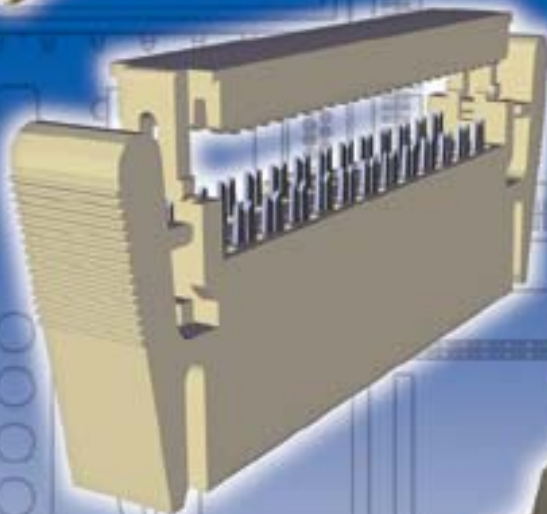


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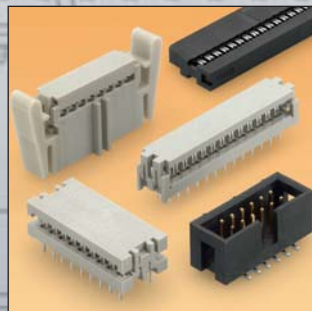
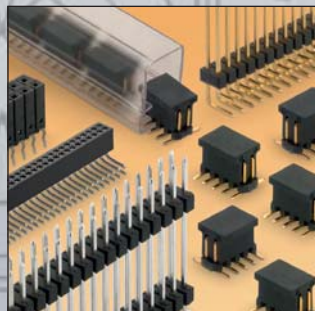
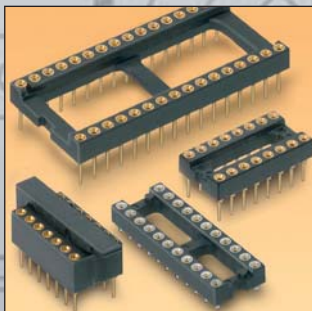
f.con

 made  
in  
Germany

  
TUV  
ISO 14001

  
AEO

  
TUV  
CERT  
ISO 9001



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<b>BL 9 ...</b>	G 33	<b>DDH 3 E</b>	L 6	<b>DS ... T</b>	I 2	<b>MK 11 ...</b>	G 4
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<b>BL LP 3 ...</b>	G 28	<b>DDH 5 E</b>	L 7	<b>DS BK 25 ... /</b>		<b>MK 15 ...</b>	G 5
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<b>BLM 2 SMD ...</b>	G 74	<b>DF 1 OK 9 Z</b>	G 54	<b>DS BK LP 25 ... /</b>		<b>MK 204 ...</b>	G 3
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<b>BLM KG 2 ... /</b>	G 70	<b>DF OB ...</b>	G 55	<b>DB WE 3 ... / DB WE 4 ...</b>		<b>MK 208 ...</b>	G 4
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<b>BLP 2 ...</b>	G 53	<b>DH 09 S / DH 09 M</b>	I 20	<b>DS WR ... / DB WR ...</b>	I 6	<b>MK 212 X 2 ...</b>	G 21
<b>BLR 1 ...</b>	G 72	<b>DH 3 R</b>	L 5	<b>DS WR 3 ... / DS WR 4 ...</b>	I 6	<b>MK 213 X ...</b>	G 21
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<b>BLR 5 SMD ...</b>	G 76	<b>DH 5 SRC</b>	L 4	<b>DSM 7K2 L20</b>	I 13	<b>MK 220 SMD ...</b>	G 49
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High-precision contacts, loose

Female contacts for Ø 0.5 mm

<p><b>art. no.</b> 1706 ... ... G</p>	<p><b>art. no.</b> PEK ... ... G</p>	<p><b>art. no.</b> PK 1 ... ... G ... Z</p>
<p><b>art. no.</b> 1831 ... ... Z</p>	<p><b>art. no.</b> WWPS 1 ... ... G</p>	<p><b>art. no.</b> SK 06 ... ... G ... Z</p>
<p><b>art. no.</b> SK 13 X 2 ... ... G</p>	<p><b>art. no.</b> TF ... ... G</p>	<p><b>art. no.</b> SK 19 ... ... G ... Z</p>
<p><b>art. no.</b> SIL 1 ... ... G ... Z</p>		

Female contact for 0.64 mm □ and Ø 0.80 mm

<p><b>art. no.</b> SKB 5 ... ... Z</p>	<p><b>art. no.</b> SKB 9 ... ... Z</p>		
--	--	--	--

contact shell surface: tin-plated  
contact spring: gold-plated

Sockets for DIL-IC → F 4 - 10  
Programmable headers → F 23  
Technical data → F 31 - 34  
Fem. head. 2.54 solder, put through → G 29

High-prec. male headers 2.54 solder → G 21 - 24  
High-precision female headers → G 3 - 7  
Peel-off terminal strips → G 25

## High-precision contacts, loose

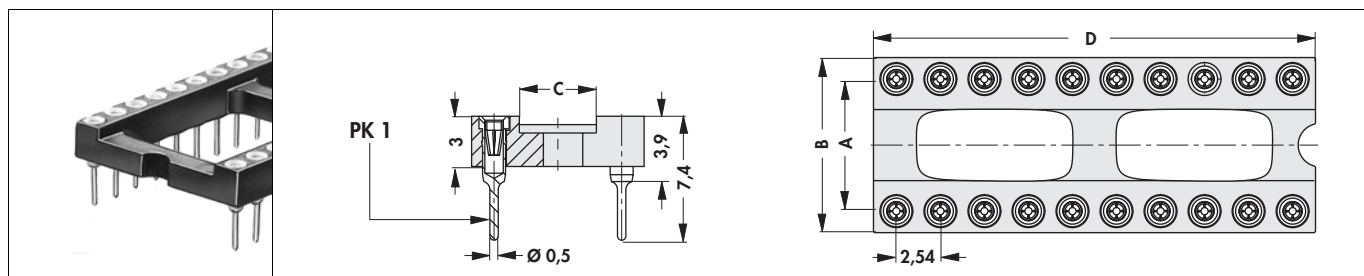
## Contacts with solder head

<b>art. no.</b> <b>PK 4 ...</b> <b>... Z</b>		<b>art. no.</b> <b>SK 02 ...</b> <b>... G ... Z</b>		<b>art. no.</b> <b>SK 03 ...</b> <b>... G ... Z</b>	
<b>art. no.</b> <b>SK 04 ...</b> <b>... Z</b>		<b>art. no.</b> <b>SK 08 ...</b> <b>... G</b>			

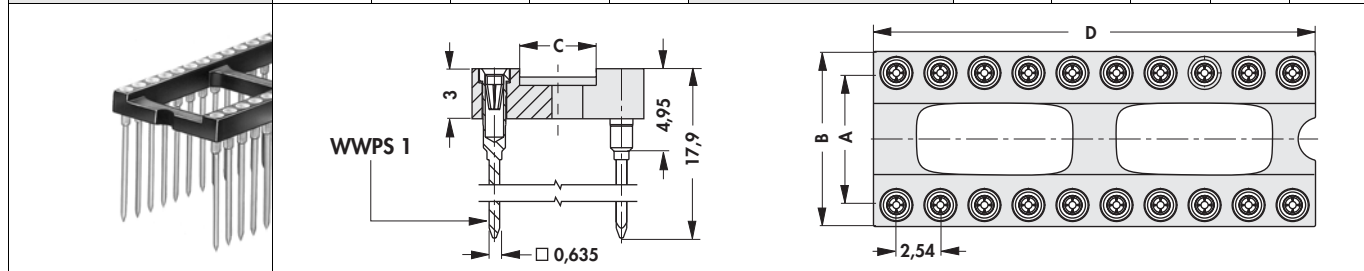
## Male contacts

<b>art. no.</b> <b>PK 3 ...</b> <b>... G ... Z</b>		<b>art. no.</b> <b>SK 05 ...</b> <b>... G ... Z</b>		<b>art. no.</b> <b>SK 11 ...</b> <b>... G ... Z</b>	
<b>art. no.</b> <b>SK 14 X 2 ...</b> <b>... G ... Z</b>		<b>art. no.</b> <b>SK 40 ...</b> <b>... G</b>		<b>art. no.</b> <b>SK 41 ...</b> <b>... G ... Z</b>	
<b>art. no.</b> <b>SK 42 ...</b> <b>... G ... Z</b>					

High-precision sockets for DIL-IC, open frame



art. no.	no. of contacts	dim. [mm]				art. no.	no. of contacts	dim. [mm]			
		A	B	C	D			A	B	C	D
DIL 6 M ...	6	7.62	10.10	4.10	7.60	DIL 22 03 M Z	22	7.62	10.10	4.10	27.90
DIL 8 M ...	8	7.62	10.10	4.10	10.10	DIL 24 M ...	24	15.24	17.70	11.70	30.60
DIL 10 M ...	10	7.62	10.10	4.10	12.70	DIL 24 03 M ...	24	7.62	10.10	4.10	30.60
DIL 14 M ...	14	7.62	10.10	4.10	17.70	DIL 24 04 M G	24	10.16	12.70	6.70	30.60
DIL 16 M ...	16	7.62	10.10	4.10	20.40	DIL 28 M ...	28	15.24	17.70	11.70	35.70
DIL 18 M ...	18	7.62	10.10	4.10	23.00	DIL 28 03 M ...	28	7.62	10.10	4.10	35.70
DIL 20 M ...	20	7.62	10.10	4.10	25.50	DIL 32 M ...	32	15.24	17.70	11.70	40.60
DIL 22 M ...	22	10.16	12.70	6.70	27.90	DIL 36 M G	36	15.24	17.70	11.70	45.60



art. no.	no. of contacts	dim. [mm]				art. no.	no. of contacts	dim. [mm]			
		A	B	C	D			A	B	C	D
DIL 6 N ...	6	7.62	10.10	4.10	7.60	DIL 22 03 N ...	22	7.62	10.10	4.10	27.90
DIL 8 N ...	8	7.62	10.10	4.10	10.10	DIL 24 N ...	24	15.24	17.70	11.70	30.60
DIL 10 N ...	10	7.62	10.10	4.10	12.70	DIL 24 03 N Z	24	7.62	10.10	4.10	30.60
DIL 14 N ...	14	7.62	10.10	4.10	17.70	DIL 24 04 N Z	24	10.16	12.70	6.70	30.60
DIL 16 N ...	16	7.62	10.10	4.10	20.40	DIL 28 N G	28	15.24	17.70	11.70	35.70
DIL 18 N Z	18	7.62	10.10	4.10	23.00	DIL 28 03 N Z	28	7.62	10.10	4.10	35.70
DIL 20 N Z	20	7.62	10.10	4.10	25.50	DIL 32 N Z	32	15.24	17.70	11.70	40.60
DIL 22 N ...	22	10.16	12.70	6.70	27.90	DIL 36 N ...	36	15.24	17.70	11.70	45.60

please indicate: ... surface  
**G** = gold-plated  
**Z** = tin-plated

contact spring: gold-plated

Fem. head. 2.54 solder, put through → G 29  
 Programmable headers → F 23  
 Sockets for LED → F 11 - 12  
 Technical data → F 31 - 34

Single precision contacts → F 2 - 3  
 High-prec. male headers 2.54 solder → G 21 - 24  
 Peel-off terminal strips → G 25

**F 4**

A  
B  
C  
D  
E  
F  
G  
H  
I  
K  
L  
M  
N



A


**High-precision sockets for DIL-IC, open frame**

<b>art. no.</b>	no. of contacts	dim. [mm]				<b>art. no.</b>	no. of contacts	dim. [mm]			
<b>DIL 6 O ...</b>	6	7.62	10.10	4.10	7.60	<b>DIL 22 03 O Z</b>	22	7.62	10.10	4.10	27.90
<b>DIL 8 O ...</b>	8	7.62	10.10	4.10	10.10	<b>DIL 24 O G</b>	24	15.24	17.70	11.70	30.60
<b>DIL 10 O Z</b>	10	7.62	10.10	4.10	12.70	<b>DIL 24 03 O ...</b>	24	7.62	10.10	4.10	30.60
<b>DIL 14 O ...</b>	14	7.62	10.10	4.10	17.70	<b>DIL 24 04 O Z</b>	24	10.16	12.70	6.70	30.60
<b>DIL 16 O ...</b>	16	7.62	10.10	4.10	20.40	<b>DIL 28 O ...</b>	28	15.24	17.70	11.70	35.70
<b>DIL 18 O ...</b>	18	7.62	10.10	4.10	23.00	<b>DIL 28 03 O Z</b>	28	7.62	10.10	4.10	35.70
<b>DIL 20 O ...</b>	20	7.62	10.10	4.10	25.50	<b>DIL 32 O ...</b>	32	15.24	17.70	11.70	40.60
<b>DIL 22 O ...</b>	22	10.16	12.70	6.70	27.90	<b>DIL 36 O Z</b>	36	15.24	17.70	11.70	45.60
<b>art. no.</b>	no. of contacts	dim. [mm]				<b>art. no.</b>	no. of contacts	dim. [mm]			
<b>DIL 6 P Z</b>	6	7.62	10.10	4.10	7.60	<b>DIL 22 P G</b>	22	10.16	12.70	6.70	27.90
<b>DIL 8 P ...</b>	8	7.62	10.10	4.10	10.10	<b>DIL 22 03 P ...</b>	22	7.62	10.10	4.10	27.90
<b>DIL 10 P ...</b>	10	7.62	10.10	4.10	12.70	<b>DIL 24 P G</b>	24	15.24	17.70	11.70	30.60
<b>DIL 14 P ...</b>	14	7.62	10.10	4.10	17.70	<b>DIL 24 03 P G</b>	24	7.62	10.10	4.10	30.60
<b>DIL 16 P ...</b>	16	7.62	10.10	4.10	20.40	<b>DIL 24 04 P ...</b>	24	10.16	12.70	6.70	30.60
<b>DIL 18 P ...</b>	18	7.62	10.10	4.10	23.00	<b>DIL 32 P Z</b>	32	15.24	17.70	11.70	40.60
<b>DIL 20 P ...</b>	20	7.62	10.10	4.10	25.50	<b>DIL 36 P ...</b>	36	15.24	17.70	11.70	45.60
<b>please indicate:</b>											
... surface											
<b>G=gold-plated</b>											
<b>Z=tin-plated</b>											

K

L

M

N

**F 5**
**Mounting tool for DIL/PLCC**
**Peel-off terminal strips**
**Technical data**
**High-prec. male headers 2.54 solder**

