straight solder pins, kinked

Identification

SMC male header

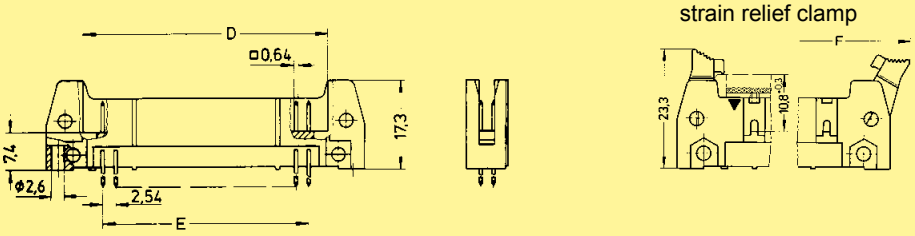
Drawing

Dimensions in mm

No. of contacts	A	C	D	E	F	G
6	26.9	22.86	12.45	2.54 x 2 = 5.08	36.9	40.3
10	32.0	27.94	17.53	2.54 x 4 = 10.16	42.0	45.4
14	37.1	33.02	22.61	2.54 x 6 = 15.24	47.1	50.4
16	39.6	35.56	25.15	2.54 x 7 = 17.78	49.6	53.0
20	44.7	40.64	30.23	2.54 x 9 = 22.86	54.7	58.1
24	49.8	45.72	35.91	2.54 x 11 = 27.94	59.8	63.2
26	52.3	48.26	37.85	2.54 x 12 = 30.48	62.3	65.7
30	57.7	53.34	43.83	2.54 x 14 = 35.56	68.2	68.6
34	62.5	58.42	48.01	2.54 x 16 = 40.64	72.5	75.8
40	70.1	66.04	55.63	2.54 x 19 = 48.26	80.1	83.5
50	82.8	78.74	68.33	2.54 x 24 = 60.96	92.8	96.2
60	95.5	91.44	81.03	2.54 x 29 = 73.66	105.5	108.9
64	100.6	96.52	86.11	2.54 x 31 = 78.74	110.6	113.9

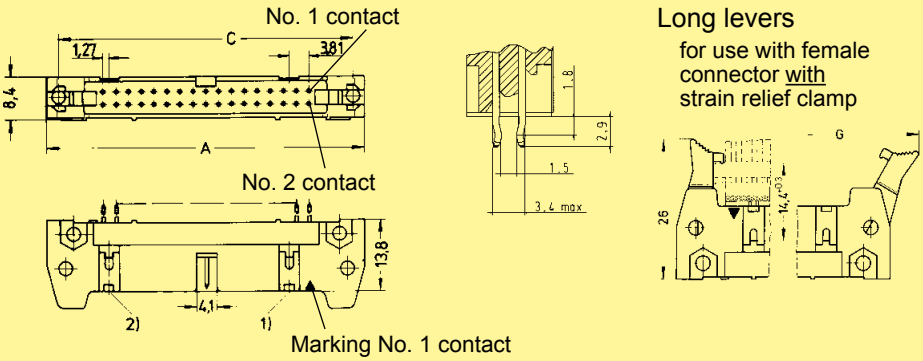
Short levers

for use with female connector without strain relief clamp

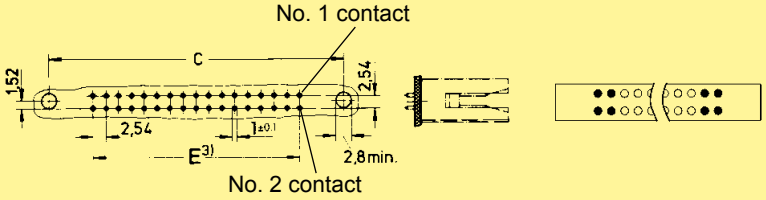


Long levers

for use with female connector with strain relief clamp



Board drillings



● Kinked contact: pcb thickness from 1.50 to 1.94 mm after Cu + Sn plating with non-remelted through holes ø 0.80 to ø 0.95 mm. Max. insertion force = 125 N. Min. retention force = 6 N.

○ Non-kinked contact: Solder pins for pcb connections ø 1 ± 0.1 mm as per IEC 60 603-13.