→ F 14

→ G 25

→ F 31 - 34

→ G 21 - 24

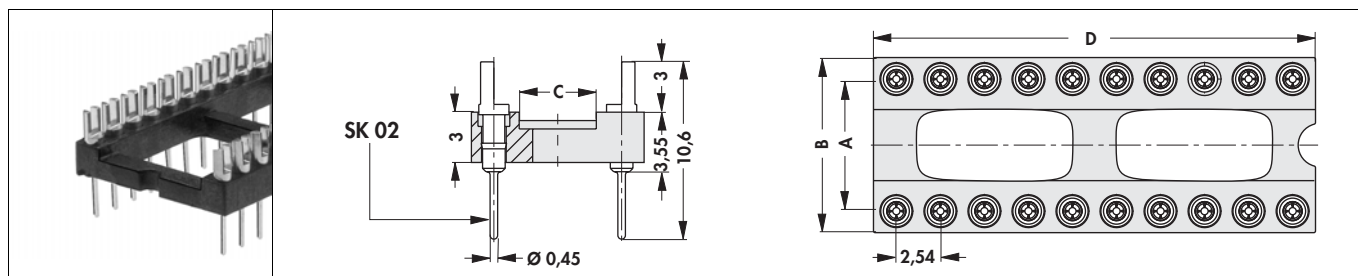
**Sockets for LED**
**Single precision contacts**
**Fem. head. 2.54 solder, put through**

→ F 11 - 12

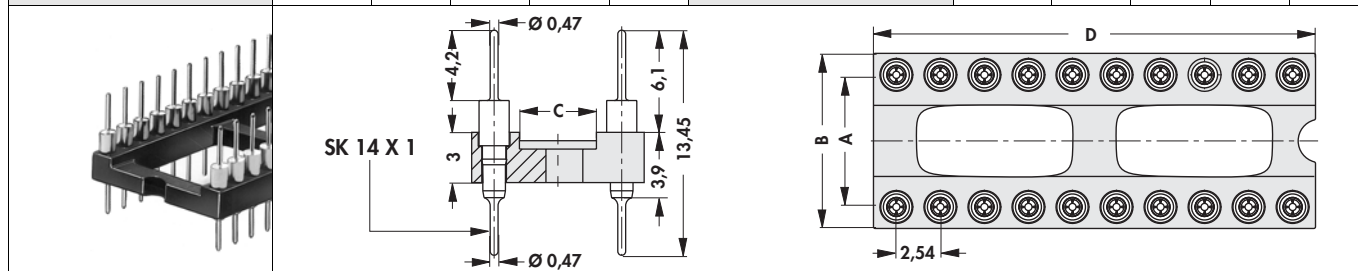
→ F 2 - 3

→ G 29

High-precision sockets for DIL-IC, open frame



art. no.	no. of contacts	dim. [mm]				art. no.	no. of contacts	dim. [mm]			
		A	B	C	D			A	B	C	D
<b>DIL 6 Q Z</b>	6	7.62	10.10	4.10	7.60	<b>DIL 20 Q Z</b>	20	7.62	10.10	4.10	25.50
<b>DIL 8 Q ...</b>	8	7.62	10.10	4.10	10.10	<b>DIL 24 03 Q G</b>	24	7.62	10.10	4.10	30.60
<b>DIL 10 Q Z</b>	10	7.62	10.10	4.10	12.70	<b>DIL 28 Q ...</b>	28	15.24	17.70	11.70	35.70
<b>DIL 14 Q Z</b>	14	7.62	10.10	4.10	17.70	<b>DIL 28 03 Q Z</b>	28	7.62	10.10	4.10	35.70
<b>DIL 16 Q ...</b>	16	7.62	10.10	4.10	20.40	<b>DIL 36 Q ...</b>	36	15.24	17.70	11.70	45.60
<b>DIL 18 Q ...</b>	18	7.62	10.10	4.10	23.00						



art. no.	no. of contacts	dim. [mm]				art. no.	no. of contacts	dim. [mm]			
		A	B	C	D			A	B	C	D
<b>DIL 6 U ...</b>	6	7.62	10.10	4.10	7.60	<b>DIL 22 03 U Z</b>	22	7.62	10.10	4.10	27.90
<b>DIL 8 U ...</b>	8	7.62	10.10	4.10	10.10	<b>DIL 24 U ...</b>	24	15.24	17.70	11.70	30.60
<b>DIL 10 U Z</b>	10	7.62	10.10	4.10	12.70	<b>DIL 24 03 U ...</b>	24	7.62	10.10	4.10	30.60
<b>DIL 14 U ...</b>	14	7.62	10.10	4.10	17.70	<b>DIL 24 04 U Z</b>	24	10.16	12.70	6.70	30.60
<b>DIL 16 U ...</b>	16	7.62	10.10	4.10	20.40	<b>DIL 28 U ...</b>	28	15.24	17.70	11.70	35.70
<b>DIL 18 U Z</b>	18	7.62	10.10	4.10	23.00	<b>DIL 32 U G</b>	32	15.24	17.70	11.70	40.60
<b>DIL 20 U Z</b>	20	7.62	10.10	4.10	25.50	<b>DIL 36 U ...</b>	36	15.24	17.70	11.70	45.60
<b>DIL 22 U ...</b>	22	10.16	12.70	6.70	27.90						

please indicate:

... surface  
**G**=gold-plated  
**Z**=tin-plated

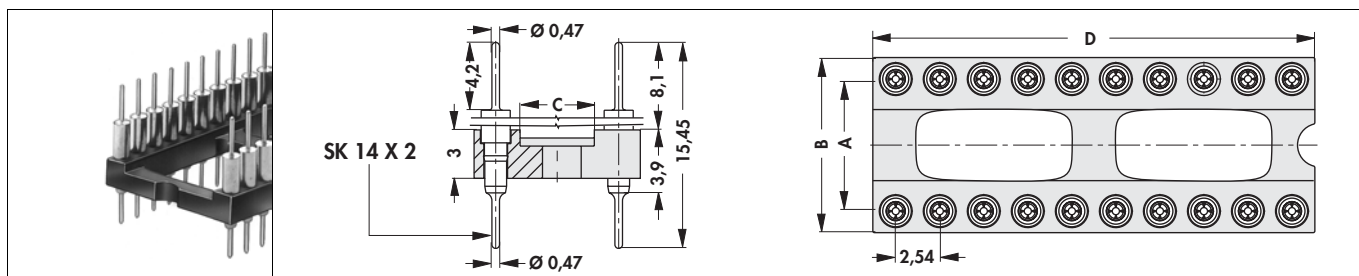
Mounting tool for DIL/PLCC  
 Programmable headers  
 Technical data  
 Single precision contacts

→ F 14  
 → F 23  
 → F 31 - 34  
 → F 2 - 3

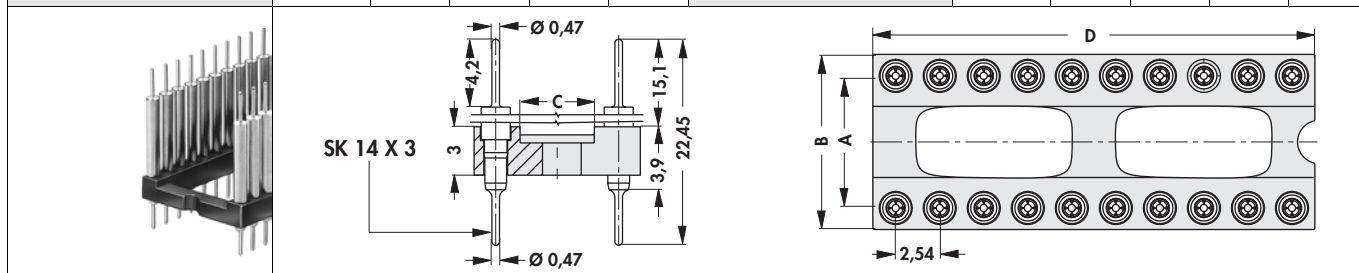
High-prec. male headers 2.54 solder → G 21 - 24  
 Sockets for LED → F 11 - 12  
 Fem. head. 2.54 solder, put through → G 29  
 Peel-off terminal strips → G 25

**F 6**

High-precision sockets for DIL-IC, open frame



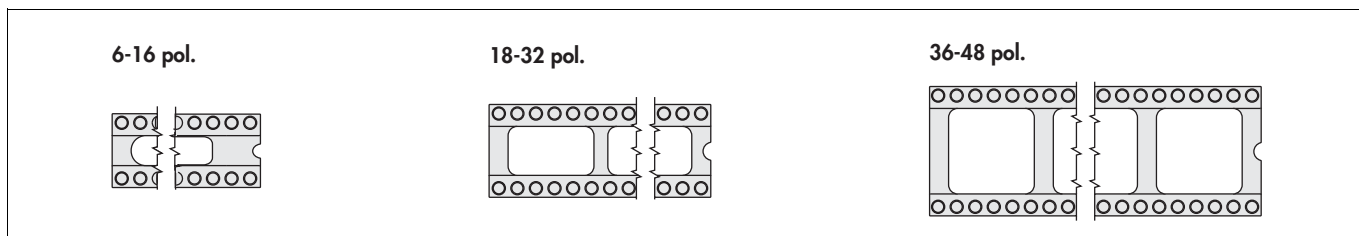
art. no.	no. of contacts	dim. [mm]				art. no.	no. of contacts	dim. [mm]			
		A	B	C	D			A	B	C	D
DIL 6 V ...	6	7.62	10.10	4.10	7.60	DIL 22 V G	22	10.16	12.70	6.70	27.90
DIL 8 V ...	8	7.62	10.10	4.10	10.10	DIL 22 03 V Z	22	7.62	10.10	4.10	27.90
DIL 10 V Z	10	7.62	10.10	4.10	12.70	DIL 24 03 V ...	24	7.62	10.10	4.10	30.60
DIL 14 V ...	14	7.62	10.10	4.10	17.70	DIL 24 04 V ...	24	10.16	12.70	6.70	30.60
DIL 16 V ...	16	7.62	10.10	4.10	20.40	DIL 28 V ...	28	15.24	17.70	11.70	35.70
DIL 18 V ...	18	7.62	10.10	4.10	23.00	DIL 28 03 V Z	28	7.62	10.10	4.10	35.70
DIL 20 V Z	20	7.62	10.10	4.10	25.50	DIL 36 V ...	36	15.24	17.70	11.70	45.60



art. no.	no. of contacts	dim. [mm]				art. no.	no. of contacts	dim. [mm]			
		A	B	C	D			A	B	C	D
DIL 6 W Z	6	7.62	10.10	4.10	7.60	DIL 22 W Z	22	10.16	12.70	6.70	27.90
DIL 8 W ...	8	7.62	10.10	4.10	10.10	DIL 22 03 W ...	22	7.62	10.10	4.10	27.90
DIL 10 W ...	10	7.62	10.10	4.10	12.70	DIL 24 03 W Z	24	7.62	10.10	4.10	30.60
DIL 14 W ...	14	7.62	10.10	4.10	17.70	DIL 24 04 W ...	24	10.16	12.70	6.70	30.60
DIL 16 W G	16	7.62	10.10	4.10	20.40	DIL 32 W ...	32	15.24	17.70	11.70	40.60
DIL 18 W ...	18	7.62	10.10	4.10	23.00	DIL 36 W ...	36	15.24	17.70	11.70	45.60

please indicate: ... surface  
**G**=gold-plated  
**Z**=tin-plated

Socket layout of various numbers of contacts for DIL-IC, open frame





High-precision sockets for DIL-IC, closed frame

<b>art. no.</b>	no. of contacts	dim. [mm] A B D	<b>art. no.</b>	no. of contacts	dim. [mm] A B D
<b>DIL 6 E ...</b>	6	7.62 10.30 7.60	<b>DIL 20 E ...</b>	20	7.62 10.30 25.50
<b>DIL 8 E ...</b>	8	7.62 10.30 10.10	<b>DIL 28 E ...</b>	28	15.24 17.70 35.50
<b>DIL 14 E ...</b>	14	7.62 10.30 17.70	<b>DIL 32 E ...</b>	32	15.24 17.70 40.60
<b>DIL 16 E ...</b>	16	7.62 10.30 20.40	<b>DIL 40 E ...</b>	40	15.24 17.70 50.80
<b>DIL 18 E ...</b>	18	7.62 10.30 23.00			
<b>art. no.</b>	no. of contacts	dim. [mm] A B D	<b>art. no.</b>	no. of contacts	dim. [mm] A B D
<b>DIL 6 H ...</b>	6	7.62 10.30 7.60	<b>DIL 22 H ...</b>	22	10.16 12.70 27.90
<b>DIL 8 H Z</b>	8	7.62 10.30 10.10	<b>DIL 28 H Z</b>	28	15.24 17.70 35.50
<b>DIL 14 H Z</b>	14	7.62 10.30 17.70	<b>DIL 32 H ...</b>	32	15.24 17.70 40.60
<b>DIL 16 H Z</b>	16	7.62 10.30 20.40	<b>DIL 36 H Z</b>	36	15.24 17.70 45.60
<b>DIL 18 H Z</b>	18	7.62 10.30 23.00	<b>DIL 40 H ...</b>	40	15.24 17.70 50.80
<b>DIL 20 H ...</b>	20	7.62 10.30 25.50	<b>DIL 48 H Z</b>	48	15.24 17.70 61.30
<b>art. no.</b>	no. of contacts	dim. [mm] A B D	<b>art. no.</b>	no. of contacts	dim. [mm] A B D
<b>DIL 6 A G</b>	6	7.62 10.30 7.60	<b>DIL 18 A ...</b>	18	7.62 10.30 23.00
<b>DIL 8 A ...</b>	8	7.62 10.30 10.10	<b>DIL 36 A Z</b>	36	15.24 17.70 45.60
<b>DIL 14 A ...</b>	14	7.62 10.30 17.70	<b>DIL 40 A Z</b>	40	15.24 17.70 50.80
<b>DIL 16 A G</b>	16	7.62 10.30 20.40	<b>DIL 48 A Z</b>	48	15.24 17.70 61.30
<p>please indicate: ... surface  <b>G</b>=gold-plated  <b>Z</b>=tin-plated</p>					

contact spring: gold-plated

SMD sockets for PLCC  
 Programmable headers  
 Technical data  
 High-prec. male headers 2.54 solder

→ F 18  
 → F 23  
 → F 31 - 34  
 → G 21 - 24

Single precision contacts  
 Sockets for LED  
 Fem. head. 2.54 solder, put through  
 Peel-off terminal strips

→ F 2 - 3  
 → F 11 - 12  
 → G 29  
 → G 25

**F 8**

A

B

C

D

E

**F**

G

H

I

K

L

M

N

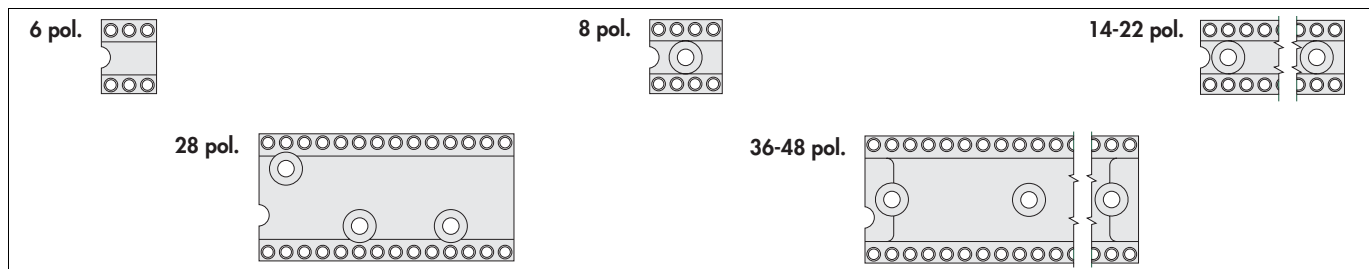
High-precision sockets for DIL-IC, closed frame