1) No polarization slot for 6, 10 or 14 way male header

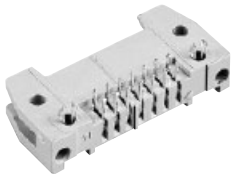
2) No polarization slot for 6 way male header

3) Pitch tolerance: ± 0.1

SMC technology

Number of contacts

6–64



SMC male header with angled solder pins and board lock

Identification	No. of contacts	Part No. Without levers	With short levers	With long levers
SMC male header with angled solder pins and pcb board lock Length: 2.9 mm for 1.6 mm pcb thickness	6	09 19 506 ⌴ 973*	09 19 506 ⌴ 963*	09 19 506 ⌴ 953*
	10	09 19 510 ⌴ 973*	09 19 510 ⌴ 963*	09 19 510 ⌴ 953*
	14	09 19 514 ⌴ 973*	09 19 514 ⌴ 963*	09 19 514 ⌴ 953*
	16	09 19 516 ⌴ 973*	09 19 516 ⌴ 963*	09 19 516 ⌴ 953*
	20	09 19 520 ⌴ 973*	09 19 520 ⌴ 963*	09 19 520 ⌴ 953*
To hold the connector on the pcb before the soldering process, two board locks have been added on the male header with angled solder pins.	24	09 19 524 ⌴ 973*	09 19 524 ⌴ 963*	09 19 524 ⌴ 953*
	26	09 19 526 ⌴ 973*	09 19 526 ⌴ 963*	09 19 526 ⌴ 953*
	30	09 19 530 ⌴ 973*	09 19 530 ⌴ 963*	09 19 530 ⌴ 953*
	34	09 19 534 ⌴ 973*	09 19 534 ⌴ 963*	09 19 534 ⌴ 953*
	40	09 19 540 ⌴ 973*	09 19 540 ⌴ 963*	09 19 540 ⌴ 953*
	50	09 19 550 ⌴ 973*	09 19 550 ⌴ 963*	09 19 550 ⌴ 953*
	60	09 19 560 ⌴ 973*	09 19 560 ⌴ 963*	09 19 560 ⌴ 953*
	64	09 19 564 ⌴ 973*	09 19 564 ⌴ 963*	09 19 564 ⌴ 953*

* Not normally kept in stock

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 eqivalent 5

Number of contacts

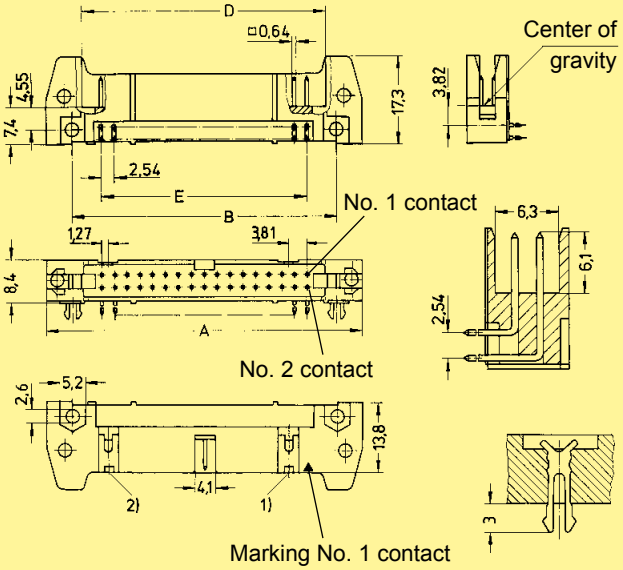
6–64

SMC male header with angled solder pins and board lock

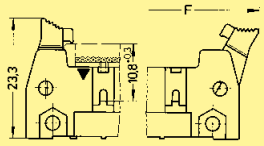
Identification | Drawing | Dimensions in mm

SMC male header

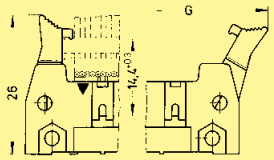
No. of contacts	A	B	D	E	F	G
6	26.9	16.76	12.45	2.54 x 2 = 5.08	36.9	40.3
10	32.0	21.84	17.53	2.54 x 4 = 10.16	42.0	45.4
14	37.1	26.92	22.61	2.54 x 6 = 15.24	47.1	50.4
16	39.6	29.46	25.15	2.54 x 7 = 17.78	49.6	53.0
20	44.7	34.54	30.23	2.54 x 9 = 22.86	54.7	58.1
24	49.8	39.62	35.91	2.54 x 11 = 27.94	59.8	63.2
26	52.3	42.16	37.85	2.54 x 12 = 30.48	62.3	65.7
30	57.7	47.24	43.83	2.54 x 14 = 35.56	68.2	68.6
34	62.5	52.32	48.01	2.54 x 16 = 40.64	72.5	75.8
40	70.1	59.94	55.63	2.54 x 19 = 48.26	80.1	83.5
50	82.8	72.64	68.33	2.54 x 24 = 60.96	92.8	96.2
60	95.5	85.34	81.03	2.54 x 29 = 73.66	105.5	108.9
64	100.6	90.42	86.11	2.54 x 31 = 78.74	110.6	113.9



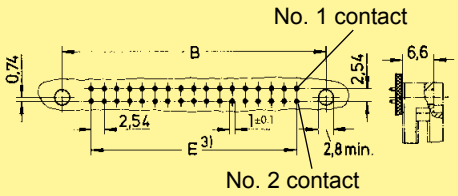
Short levers
for use with female connector without strain relief clamp



Long levers
for use with female connector with strain relief clamp



Board drillings



SMC technology

For accessories see page 22.30

1) No polarization slot for 6, 10 or 14 way male header

2) No polarization slot for 6 way male header

3) Pitch tolerance: ± 0.1

Number of contacts

6–64

Tape & Reel packaging

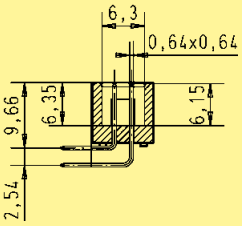
SMC low-profile male header, angled solder pins

Identification	No. of contacts	Part No.
SMC male header with angled solder pins		
Length: 2.9 mm	6	09 19 506 ⌴ 323
Colour: Beige	10	09 19 510 ⌴ 323
Packaging: Carton	14	09 19 514 ⌴ 323
	16	09 19 516 ⌴ 323
	20	09 19 520 ⌴ 323
	26	09 19 526 ⌴ 323
	30	09 19 530 ⌴ 323
	34	09 19 534 ⌴ 323
	40	09 19 540 ⌴ 323
	50	09 19 550 ⌴ 323
	60	09 19 560 ⌴ 323
	64	09 19 564 ⌴ 323
Colour: Beige	6	09 19 506 ⌴ 323 740
Packaging: Tape & Reel	10	09 19 510 ⌴ 323 740
	14	09 19 514 ⌴ 323 740
	16	09 19 516 ⌴ 323 740
Vacuum plate for pick & place process	20	09 19 520 ⌴ 323 740
	26	09 19 526 ⌴ 323 740
	30	09 19 530 ⌴ 323 740
	34	09 19 534 ⌴ 323 740
	40	09 19 540 ⌴ 323 740
Colour: Black	6	09 19 506 ⌴ 323 741
Packaging: Tape & Reel	10	09 19 510 ⌴ 323 741
	14	09 19 514 ⌴ 323 741
	16	09 19 516 ⌴ 323 741
Vacuum plate for pick & place process	20	09 19 520 ⌴ 323 741
	26	09 19 526 ⌴ 323 741
	30	09 19 530 ⌴ 323 741
	34	09 19 534 ⌴ 323 741
	40	09 19 540 ⌴ 323 741