<b>art. no.</b>	no. of contacts	dim. [mm]	<b>art. no.</b>	no. of contacts	dim. [mm]
		A B D			A B D
<b>DIL 6 B ...</b>	6	7.62 10.30 7.60	<b>DIL 28 B Z</b>	28	15.24 17.70 35.50
<b>DIL 8 B G</b>	8	7.62 10.30 10.10	<b>DIL 32 B Z</b>	32	15.24 17.70 40.60
<b>DIL 14 B ...</b>	14	7.62 10.30 17.70	<b>DIL 36 B ...</b>	36	15.24 17.70 45.60
<b>DIL 16 B ...</b>	16	7.62 10.30 20.40	<b>DIL 40 B G</b>	40	15.24 17.70 50.80
<b>DIL 18 B ...</b>	18	7.62 10.30 23.00	<b>DIL 48 B ...</b>	48	15.24 17.70 61.30
<b>DIL 20 B ...</b>	20	7.62 10.30 25.50			
<b>art. no.</b>	no. of contacts	dim. [mm]	<b>art. no.</b>	no. of contacts	dim. [mm]
		A B D			A B D
<b>DIL 6 D ...</b>	6	7.62 10.30 7.60	<b>DIL 20 D ...</b>	20	7.62 10.30 25.50
<b>DIL 8 D ...</b>	8	7.62 10.30 10.10	<b>DIL 32 D G</b>	32	15.24 17.70 40.60
<b>DIL 14 D Z</b>	14	7.62 10.30 17.70	<b>DIL 36 D ...</b>	36	15.24 17.70 45.60
<b>DIL 16 D ...</b>	16	7.62 10.30 20.40	<b>DIL 48 D ...</b>	48	15.24 17.70 61.30
<b>DIL 18 D ...</b>	18	7.62 10.30 23.00			
<b>art. no.</b>	no. of contacts	dim. [mm]	<b>art. no.</b>	no. of contacts	dim. [mm]
		A B D			A B D
<b>DIL 6 X ...</b>	6	7.62 10.30 7.60	<b>DIL 28 X Z</b>	28	15.24 17.70 35.50
<b>DIL 8 X G</b>	8	7.62 10.30 10.10	<b>DIL 32 X ...</b>	32	15.24 17.70 40.60
<b>DIL 14 X G</b>	14	7.62 10.30 17.70	<b>DIL 36 X ...</b>	36	15.24 17.70 45.60
<b>DIL 16 X ...</b>	16	7.62 10.30 20.40	<b>DIL 40 X ...</b>	40	15.24 17.70 50.80
<b>DIL 18 X ...</b>	18	7.62 10.30 23.00	<b>DIL 48 X ...</b>	48	15.24 17.70 61.30
<b>DIL 22 X ...</b>	22	10.16 12.70 27.90			
<p>please indicate: ... surface  <b>G</b>=gold-plated  <b>Z</b>=tin-plated</p>					

High-precision sockets for DIL-IC, closed frame

art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
		A	B	D			A	B	D
<b>DIL 6 Y ...</b>	6	7.62	10.30	7.60	<b>DIL 22 Y G</b>	22	10.16	12.70	27.90
<b>DIL 8 Y ...</b>	8	7.62	10.30	10.10	<b>DIL 28 Y ...</b>	28	15.24	17.70	35.50
<b>DIL 14 Y Z</b>	14	7.62	10.30	17.70	<b>DIL 36 Y ...</b>	36	15.24	17.70	45.60
<b>DIL 16 Y ...</b>	16	7.62	10.30	20.40	<b>DIL 40 Y ...</b>	40	15.24	17.70	50.80
<b>DIL 18 Y ...</b>	18	7.62	10.30	23.00	<b>DIL 48 Y ...</b>	48	15.24	17.70	61.30
<p>please indicate: ... surface  <b>G</b>=gold-plated  <b>Z</b>=tin-plated</p>									

Socket layout of various numbers of contacts for DIL-IC, closed frame



DIL-IC-sockets with extractor

art. no.	no. of contacts	dim. [mm]			
		A	B	C	D
<b>DIL 14 PEK</b>	14	7.62	10.10	12.00	17.00
<b>DIL 16 PEK</b>	16	7.62	10.10	12.00	20.30

contact shell surface: gold-plated  
 contact spring: gold-plated

SMD sockets for PLCC → F 18  
 Mounting tool for DIL/PLCC → F 14  
 Technical data → F 31 - 34  
 High-prec. male headers 2.54 solder → G 21 - 24

Single precision contacts → F 2 - 3  
 Sockets for LED → F 11 - 12  
 Fem. head. 2.54 solder, put through → G 29  
 Programmable headers → F 23



A


**High-precision sockets for DIL-IC**
**LED display sockets of 0.6" pitch**

<b>art. no.</b>	no. of contacts	dim. [mm] A	<b>art. no.</b>	no. of contacts	dim. [mm] A
<b>DIL 16 06 E Z</b>	16	20.30	<b>DIL 18 06 E ...</b>	18	22.80
<p><b>please indicate:</b> ... <b>surface</b>  <b>G = gold-plated</b>  <b>Z = tin-plated</b></p>					
<b>art. no.</b>	no. of contacts	dim. [mm] A	<b>art. no.</b>	no. of contacts	dim. [mm] A
<b>DIL 16 06 H Z</b>	16	20.30	<b>DIL 18 06 H Z</b>	18	22.80

**contact spring:** gold-plated

H

I

K

L

M

N

High-precision sockets for DIL-IC

IC-sockets partially equipped, e.g. for oscillators and relays

	DIL 4 OR ...		DIL 8 1 OR ...		DIL 8 2 OR ...		
<b>art. no.</b>	no. of contacts		<b>art. no.</b>	no. of contacts			
<b>DIL 4 OR ...</b>	4		<b>DIL 8 2 OR ...</b>	8			
<b>DIL 8 1 OR Z</b>	8						
<b>please indicate:</b>	... surface <b>G = gold-plated</b> <b>Z = tin-plated</b>						

contact spring: gold-plated

LED display sockets in vertical construction

	<b>art. no.</b>	no. of contacts	dim. [mm]		<b>art. no.</b>	no. of contacts	dim. [mm]
<b>DIL 14 W 90</b>	14	A	B	<b>DIL 16 W 90</b>	16	A	B
		27.70	22.70			30.30	25.30

contact shell surface: tin-plated; contact spring: gold-plated

	<b>art. no.</b>	no. of contacts	dim. [mm]		<b>art. no.</b>	no. of contacts
<b>DIL 8 G ...</b>	8	A		<b>DIL 16 G ...</b>	16	A
<b>DIL 10 G ...</b>	10	12.70		<b>DIL 20 G ...</b>	20	25.40
<b>DIL 14 G ...</b>	14	17.70				
<b>please indicate:</b>	... surface <b>G = gold-plated</b> <b>Z = tin-plated</b>					

contact spring: gold-plated

Mounting tool for DIL/PLCC

→ F 14

Single contacts metal strip

→ G 26

Jump. links 2.00 & 2.54 solder  
Sockets for DIL-IC

→ G 20

Jumpers

→ G 77 - 78

→ F 4 - 10

Male con./fem. con. 6.00 solder

→ G 2

**F 12**

A

B

C

D

E

**F**

G

H

I

K

L

M

N

High-precision sockets for DIL-IC

DIL adaptor plugs

	<p>PK 3</p>		<p>SK 02 (≅ PK 5)</p>		<p>PK 3</p>		<p>SK 02 (≅ PK 5)</p>	
	art. no.	no. of contacts	dim. [mm]		art. no.	no. of contacts	dim. [mm]	
			A	B			A	B
<b>DILS 04 PK 5</b>	4	5.00	2.54		<b>DILS 16 PK 3</b>	16	20.30	17.78
<b>DILS 06 PK 3</b>	6	7.60	5.08		<b>DILS 16 PK 5</b>	16	20.30	17.78
<b>DILS 08 PK 3</b>	8	10.10	7.62		<b>DILS 18 PK 5</b>	18	23.00	20.32
<b>DILS 14 PK 3</b>	14	17.70	15.24					
	<p>PK 3</p>		<p>SK 02 (≅ PK 5)</p>		<p>PK 3</p>		<p>SK 02 (≅ PK 5)</p>	
	art. no.	no. of contacts	dim. [mm]		art. no.	no. of contacts	dim. [mm]	
			A	B			A	B
<b>DILS 16 6 PK 3</b>	16	20.30	17.78		<b>DILS 28 6 PK 3</b>	28	35.50	33.02
<b>DILS 24 6 PK 5</b>	24	30.50	27.94		<b>DILS 40 6 PK 3</b>	40	50.80	48.26

contact surface finish: gold-plated

DIL platforms

suitable for DIL-cases DILS ... GA LO

	art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
			A	B	C			A	B	C
<b>DILS 08 GO</b>	8	12.40	12.50	7.62		<b>DILS 24 GO</b>	24	32.80	20.10	15.24
<b>DILS 14 GO</b>	14	20.00	12.50	7.62		<b>DILS 28 GO</b>	28	37.80	20.10	15.24
<b>DILS 16 GO</b>	16	22.60	12.50	7.62		<b>DILS 40 GO</b>	40	53.10	20.10	15.24
<b>DILS 18 GO</b>	18	25.20	12.50	7.62						

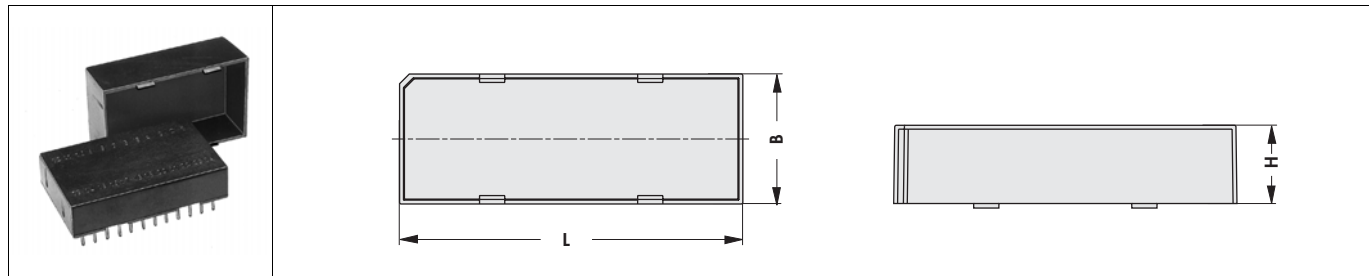
contact surface finish: gold-plated



# High-precision sockets for DIL-IC

## DIL cases - grid spacing 2.54 mm

suitable for platforms DIL DILS ... GO



art. no.	dim. [mm]			art. no.	dim. [mm]		
	B	H	L		B	H	L
<b>DILS 08 GA LO</b>	12.50	6.70	12.40	<b>DILS 14 GB LO</b>	12.50	11.70	20.00
<b>DILS 14 GA LO</b>	12.50	6.70	20.00	<b>DILS 16 GB LO</b>	12.50	11.70	22.60
<b>DILS 16 GA LO</b>	12.50	6.70	22.60	<b>DILS 18 GB LO</b>	12.50	11.70	25.20
<b>DILS 18 GA LO</b>	12.50	6.70	25.20	<b>DILS 24 GB LO</b>	20.10	11.70	32.80
<b>DILS 24 GA LO</b>	20.10	6.70	32.80	<b>DILS 28 GB LO</b>	20.10	11.70	37.80
<b>DILS 40 GA LO</b>	20.10	6.70	53.10	<b>DILS 40 GB LO</b>	20.10	11.70	53.10
<b>DILS 08 GB LO</b>	12.50	11.70	12.40				

contact spring: gold-plated

## IC-mounting tools - Design DIL



art. no.	spacing of contact rows
<b>MIC 03</b>	7.62
<b>MIC 06</b>	15.24

material: polyacetal, non-conductive; flammability: UL 94:HB

High-prec. male headers 2.54 solder → G 21 - 24  
 Peel-off terminal strips → G 25  
 High-prec. male head. in SMD mount. → G 35  
 Technical data → F 31 - 34

DIL platform adapters & cases → F 13 - 14  
 Teflon sockets/TO 5 & TO 18 → F 21 - 22  
 Fem. head. 2.54 solder, put through → G 29  
 Screw fastening → I 28

**F 14**

A  
B  
C  
D  
E  
F  
G  
H  
I  
K  
L  
M  
N

High-precision sockets for DIL-IC

SMD-plug for DIL

with PK 3-contacts

	<b>art. no.</b>	no. of contacts	dim. [mm]			
			A	B	C	D
<b>DIL 08 SMD PK3 Z</b>	8		7.62	10.10	3.50	10.00
<b>DIL 16 SMD PK3 ...</b>	16		7.62	10.10	3.50	20.10
<b>DIL 20 SMD PK3 ...</b>	20		7.62	10.10	3.50	25.20
<b>DIL 24 SMD PK3 ...</b>	24		15.24	17.60	11.70	30.30
<p><b>please indicate:</b> ... surface  <b>G</b> = gold-plated  <b>Z</b> = tin-plated</p>						

with SK5-contacts

	<b>art. no.</b>	no. of contacts	dim. [mm]			
			A	B	C	D
<b>DIL 08 SMD SK5 ...</b>	8		7.62	10.10	3.50	10.00
<b>DIL 16 SMD SK5 ...</b>	16		7.62	10.10	3.50	20.10
<b>DIL 20 SMD SK5 ...</b>	20		7.62	10.10	3.50	25.20
<b>DIL 24 SMD SK5 ...</b>	24		15.24	17.60	11.70	30.30
<p><b>please indicate:</b> ... surface  <b>G</b> = gold-plated  <b>Z</b> = tin-plated</p>						



# High-precision sockets for DIL-IC

## SMD-socket for DIL IC

Contacts, especially integrated into the insulating part, will adjust to the solder paste which possibly is not equally distributed.

art. no.	no. of contacts	dim. [mm]			
		A	B	C	D
<b>DIL 16 SMD M</b>	16	20.10	10.10	7.62	3.50
<b>DIL 20 SMD M</b>	20	25.20	10.10	7.62	3.50
<b>DIL 24 03 SMD M</b>	24	30.30	10.10	7.62	3.50
<b>DIL 28 SMD M</b>	28	35.40	17.60	15.24	11.20
art. no.	no. of contacts	dim. [mm]			
		A	B	C	D
<b>DIL SMD 08 Z</b>	8	10.08	10.08	7.62	4.80
<b>DIL SMD 10 Z</b>	10	12.62	10.08	7.62	4.80
<b>DIL SMD 16 Z</b>	16	20.24	10.08	7.62	4.80
<b>DIL SMD 22 03 Z</b>	22	27.86	10.08	7.62	4.80
<b>DIL SMD 22 04 Z</b>	22	27.86	12.62	10.16	6.50
<b>DIL SMD 28 06 Z</b>	28	35.48	17.70	15.24	10.60
<b>DIL SMD 32 Z</b>	32	40.56	17.70	15.24	10.60
<b>DIL SMD 40 Z</b>	40	50.72	17.70	15.24	10.60

with centre bar for vacuum-mounting

art. no.	no. of contacts	dim. [mm]		
		A	B	C
<b>DIL SMD M 14 Z</b>	14	17.70	10.08	7.62
<b>DIL SMD M 28 06 Z</b>	28	35.48	17.70	15.24
<b>DIL SMD M 32 Z</b>	32	40.56	17.70	15.24

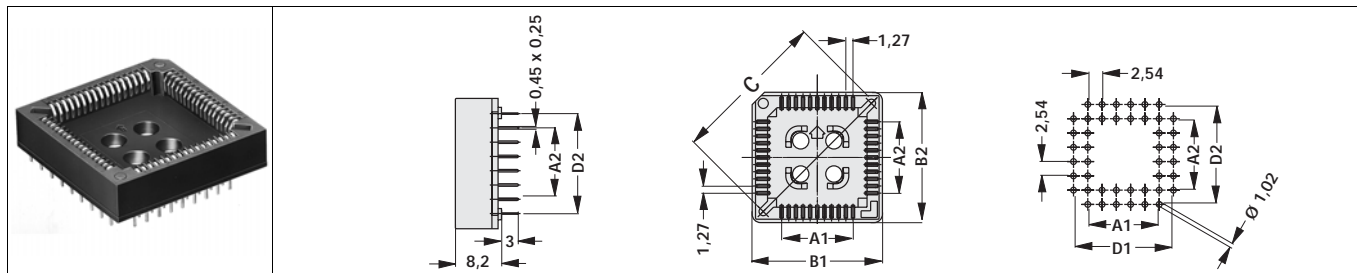
contact shell surface: tin-plated; contact spring: gold-plated (DIL ... SMD M; DIL SMD ...; DIL SMD M ...)

A


**Sockets for IC-PLCC**

B

C



D

E

art. no.	no. of contacts	VPE	dim. [mm]						
			A1	A2	B1	B2	C	D1	D2
<b>PLCC 20</b>	20	39	5.08	5.08	15.55	15.55	16.70	10.16	10.16
<b>PLCC 28</b>	28	33	7.62	7.62	18.10	18.10	20.30	12.70	12.70
<b>PLCC 32</b>	32	29	7.62	10.16	18.10	20.70	22.20	12.70	15.24
<b>PLCC 44</b>	44	25	12.70	12.70	23.20	23.20	27.50	17.78	17.78
<b>PLCC 52</b>	52	23	15.24	15.24	25.70	25.70	31.00	20.32	20.32
<b>PLCC 68</b>	68	19	20.32	20.32	30.80	30.80	37.30	25.40	25.40
<b>PLCC 84</b>	84	16	25.40	25.40	36.00	36.00	44.50	30.48	30.48

**contact surface finish:** tin-plated; **VPE** = packing unit (pieces/tube)

F

Data sheet for pin configuration of PLCC sockets available on request.

These sockets conform to EIA/JEDEC "A" package requirements for leaded plastic chip carriers.

Drain holes for easier inside cleaning.

Test probe holes are moulded next to each contact, providing easy access.

Insulating material as per UL 94 V-0.

G

**colour:** black

H

I

K

L

M

N

**F 17**

Mounting tool for DIL/PLCC  
SMD sockets for PLCC  
Connector-sleeves  
Technical data

→ F 14  
→ F 18  
→ F 25 - 27  
→ F 31 - 34

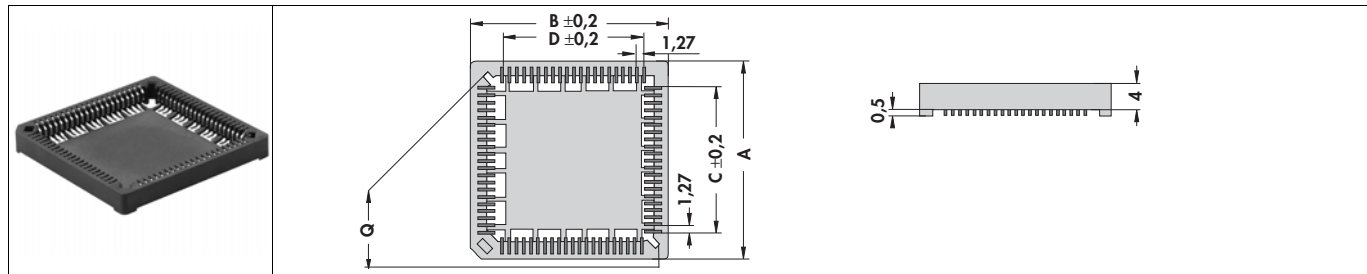
Teflon sockets/TO 5 & TO 18  
Fem. head. 2.54 solder, put through  
PGA sockets

→ F 21 - 22  
→ G 29  
→ F 21

## Sockets for IC-PLCC

### SMD sockets for PLCC - low profile housing

These sockets conform to EIA/JEDEC "A" package requirements for leaded plastic chip carriers.



art. no.	no. of contacts	VPE	dim. [mm]				
			A	B	C	D	Q
<b>PLCC 20 SMD</b>	20	39	15.58	15.58	5.08	5.08	16.00
<b>PLCC 28 SMD</b>	28	32	18.12	18.12	7.62	7.62	20.60
<b>PLCC 32 SMD</b>	32	29	18.12	20.66	7.62	10.16	22.50
<b>PLCC 44 SMD</b>	44	26	23.40	23.40	12.70	12.70	27.50
<b>PLCC 52 SMD</b>	52	23	25.74	25.74	15.24	15.24	31.10
<b>PLCC 68 SMD</b>	68	19	30.82	30.82	20.32	20.32	38.80
<b>PLCC 84 SMD</b>	84	15	35.90	35.90	25.40	25.40	44.80

VPE = packing unit (pieces/tube)\*dimensions ± 0.2 mm

Tin-plated phosphorbronze socket contacts.

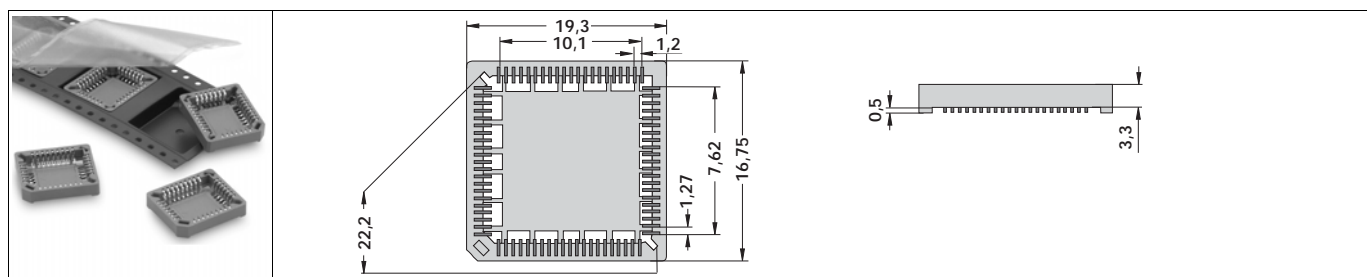
colour: black

packing: bar magazine

- Dual polarisation indicators guarantee the correct alignment of the device.
- Drain holes for easier inside cleaning.
- Test probe holes are moulded next to each contact, providing easy access.
- Efficient heat dissipation.


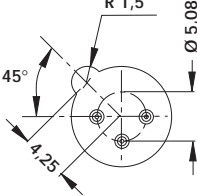
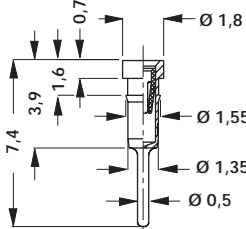
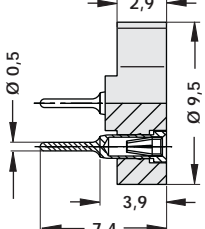

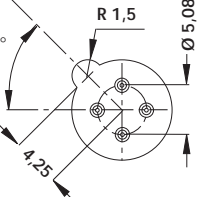
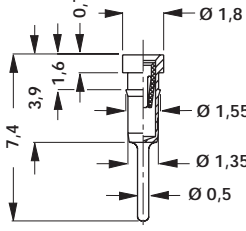
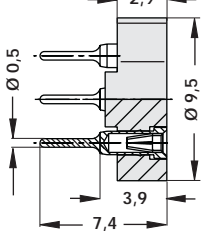
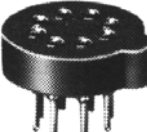
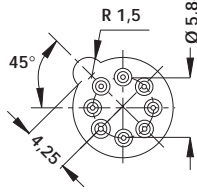
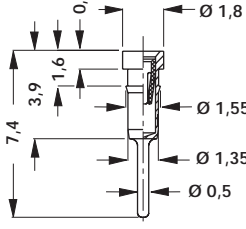
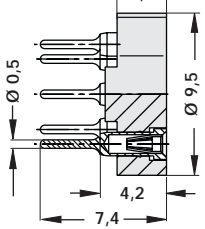
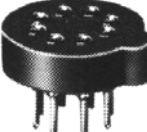
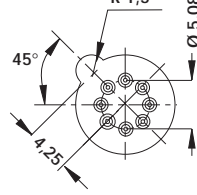
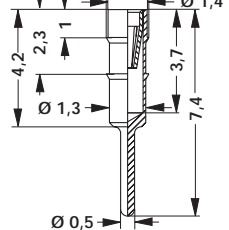
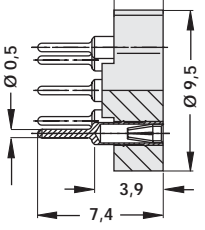
Insulating material (PBT) UL 94 V-0 rated.

### SMD-sockets for PLCC - low profile housing




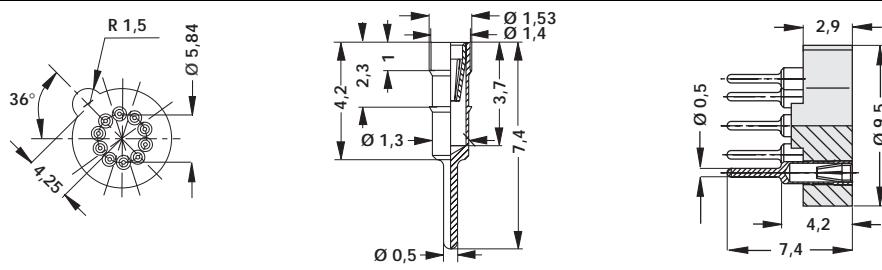
art. no.	no. of contacts
<b>PLCC 32 LP SMD ...</b>	32
<b>please indicate:</b>	<b>... packing (option)</b> <b>SM = tube magazine</b> <b>TR = tape and reel (500 pcs/reel)</b>

### Sockets for TO 5

			
<b>art. no.</b>	no. of contacts		
<b>PF 53 ...</b>	3		
			
<b>art. no.</b>	no. of contacts		
<b>PF 54 ...</b>	4		
			
<b>art. no.</b>	no. of contacts		
<b>PF 58 23 ...</b>	8		
			
<b>art. no.</b>	no. of contacts		
<b>PF 58 2 ...</b>	8		
<b>please indicate:</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>		


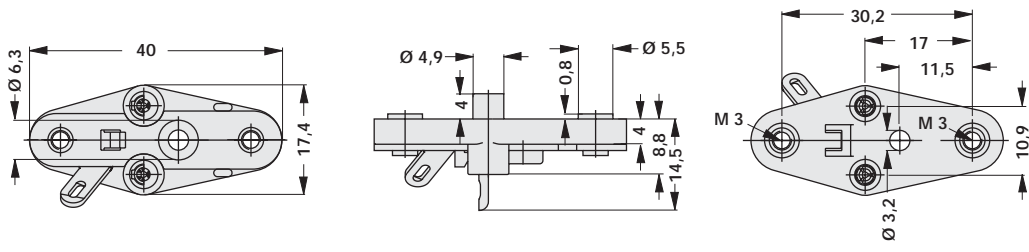
contact spring: gold-plated

### Sockets for TO 5

	
<b>art. no.</b>	no. of contacts
<b>PF 510 ...</b>	10
<b>please indicate:</b>	
<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	

**contact spring:** gold-plated

### Sockets for power transistors TO 3

	
<b>art. no.</b>	no. of contacts
<b>TF 3 2</b>	3

**insulator:** PCT, glassfibre filled

**contact:** beryllium copper; 4 ... 6 µm Sn

#### Technical data:

current rating: 15 A max.

capacitance: 1 pF

contact resistance: < 10 mΩ

insulation resistance: > 10<sup>10</sup> Ω/cm

temperature range: -65 °C ... +290 °C

test voltage: 1650 V

Single contacts metal strip  
 Jumper links  
 Female headers 2.54 press-fit  
 Teflon sockets/TO 5 & TO 18

→ G 26  
 → F 24  
 → G 53  
 → F 21 - 22

Peel-off terminal strips  
 DIL platform adapters & cases  
 Connector-sleeves

→ G 25  
 → F 13 - 14  
 → F 25 - 27

**F 20**

A

B

C

D

E

**F**

G

H

I

K

L

M

N



A

B

C

D

E

F

G

H

I


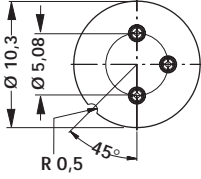
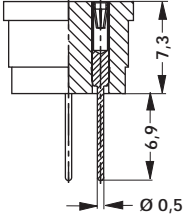

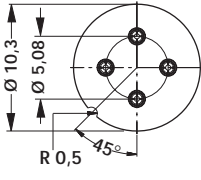
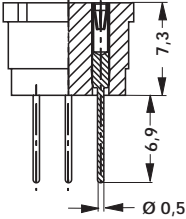

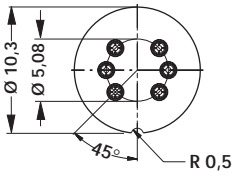
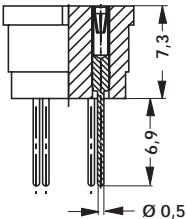

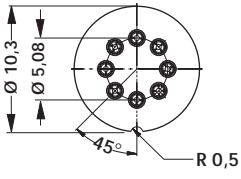
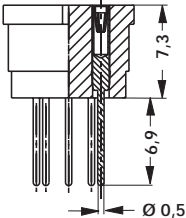
K

L

M

N

**Transistor sockets - teflon sockets for TO 5**

		
<b>art. no.</b> <b>TF 53</b>	no. of contacts 3	
		
<b>art. no.</b> <b>TF 54</b>	no. of contacts 4	
		
<b>art. no.</b> <b>TF 56</b>	no. of contacts 6	
		
<b>art. no.</b> <b>TF 58</b>	no. of contacts 8	


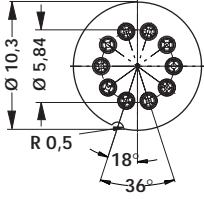
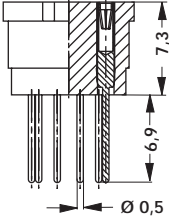