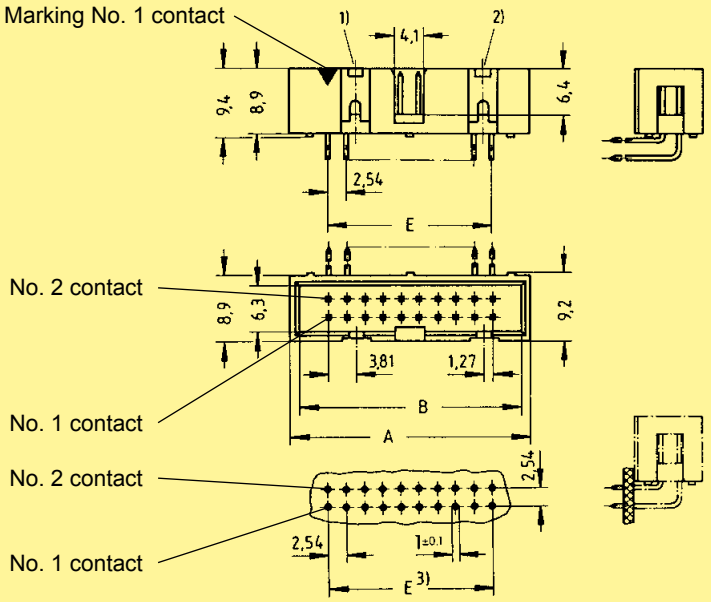
Drawing

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
30	45.72	43.26	2.54 x 14 = 35.56
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

Dimensions in mm



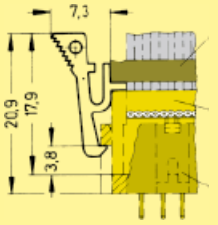
Solder pins for 1 ± 0.1 mm dia. hole



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 eqivalent 5 *

Identification	Part No.
Locking lever for female connector with strain relief in conjunction with low-profile male header	09 18 000 9905 4)

Drawing



Strain relief clamp

Female connector

Low-profile male header

When the security of latching is required and space is a premium, these locking levers can be fitted onto the strain relief of the HARTING female connector.

Dimensions in mm

SMC technology

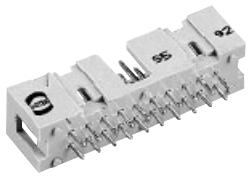
* Not normally kept in stock

1) No polarization slot for 6, 10 or 14 way male header
2) No polarization slot for 6 way male header
3) Pitch tolerance: ± 0.1
4) Order 2 per female connector

Number of contacts

6–64

Tape & Reel packaging



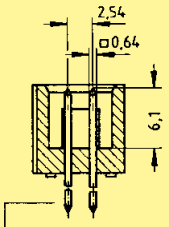
SMC low-profile male header, straight solder pins

Identification	No. of contacts	Part No.
SMC male header with straight solder pins		
Length: 2.9 mm	6	09 19 506 ⌴ 324
Colour: Beige	10	09 19 510 ⌴ 324
Packaging: Carton	14	09 19 514 ⌴ 324
	16	09 19 516 ⌴ 324
	20	09 19 520 ⌴ 324
	26	09 19 526 ⌴ 324
	30	09 19 530 ⌴ 324
	34	09 19 534 ⌴ 324
	40	09 19 540 ⌴ 324
	50	09 19 550 ⌴ 324
	60	09 19 560 ⌴ 324
	64	09 19 564 ⌴ 324
Colour: Beige	6	09 19 506 ⌴ 324 740
Packaging: Tape & Reel	10	09 19 510 ⌴ 324 740
	14	09 19 514 ⌴ 324 740
	16	09 19 516 ⌴ 324 740
Vacuum plate for pick & place process	20	09 19 520 ⌴ 324 740
	26	09 19 526 ⌴ 324 740
	30	09 19 530 ⌴ 324 740
	34	09 19 534 ⌴ 324 740
	40	09 19 540 ⌴ 324 740
Colour: Black	6	09 19 506 ⌴ 324 741
Packaging: Tape & Reel	10	09 19 510 ⌴ 324 741
	14	09 19 514 ⌴ 324 741
	16	09 19 516 ⌴ 324 741
Vacuum plate for pick & place process	20	09 19 520 ⌴ 324 741
	26	09 19 526 ⌴ 324 741
	30	09 19 530 ⌴ 324 741
	34	09 19 534 ⌴ 324 741
	40	09 19 540 ⌴ 324 741

Drawing

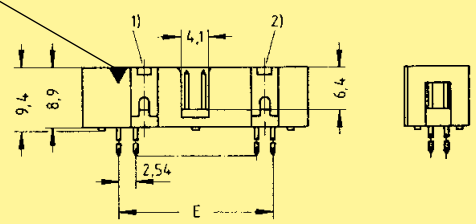
No. of contacts	A	B	E
6	15.2	12.78	2.54 x 2 = 5.08
10	20.3	17.86	2.54 x 4 = 10.16
14	25.4	22.94	2.54 x 6 = 15.24
16	27.9	25.48	2.54 x 7 = 17.78
20	33.0	30.56	2.54 x 9 = 22.86
26	40.6	38.18	2.54 x 12 = 30.48
30	45.72	43.26	2.54 x 14 = 35.56
34	50.8	48.34	2.54 x 16 = 40.64
40	58.4	55.96	2.54 x 19 = 48.26
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