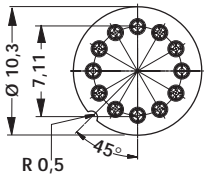
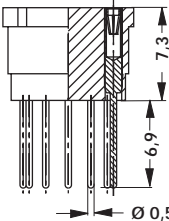
**contact shell and contact spring: gold-plated**
**F 21**
**Programmable headers**  
**Sockets for TO 5 and TO 3**  
**Sockets für PLCC**  
**Single contacts metal strip**

 → F 23  
 → F 19 - 20  
 → F 17  
 → G 26

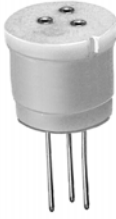
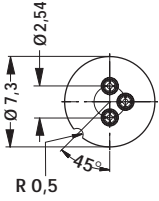
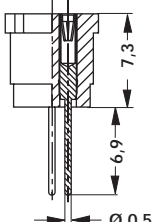
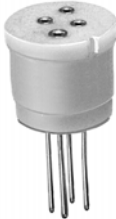
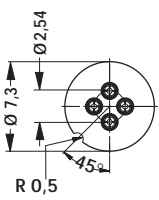
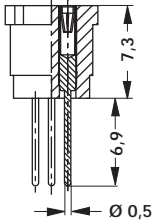
**Jumper links**  
**High-prec.male head.in SMD mount.** → G 35

→ F 24

Transistor sockets - teflon sockets for TO 5

		
<p>art. no.</p>	<p>no. of contacts</p>	
<p>TF 510</p>	<p>10</p>	
		
<p>art. no.</p>	<p>no. of contacts</p>	
<p>TF 512</p>	<p>12</p>	

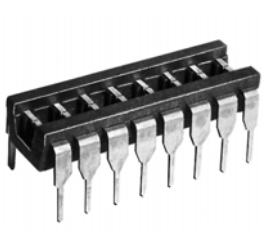
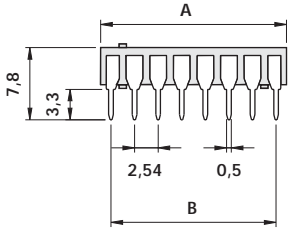
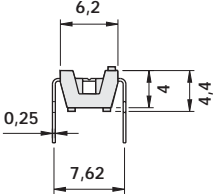
Transistor sockets - teflon sockets for TO 18

		
<p>art. no.</p>	<p>no. of contacts</p>	
<p>TF 183</p>	<p>3</p>	
		
<p>art. no.</p>	<p>no. of contacts</p>	
<p>TF 184</p>	<p>4</p>	

contact shell and contact spring: gold-plated

## Programmable headers

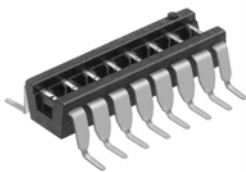
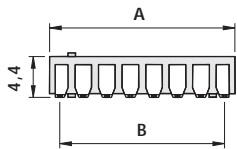
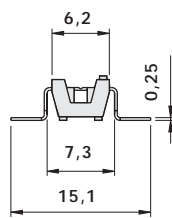
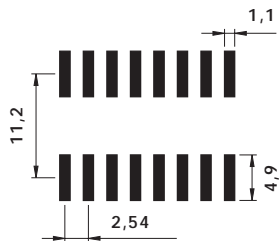
## Version for soldering technique

			
art. no.	no. of contacts	dim. [mm]	
		A	B
<b>CAB 3 02 03 Z</b>	2	2.22	-
<b>CAB 3 04 03 Z</b>	4	4.76	2.54
<b>CAB 3 06 03 Z</b>	6	7.30	5.08
<b>CAB 3 08 03 Z</b>	8	9.84	7.62
<b>CAB 3 10 03 Z</b>	10	12.38	10.16
<b>CAB 3 12 03 Z</b>	12	14.92	12.70
<b>CAB 3 14 03 Z</b>	14	17.46	15.24
<b>CAB 3 16 03 Z</b>	16	20.00	17.78

**contacts:** brass

The contacts have a preformed dividing groove and can easily be separated with a screwdriver blade.

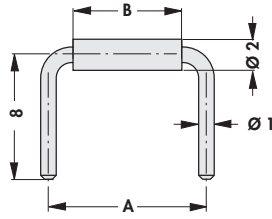
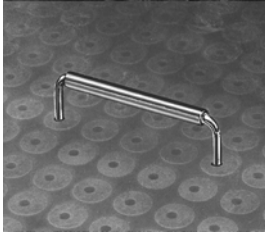
## Version for SMD technology

			
art. no.	no. of contacts	dim. [mm]	
		A	B
<b>CAB 3 SMD 04 Z</b>	4	4.76	2.54
<b>CAB 3 SMD 08 Z</b>	8	9.84	7.62
<b>CAB 3 SMD 10 Z</b>	10	12.38	10.16
<b>CAB 3 SMD 12 Z</b>	12	14.92	12.70
<b>CAB 3 SMD 14 Z</b>	14	17.46	15.24
<b>CAB 3 SMD 16 Z</b>	16	20.00	17.78

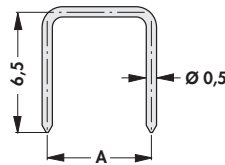
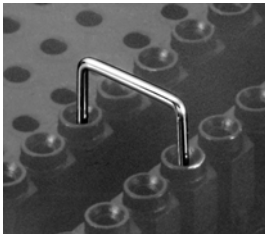
**contacts:** brass

The contacts have a preformed dividing groove and can easily be separated with a screwdriver blade.

## Jumper links

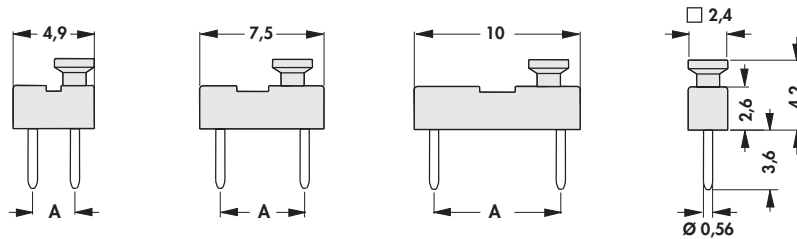
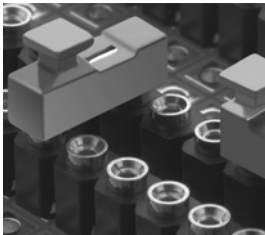


art. no.	dim. [mm]	
	A	B
<b>LB 02 G</b>	5.08	2.00
<b>LB 03 G</b>	7.62	4.50
<b>LB 04 G</b>	10.16	7.00
<b>LB 06 G</b>	15.24	12.00

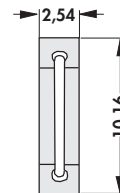
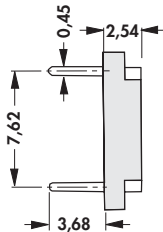
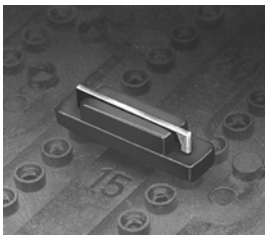


art. no.	dim. [mm]
	A
<b>CB 1 ...</b>	2.54
<b>CB 3 ...</b>	5.08
<b>CB 6 ...</b>	7.62

please indicate: ... surface  
**G** = gold-plated  
**Z** = tin-plated



art. no.	dim. [mm]
	A
<b>LEB 01 G</b>	2.54
<b>LEB 02 G</b>	5.08
<b>LEB 03 G</b>	7.62



art. no.
<b>PSB 03 G</b>

Mounting tool for DIL/PLCC  
 Single precision contacts

→ F 14  
 F 2  
 - 3  
 High-prec. male headers 2.54 solder G 21  
 - 24

**F 24**

A

B

C

D

E

**F**

G

H

I

K

L

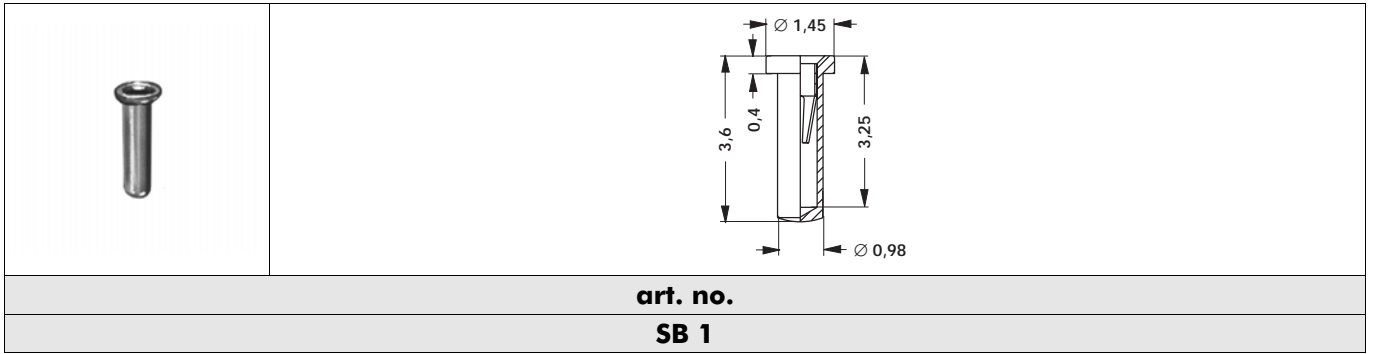
M

N

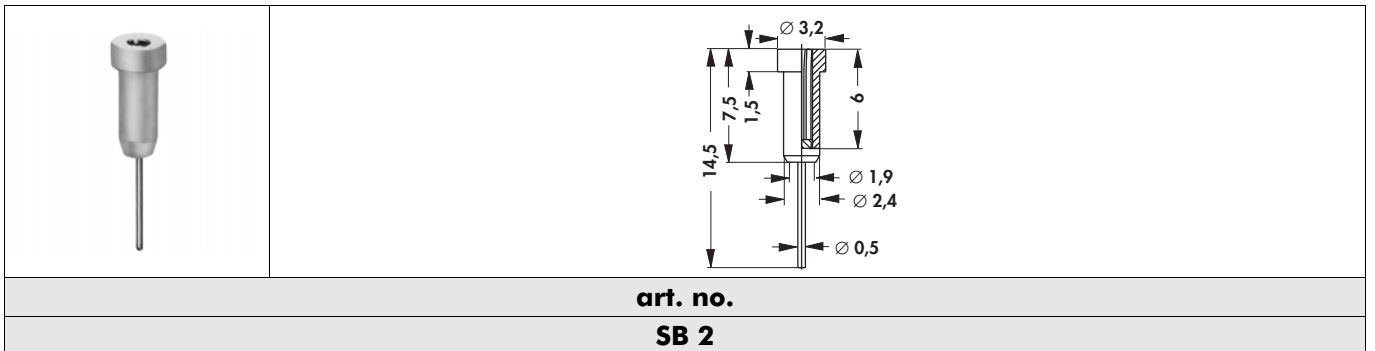
A

**Connector-sleeves**

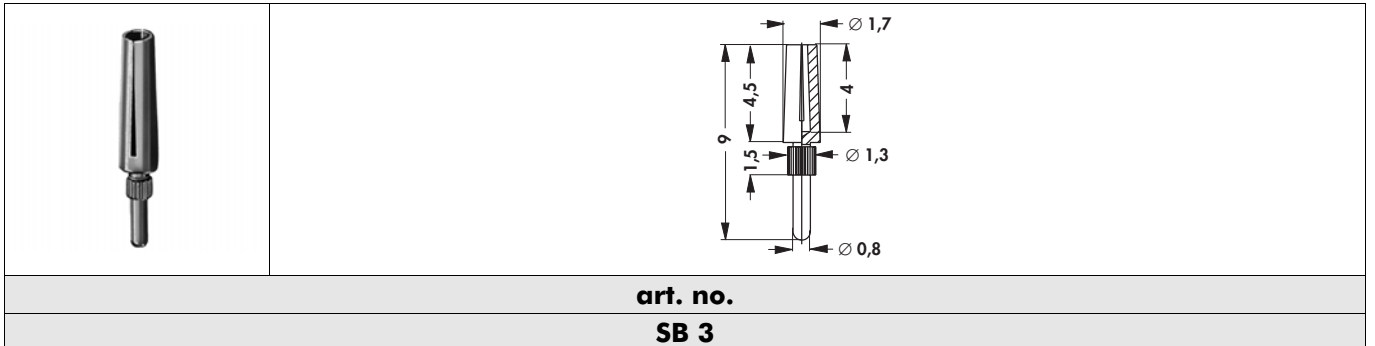
B

**for 0.4 mm with BeCu spring 3  $\mu$ m Ni, 1  $\mu$ m Au**


D

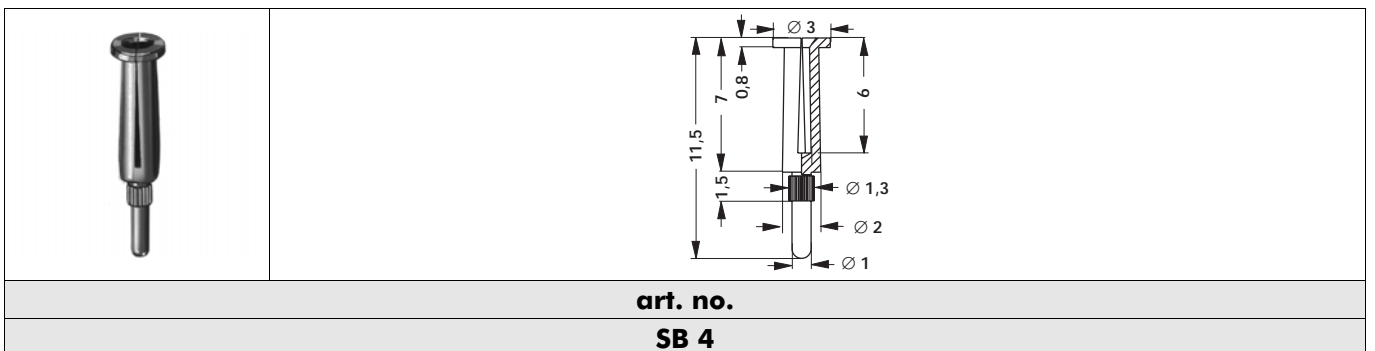
**for 0.4 mm with bronze spring, teflon insulated**


F

**for 0.8 mm, slotted**


G

H

**for 1 mm, slotted**


I

K

L

**material:** brass 2  $\mu$ m Ni, 0.25  $\mu$ m Au (unless otherwise stated)

M

N

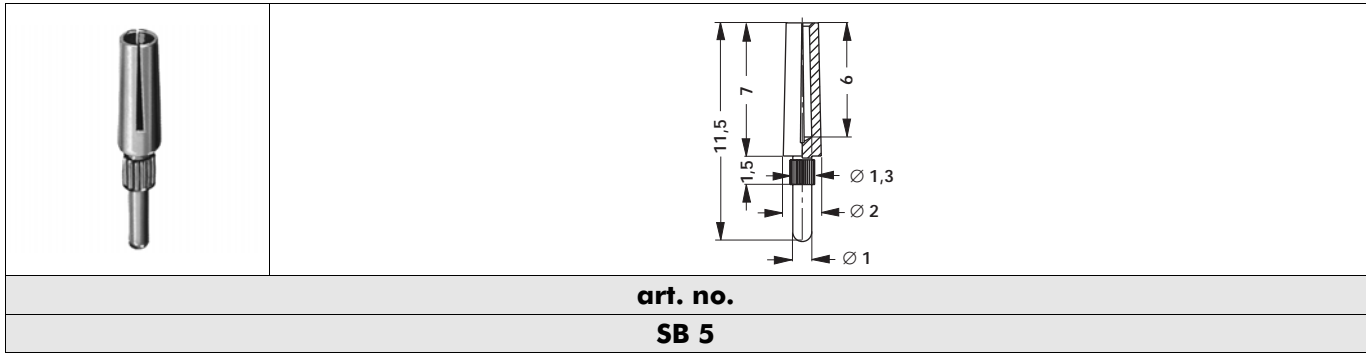
**F 25**
**High-prec. male headers 2.54 solder** → G 21 - 24  
**Teflon sockets/TO 5 & TO 18** → F 21 - 22  
**High-precision female headers** → G 3 - 5  
**Jumper links** → F 24

**Sockets für PLCC**  
**Single precision contacts**

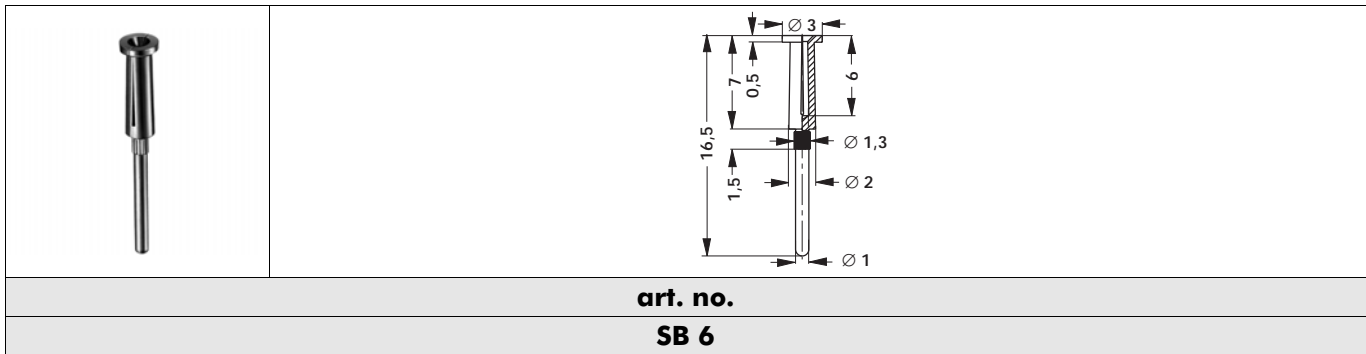
 → F 17  
 → F 2 - 3



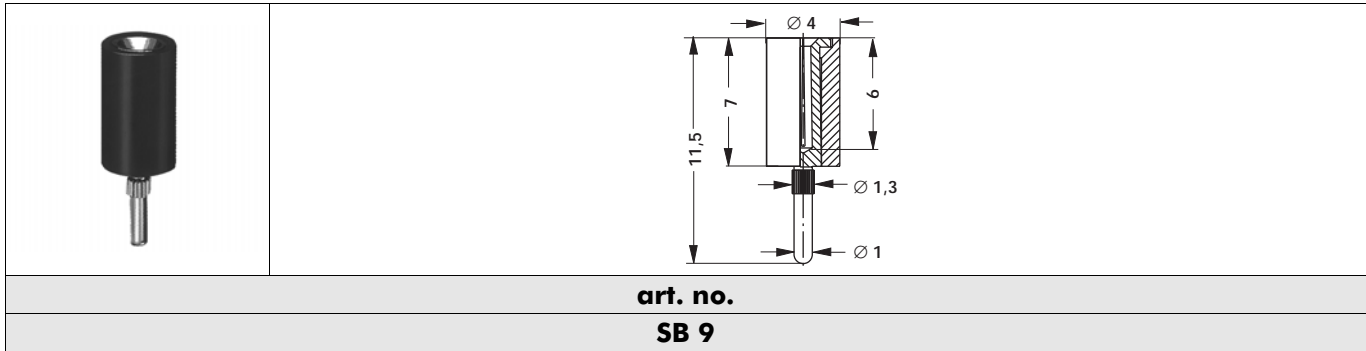
for 1 mm, slotted



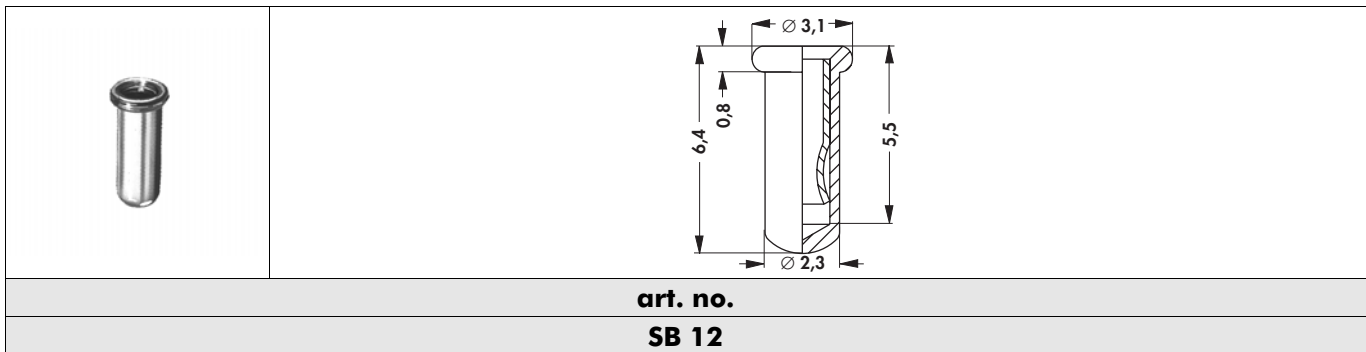
for 1 mm, slotted



for 1 mm, slotted, plastic insulated



for 1 mm, with BeCu spring 3 μm Ni, 1 μm Au

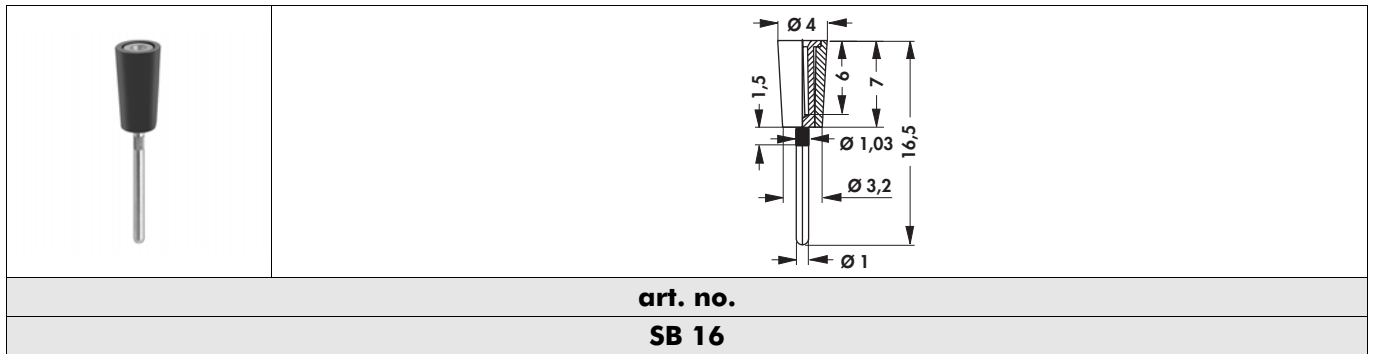


material: brass 2 μm Ni, 0.25 μm Au (unless otherwise stated)

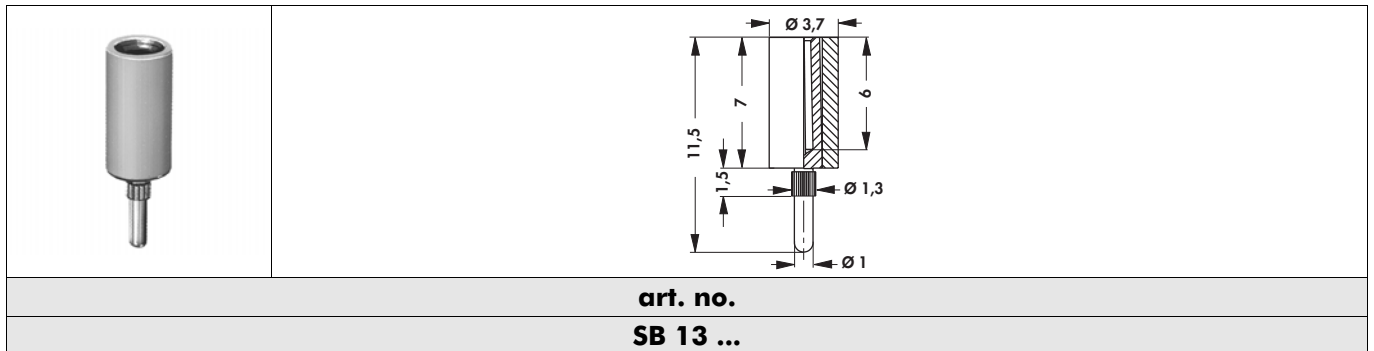
A

**Connector-sleeves**

B

**for 1 mm, slotted, plastic insulated**


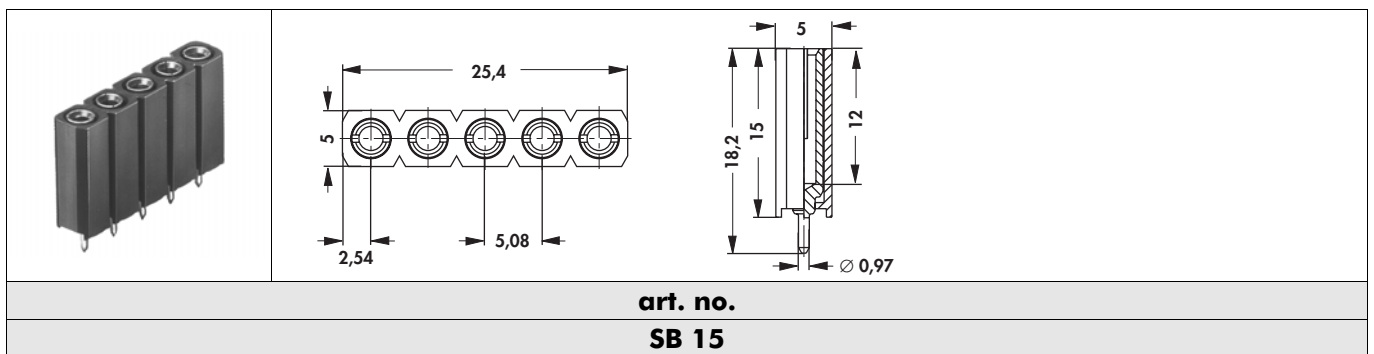
D

**for 2 mm, slotted, plastic insulated**


F

**please indicate:**
**... case colour**
**B = blue**
**R = red**
**S = black**

G

**for 2 mm, slotted, plastic insulated, separable**


H

I

K



**material:** brass 2  $\mu\text{m}$  Ni, 0.25  $\mu\text{m}$  Au (unless otherwise stated)

L

M


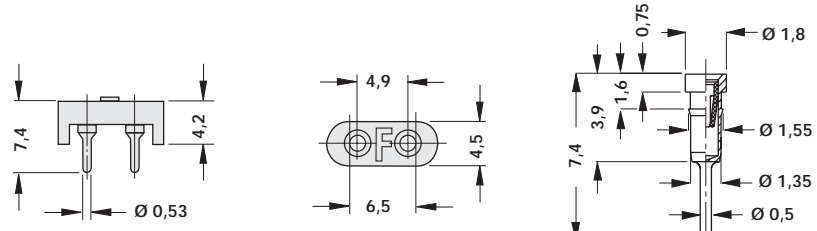
N

**F 27**
**Teflon sockets/TO 5 & TO 18**  
**Sockets für PLCC**  
**High-precision female headers**  
**Jumper links**
**→ F 21 - 22**  
**→ F 17**  
**→ G 3 - 5**  
**→ F 24**
**Single precision contacts**  
**High-prec. male headers 2.54 solder**  
**Sockets für PLCC**
**→ F 2 - 3**  
**→ G 21 - 24**  
**→ F 17**


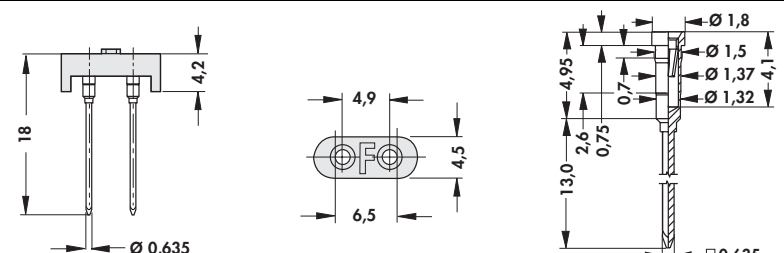
	
<b>art. no.</b> <b>QS 25 GS</b>	

contact surface finish: silver-plated

**Precision sockets for crystal oscillators in case HC 18**

	
<b>art. no.</b> <b>PQ 18 ...</b>	

please indicate: ... surface  
**G** = gold-plated  
**Z** = tin-plated

	
<b>art. no.</b> <b>PQ 18 W ...</b>	

please indicate: ... surface  
**G** = gold-plated  
**Z** = tin-plated

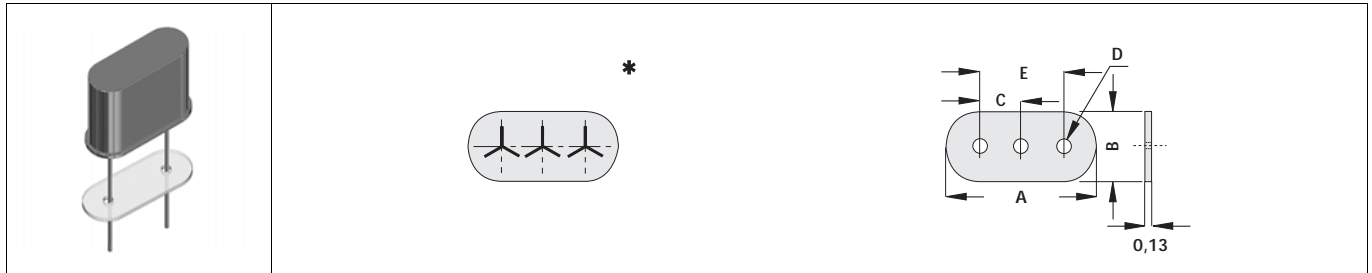
contact spring: gold-plated

A

B

**Insulators for crystal mounts**

C



D

art. no.	case design	dim. [mm]				
		A	B	C	D	E (max.)
<b>ISQ 01</b>	HC-80/U	8.30	3.70	-	0.71	3.80
<b>ISQ 02</b>	HC-80/U	8.30	3.70	-	*	3.80
<b>ISQ 03</b>	HC-80/U	8.30	3.70	1.90	0.71	3.80
<b>ISQ 04</b>	HC-18/U, HC-43/U, HC-49/U	11.80	5.60	-	0.71	4.90
<b>ISQ 05</b>	HC-18/U, HC-43/U, HC-49/U	11.80	5.60	-	*	4.90
<b>ISQ 06</b>	HC-18/U, HC-43/U, HC-49/U	11.80	5.60	2.40	0.71	4.90
<b>ISQ 07</b>	HC-18/U, HC-43/U, HC-49/U	11.80	5.60	2.40	*	4.90
<b>ISQ 08</b>	HC-25/U, HC-42/U, HC-50/U	11.80	5.60	-	1.30	4.90