Dimensions in mm



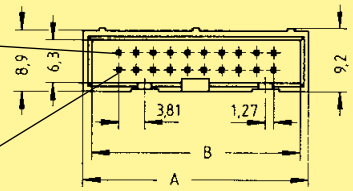
Solder pins for 1 ± 0.1 mm dia. hole

Marking No. 1 contact



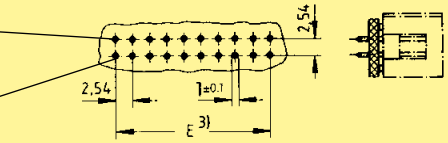
No. 2 contact

No. 1 contact



No. 2 contact

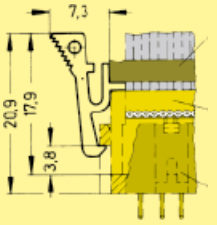
No. 1 contact



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 eqivalent 5 *

Identification	Part No.
Locking lever for female connector with strain relief in conjunction with low-profile male header	09 18 000 9905 4)

Drawing



Strain relief clamp

Female connector

Low-profile male header

When the security of latching is required and space is a premium, these locking levers can be fitted onto the strain relief of the HARTING female connector.

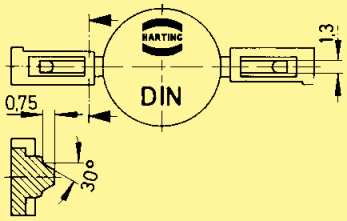
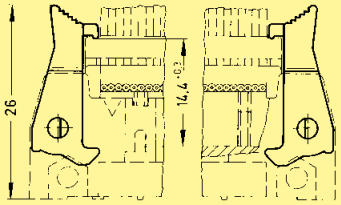
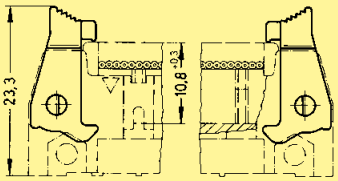
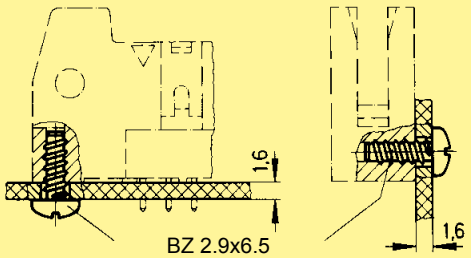
Dimensions in mm

SMC technology

* Not normally kept in stock

1) No polarization slot for 6, 10 or 14 way male header
2) No polarization slot for 6 way male header
3) Pitch tolerance: ± 0.1
4) Order 2 per female connector

Accessories

Identification	Part No.	Drawing	Dimensions in mm
Polarization key [1] Part No. comprises 2 keys	09 18 500 9902[1]		
Locking lever (snaps into place, can be fitted whenever required) [2] Order 2 per male header	Long: 09 19 000 9903[2] Short: 09 19 000 9904[2]	**Long**  For use with female connector with strain relief clamp **Short**  For use with female connector without strain relief clamp	
Fixing screws for 1.6 mm P.C. board [3] Part No. comprises 50 pieces	09 18 000 9906[3]	 BZ 2.9x6.5 (DIN 7981 or DIN 7049)	For connectors with part numbers 09 18 5xx x9xx: screwing torque 0.2 Nm 09 19 5xx x9xx: screwing torque 0.4 – 0.5 Nm Screw material: Steel (Inox A2) Plating: Nickel
Coding system with loss of contact [4] Part No. comprises 6 code pins	Code pin 09 18 000 9901[4] Removal tool for male contacts 09 99 000 0133	To avoid cross-plugging adjacent connectors a coding system is required. A code pin is inserted into the appropriate cavity in the female connector. The corresponding male contact is removed by a special removal tool.