E

\* = self retaining

F

**Technical data:**

foil: MYLAR

thickness: 0.127 mm

heat resistance: 250 °C

dielectric strength: 9 KV

G

H

I

K

L

M

N

**F 29**

High-prec. male headers 2.54 solder → G 21 - 24  
 Teflon sockets/TO 5 & TO 18 → F 21 - 22  
 Sockets für PLCC → F 17  
 Jumper links → F 24

Programmable headers → F 23  
 Sockets for TO 5 and TO 3 → F 19 - 20  
 Sockets for DIL-IC → F 4 - 10

→ F 23  
 → F 19 - 20  
 → F 4 - 10

Male connector

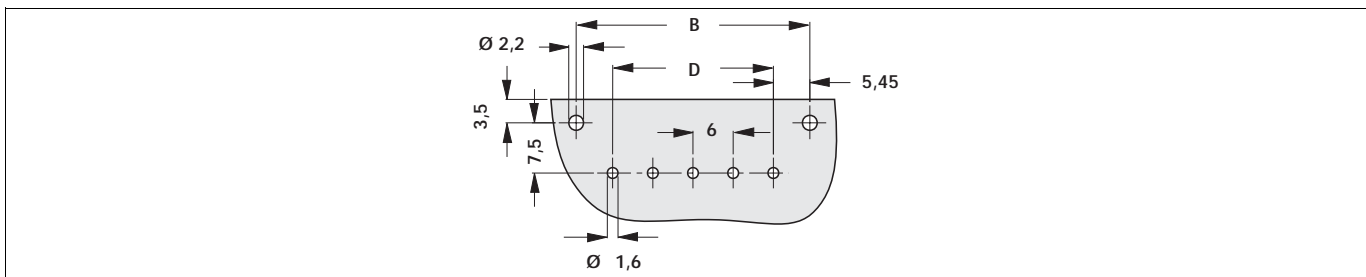
one row, angled

	<b>art. no.</b>	no. of contacts	dim. [mm]		
		A	B	C	D
<b>MELA 05</b>	5	40.00	34.90	30.00	24.00
<b>MELA 07</b>	7	52.00	46.90	42.00	36.00

surface: silver-plated

As per DIN 41622.

PCB perforation





A

**High-precision male headers soldering technique**
**Solder and plug pins, Ø 0.5 mm**

<b>art. no.</b>          <b>MK 05 ...</b>			<b>art. no.</b>          <b>MK 205 ...</b>		
<b>art. no.</b>          <b>MK 03 ...</b>			<b>art. no.</b>          <b>MK 203 ...</b>		
<b>art. no.</b>          <b>MK 04 ...</b>			<b>art. no.</b>          <b>MK 204 ...</b>		
<b>art. no.</b>          <b>MK 02 ...</b>			<b>art. no.</b>          <b>MK 202 ...</b>		
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 1-50</b> <b>two rows 2-100</b>		<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	

Also available as single contact, SK ...

**version:**

- MK 05 / MK 205: contact pin on both sides
- MK 03 / MK 203: with solder button
- MK 04 / MK 204: with diagonal solder bucket
- MK 02 / MK 202: with solder fork

I

K

L

M

N


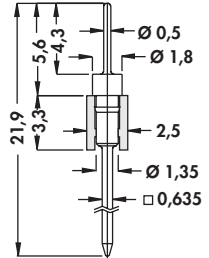

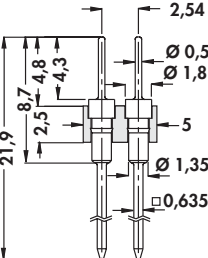

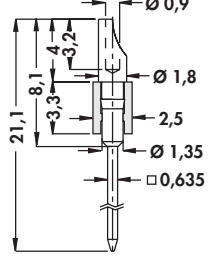

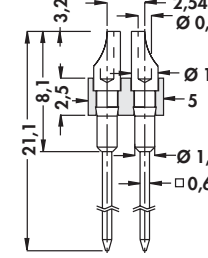

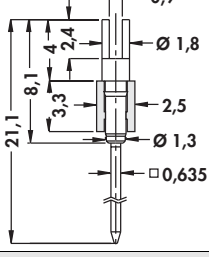

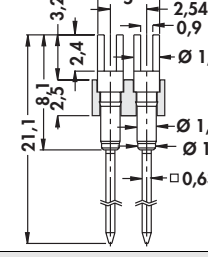
**G 3**

 High-prec. fem. headers 1.27 solder → G 72  
 Special male & female headers → G 19  
 Technical data → G 75 - 80  
 High-prec. male headers 2.54 solder → G 21 - 24

 High-prec. fem. headers 2.54 sold. → G 31 - 34  
 Male headers 2.54 solder → G 8  
 Male headers 2.54 SMD → G 37 - 42  
 Single precision contacts → F 2 - 3

# High-precision male headers soldering technique

Wire wrap pin, □ 0,635 mm

<p>art. no.</p> <p><b>MK 11 ...</b></p>		 <p>Dimensions: 21,9, 5,6, 4,3, 3,3, 2,5, 1,35, 0,635, 0,5, 1,8</p>	<p>art. no.</p> <p><b>MK 211 ...</b></p>		 <p>Dimensions: 21,9, 8,7, 4,8, 4,3, 2,5, 5, 1,35, 0,635, 0,5, 1,8, 2,54</p>
<p>art. no.</p> <p><b>MK 10 ...</b></p>		 <p>Dimensions: 21,1, 8,1, 3,3, 3,2, 2,5, 1,35, 0,635, 0,9, 1,8</p>	<p>art. no.</p> <p><b>MK 210 ...</b></p>		 <p>Dimensions: 21,1, 8,1, 2,5, 3,2, 2,54, 0,9, 1,8, 5, 1,35, 0,6, 1,35</p>
<p>art. no.</p> <p><b>MK 08 ...</b></p>		 <p>Dimensions: 21,1, 8,1, 4, 2,4, 3,3, 2,5, 1,3, 0,635, 0,9, 1,8</p>	<p>art. no.</p> <p><b>MK 208 ...</b></p>		 <p>Dimensions: 21,1, 8,1, 2,5, 3,2, 5, 2,54, 0,9, 1,8, 1,35, 1,3, 0,635</p>
<p><b>please indicate:</b></p> <p>... no. of contacts                  one row 1-50                  two rows 2-100</p> <p>... surface                  G=gold-plated                  Z=tin-plated</p>					

**version:**

- MK 11 / MK 211: solder and plug pin, Ø 0.5 mm
- MK 10 / MK 210: with diagonal solder bucket
- MK 08 / MK 208: with solder fork

A

**High-precision male headers soldering technique**
**Solder and plug pins, Ø 0,5 mm**

<b>art. no.</b>          <b>MK 51 ...</b>			<b>art. no.</b>          <b>MK 251 ...</b>		
<b>art. no.</b>          <b>MK 15 ...</b>					
<b>art. no.</b>          <b>MK 14 X 1 ...</b> <b>MK 14 X 2 ...</b> <b>MK 14 X 3 ...</b>			<b>art. no.</b>          <b>MK 214 X 1 ...</b> <b>MK 214 X 2 ...</b> <b>MK 214 X 3 ...</b>		
<b>please indicate:</b>	<b>... no. of contacts</b> <b>one row 1-50</b> <b>two rows 2-100</b>	<b>... surface</b> <b>G=gold-plated</b> <b>Z=tin-plated</b>			

**version:**

MK 51 ... / MK 251 ... / MK 15 ...: 90° PCB connection

MK 14 X ... / MK 214 X ...: parallel PCB connection

I

K

L

M

N

**G 5**

 Single precision contacts  
 Male headers 2.54 solder  
 Special male & female headers  
 Male headers 2.54 SMD

 → F 2 - 3  
 → G 8  
 → G 19  
 → G 37 - 42

 Technical data → G 75 - 80  
 High-prec. fem. headers 1.27 solder → G 72  
 High-prec. fem. headers 2.54 sold. → G 31 - 34  
 High-prec. male headers 2.54 solder → G 21 - 24

High-precision male headers soldering technique

Low profile

art. no.			art. no.		
<b>MK LP 40 ...</b>			<b>MK LP 240 ...</b>		
art. no.			art. no.		
<b>MK LP 41 ...</b>			<b>MK LP 241 ...</b>		
art. no.			art. no.		
<b>MK LP 42 ...</b>			<b>MK LP 242 ...</b>		
art. no.					
<b>MK LP 43 ...</b>					
<b>please indicate:</b>	... no. of contacts one row 1-50 two rows 4-100		... surface G = gold-plated Z = tin-plated		

Also available as single contact, SK ...

**A****High-precision male headers soldering technique****B****Low profile**

one row

**C****D****E****F****G**

<b>art. no.</b>   <b>SL 7 ...</b>		<p>2,54      Ø 0,8</p> <p>1,6      1,9</p> <p>Ø 0,6</p>	<p>9,2    4,2    Ø 1,5</p>	<p>n x 2,54</p> <p>2,5</p>
<b>art. no.</b>   <b>SL 8 ...</b>		<p>2,54      Ø 0,5</p> <p>1,4      1,7</p> <p>Ø 0,5</p>	<p>8,5    3,8</p>	<p>n x 2,54</p> <p>2,5</p>
<b>art. no.</b>   <b>SL 9 ...</b>		<p>2,54      Ø 0,5</p> <p>2,2      2,5</p> <p>Ø 0,5</p>	<p>12,8    7,3</p> <p>2,7    Ø 1,25</p>	<p>n x 2,54</p> <p>2,5</p>
<b>please indicate:</b>		... no. of contacts one row 1 - 20	... surface G = gold-plated Z = tin-plated	

**H****I****K****L****M****N****G 7**

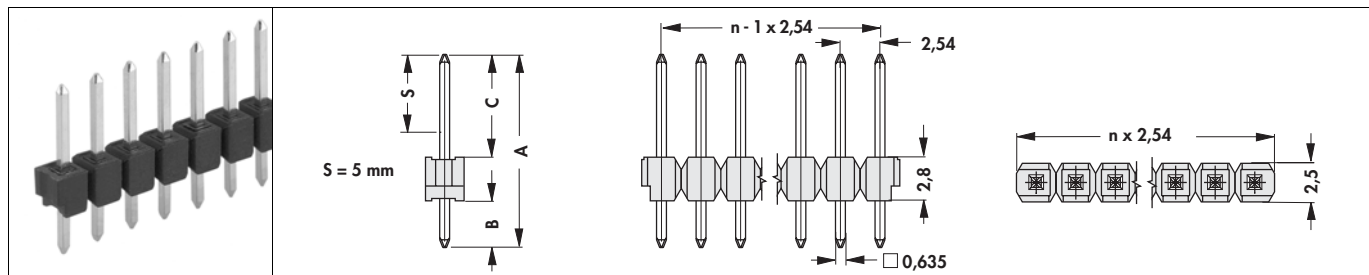
**Male headers 2.54 SMD**  
**Male headers 2.54 solder**  
**Technical data**  
**Jumpers**

→ G 37 - 42  
 → G 8  
 → G 75 - 80  
 → G 77 - 78

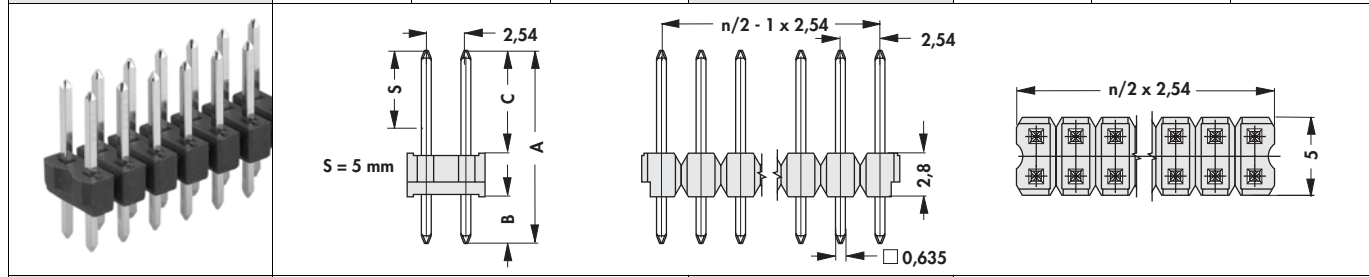
**Special male & female headers** → G 19  
**High-prec. fem. headers 2.54 sold.** → G 31 - 34  
**High-prec. male headers 2.54 solder** → G 21 - 24  
**Single precision contacts** → F 2 - 3

Male headers soldering technique

□ 0.635 mm, standard



art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
SL 11 097...	9.70	3.00	3.90	SL 1 025 ...	11.20	2.60	5.80
SL 11 112 ...	11.20	3.00	5.40	SL 1 053 ...	13.90	5.80	5.30
SL 11 124 ...	12.40	3.00	6.60	SL 1 078 ...	16.40	5.80	7.80
SL 11 139 ...	13.90	3.00	8.10	SL 1 104 ...	19.00	5.80	10.40
SL 11 164 ...	16.40	3.00	10.60	SL 1 128 ...	21.40	5.80	12.80
SL 11 190 ...	19.00	3.00	13.20	SL 1 154 ...	24.00	5.80	15.40
SL 11 214 ...	21.40	3.00	15.60	SL 1 179 ...	26.50	5.80	17.90
SL 11 240 ...	24.00	3.00	18.20	SL 1 230 ...	31.60	5.80	23.00
SL 11 265 ...	26.50	3.00	20.70		-	-	-
SL 11 316 ...	31.60	3.00	25.80				



art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
SL 22 097 ...	9.70	3.00	3.90	SL 2 025 ...	11.20	2.60	5.80
SL 22 112 ...	11.20	3.00	5.40	SL 2 053 ...	13.90	5.80	5.30
SL 22 124 ...	12.40	3.00	6.60	SL 2 078 ...	16.40	5.80	7.80
SL 22 139 ...	13.90	3.00	8.10	SL 2 104 ...	19.00	5.80	10.40
SL 22 164 ...	16.40	3.00	10.60	SL 2 128 ...	21.40	5.80	12.80
SL 22 190 ...	19.00	3.00	13.20	SL 2 154 ...	24.00	5.80	15.40
SL 22 214 ...	21.40	3.00	15.60	SL 2 179 ...	26.50	5.80	17.90
SL 22 240 ...	24.00	3.00	18.20	SL 2 230 ...	31.60	5.80	23.00
SL 22 265 ...	26.50	3.00	20.70		-	-	-
SL 22 316 ...	31.60	3.00	25.80				

please indicate:      ... no. of contacts  
                                   one row 1-36  
                                   two rows 2-72

                                  ... surface  
                                   S = selective gold-plated  
                                   G = gold-plated  
                                   Z = tin-plated

Every pin length is available on request.

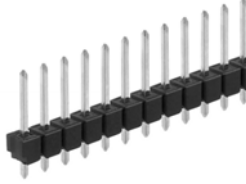
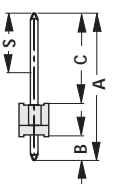
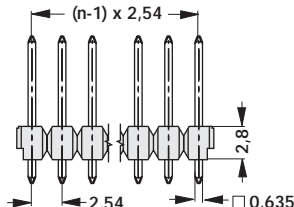
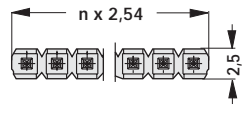
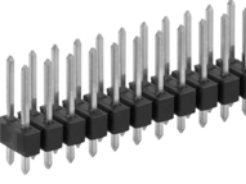
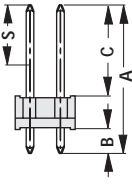
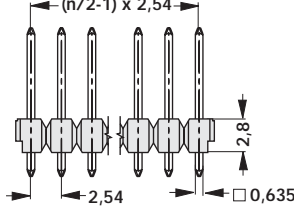
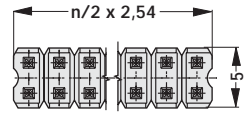
- PC connector design DIL → H 2
- Female headers 2.54 solder → G 27
- Technical data → G 75 - 80
- Fem. head. 2.54 solder, put through → G 29
- Female headers 2.54 SMD → G 46 - 49
- Special male & female headers → G 19
- High-prec. fem. headers 2.54 sold. → G 31 - 34

**G 8**

A  
B  
C  
D  
E  
F  
G  
H  
I  
K  
L  
M  
N

## Male header in through-hole-reflow-soldering technique

## □ 0.635 mm, THR soldering technique

			
<b>art. no.</b>	dim. [mm]		
	A	B	C
<b>SL 20 THR 097 ...</b>	9.70	2.00	4.90
<b>SL 20 THR 112 ...</b>	11.20	2.00	6.40
<b>SL 20 THR 124 ...</b>	12.40	2.00	7.60
<b>SL 20 THR 139 ...</b>	13.90	2.00	9.10
<b>SL 20 THR 164 ...</b>	16.40	2.00	11.60
<b>please indicate:</b>	<b>... no. of contacts one row 1-36</b>	<b>... surface S = selective gold-plated G = gold-plated Z = tin-plated</b>	
			
<b>art. no.</b>	dim. [mm]		
	A	B	C
<b>SL 21 THR 097 ...</b>	9.70	2.00	4.90
<b>SL 21 THR 112 ...</b>	11.20	2.00	6.40
<b>SL 21 THR 124 ...</b>	12.40	2.00	7.60
<b>SL 21 THR 139 ...</b>	13.90	2.00	9.10
<b>SL 21 THR 164 ...</b>	16.40	2.00	11.60
<b>please indicate:</b>	<b>... no. of contacts two rows 2-72</b>	<b>... surface S = selective gold-plated G = gold-plated Z = tin-plated</b>	

Every pin length is available on request.

# Male headers soldering technique

## "dimensions A + B" changeable

one row, □ 0.635 mm

art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
<b>SLK 3 025 ...</b>	4.50	3.00	3.00	<b>SL 3 131 ...</b>	14.60	13.10	5.80
<b>SL 3 025 ...</b>	4.50	3.00	5.80	<b>SL 3 152 ...</b>	16.70	15.20	5.80
<b>SL 3 053 ...</b>	6.90	5.40	5.80	<b>SL 3 182 ...</b>	19.70	18.20	5.80
<b>SL 3 080 ...</b>	9.50	8.00	5.80	<b>SL 3 207 ...</b>	22.20	20.70	5.80
<b>SL 3 101 ...</b>	11.60	10.10	5.80				
<b>please indicate:</b>	<b>... no. of contacts one row 1-36</b>			<b>... surface S = selective gold-plated G = gold-plated Z = tin-plated</b>			

The surface of dimension "C" of following articles is selective gold-plated: SLK 3 025 ... S, SL 3 025 ... S.

two rows, □ 0.635 mm

art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
<b>SLK 4 025 ...</b>	4.50	3.00	3.00	<b>SL 4 101 ...</b>	11.60	10.10	5.80
<b>SL 4 025 ...</b>	4.50	3.00	5.80	<b>SL 4 152 ...</b>	16.70	15.20	5.80
<b>please indicate:</b>	<b>... no. of contacts two rows 2-72</b>			<b>... surface S = selective gold-plated G = gold-plated Z = tin-plated</b>			

The surface of dimension "C" of following articles is selective gold-plated: SLK 4 025 ... S, SL 4 025 ... S.

V-notches permit breaking! Therefore any required number of contacts is available.  
Every pin length is available on request.

**IDC-connectors** → H 1 - 14  
**Female headers 2.54 solder** → G 27  
**Female headers 2.54 SMD** → G 46 - 49  
**Fem. head. 2.54 solder, put through** → G 29

**Special male & female headers** → G 19  
**High-prec. fem. headers 2.54 sold.** → G 31 - 34  
**High-prec. male head.in SMD mount.** → G 35  
**Technical data** → G 75 - 80

**G 10**

A

B

C

D

E

F

G

H

I

K

L

M

N



A

**Male headers soldering technique**

B

**Insertion side "dimension C" changeable**

one row, □ 0.635 mm

<b>art. no.</b>	dim. [mm] C		
<b>SL 18 042 ...</b>	4.20		
<b>SL 18 082 ...</b>	8.20		
<b>SL 18 108 ...</b>	10.80		
<b>SL 18 132 ...</b>	13.20		
<b>SL 18 159 ... S</b>	15.90		
<b>please indicate:</b>	<b>... no. of contacts</b> one row 1-36	<b>... surface</b> <b>S = selective gold-plated</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	

D

E

F

G

two rows, □ 0.635 mm

<b>art. no.</b>	dim. [mm] C		
<b>SL 19 082 ...</b>	8.20		
<b>SL 19 108 ...</b>	10.80		
<b>SL 19 132 ...</b>	13.20		
<b>SL 19 159 ... S</b>	15.90		
<b>please indicate:</b>	<b>... no. of contacts</b> two rows 2-72	<b>... surface</b> <b>S = selective gold-plated</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	

H

I

K

L

M

V-notches permit breaking! Therefore any required number of contacts is available.  
Every pin length is available on request.

N

**G 11**

**IDC-connectors**  
**Technical data**  
**Special male & female headers**  
**High-prec. fem. headers 2.54 sold.**

→ H 1 - 14  
 → G 75 - 80  
 → G 19  
 → G 31 - 34

**High-prec.male head.in SMD mount.**  
**Female headers 2.54 solder**  
**Fem. head. 2.54 solder, put through**  
**Female headers 2.54 SMD**

→ G 35  
 → G 27  
 → G 29  
 → G 46 - 49

# Male headers soldering technique

## Low profile, straight

one row, □ 0.635 mm

art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
<b>SL LP 1 082 ...</b>	8.20	3.00	3.50	<b>SL LP 1 139 ...</b>	13.90	3.00	9.20
<b>SL LP 1 097 ...</b>	9.70	3.00	5.00	<b>SL LP 1 164 ...</b>	16.40	3.00	11.70
<b>SL LP 1 112 ...</b>	11.20	3.00	6.50	<b>SL LP 1 190 ...</b>	19.00	3.00	14.30
<b>please indicate:</b>	<b>... no. of contacts</b> <b>one row 1-36</b>			<b>... surface</b> <b>S = selective gold-plated</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>			

two rows, □ 0.635 mm

art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
<b>SL LP 2 082 ...</b>	8.20	3.00	3.50	<b>SL LP 2 139 ...</b>	13.90	3.00	9.20
<b>SL LP 2 097 ...</b>	9.70	3.00	5.00	<b>SL LP 2 164 ...</b>	16.40	3.00	11.70
<b>SL LP 2 112 ...</b>	11.20	3.00	6.50	<b>SL LP 2 190 ...</b>	19.00	3.00	14.30
<b>please indicate:</b>	<b>... no. of contacts</b> <b>two rows 2-72</b>			<b>... surface</b> <b>S = selective gold-plated</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>			

Every pin length is available on request.

IDC-connectors

Female headers 2.54 SMD

Female headers 2.54 solder

Fem. head. 2.54 solder, put through

→ H 1 - 14

→ G 46 - 49

→ G 27

→ G 29

Jumpers

Special male & female headers

High-prec. fem. headers 2.54 sold.

Technical data

→ G 77 - 78

→ G 19

→ G 31 - 34

→ G 75 - 80

**G 12**

A

B

C

D

E

F

**G**

H

I

K

L

M

N

A

**Male headers soldering technique**

B

**Low profile, angled**

one row, □ 0.635 mm

	<b>art. no.</b>	dim. [mm]			<b>art. no.</b>	dim. [mm]			
	A	B	C		A	B	C		
<b>SL LP 3 041 ...</b>	4.50	3.00	4.10	<b>SL LP 3 069 ...</b>	4.50	3.00	6.90		
<b>please indicate:</b>	... no. of contacts one row 1-36			... surface S = selective gold-plated G = gold-plated Z = tin-plated					

D

E

F

G

two rows, □ 0.635 mm

	<b>art. no.</b>	dim. [mm]			<b>art. no.</b>	dim. [mm]			
	A	B	C		A	B	C		
<b>SL LP 4 041 ...</b>	4.50	3.00	4.10	<b>SL LP 4 069 ...</b>	4.50	3.00	6.90		
<b>please indicate:</b>	... no. of contacts two rows 2-72			... surface S = selective gold-plated G = gold-plated Z = tin-plated					

H

I

K

L

M

Every pin length is available on request.

N

**G 13**

IDC-connectors

Jumpers

Female headers 2.54 solder

Fem. head. 2.54 solder, put through

→ H 1 - 14

→ G 77 - 78

→ G 27

→ G 29

Female headers 2.54 SMD

Special male &amp; female headers

High-prec. fem. headers 2.54 sold.

Technical data

→ G 46 - 49

→ G 19

→ G 31 - 34

→ G 75 - 80

Male headers soldering technique

□ 0.635 mm, Sandwich

<b>art. no.</b>	dim. [mm]		<b>art. no.</b>	dim. [mm]	
	A	L		A	L
<b>SL 5 071 ...</b>	7.10	16.40	<b>SL 5 223 ...</b>	22.30	31.60
<b>SL 5 097 ...</b>	9.70	19.00	<b>SL 5 237 ...</b>	23.70	33.00
<b>SL 5 121 ...</b>	12.10	21.40	<b>SL 5 285 ...</b>	28.50	37.80
<b>SL 5 147 ...</b>	14.70	24.00	<b>SL 5 315 ...</b>	31.50	40.80
<b>SL 5 156 ...</b>	15.60	24.90	<b>SL 5 360 ...</b>	36.00	45.30
<b>SL 5 172 ...</b>	17.20	26.50	<b>SL 5 415 ...</b>	41.50	50.80
<b>SL 5 197 ...</b>	19.70	29.00	<b>SL 5 525 ...</b>	52.20	61.50
<b>art. no.</b>	dim. [mm]		<b>art. no.</b>	dim. [mm]	
	A	L		A	L
<b>SL 6 071 ...</b>	7.10	16.40	<b>SL 6 223 ...</b>	22.30	31.60
<b>SL 6 097 ...</b>	9.70	19.00	<b>SL 6 237 ...</b>	23.70	33.00
<b>SL 6 121 ...</b>	12.10	21.40	<b>SL 6 285 ...</b>	28.50	37.80
<b>SL 6 147 ...</b>	14.70	24.00	<b>SL 6 315 ...</b>	31.50	40.80
<b>SL 6 156 ...</b>	15.60	24.90	<b>SL 6 360 ...</b>	36.00	45.30
<b>SL 6 172 ...</b>	17.20	26.50	<b>SL 6 415 ...</b>	41.50	50.80
<b>SL 6 197 ...</b>	19.70	29.00	<b>SL 6 525 ...</b>	52.20	61.50
<b>please indicate:</b>	... <b>no. of contacts</b> one row 1-36 two rows 2-72		... <b>surface</b> S = selective gold-plated G = gold-plated Z = tin-plated		

"S" selective gold-plated to 33.0 mm pin length

For interconnections of stacked PCBs. Within the total length the insulator position can be changed as required. ... Design specification. V-notches permit breaking! Therefore any required number of contacts is available.

IDC-connectors

Technical data

High-prec. fem. headers 2.54 sold.

Special male & female headers

→ H 1 - 14

→ G 75 - 80

→ G 31 - 34

→ G 19

Jumpers

Female headers 2.54 SMD

Fem. head. 2.54 solder, put through

Female headers 2.54 solder

→ G 77 - 78

→ G 46 - 49

→ G 29

→ G 27

# Male headers soldering technique

## □ 0,635 mm, Sandwich

<b>art. no.</b>	dim. [mm]		<b>art. no.</b>	dim. [mm]	
	A	L		A	L
<b>SL 13 071 ...</b>	7.10	21.40	<b>SL 13 235 ...</b>	23.50	37.80
<b>SL 13 097 ...</b>	9.70	24.00	<b>SL 13 265 ...</b>	26.50	40.80
<b>SL 13 122 ...</b>	12.20	26.50	<b>SL 13 310 ...</b>	31.00	45.30
<b>SL 13 147 ...</b>	14.70	29.00	<b>SL 13 365 ...</b>	36.50	50.80
<b>SL 13 187 ...</b>	18.70	33.00			
<b>art. no.</b>	dim. [mm]		<b>art. no.</b>	dim. [mm]	
	A	L		A	L
<b>SL 14 071 ...</b>	7.10	21.40	<b>SL 14 235 ...</b>	23.50	37.80
<b>SL 14 097 ...</b>	9.70	24.00	<b>SL 14 265 ...</b>	26.50	40.80
<b>SL 14 122 ...</b>	12.20	26.50	<b>SL 14 310 ...</b>	31.00	45.30
<b>SL 14 147 ...</b>	14.70	29.00	<b>SL 14 365 ...</b>	36.50	50.80
<b>SL 14 187 ...</b>	18.70	33.00			
<b>please indicate:</b>	... no. of contacts one row 1-36 two rows 2-72		... surface S = selective gold-plated G = gold-plated Z = tin-plated		

### "S" selective gold-plated to 33.0 mm pin length

For interconnections of stacked PCBs. The male headers SL 13 and SL 14 are used to connect BL 11 (SL 13 ...) and BL 12 (SL 14 ...). Suitable for PCBs 1.5 mm - 3.0 mm thick.

V-notches permit breaking! Therefore any required number of contacts is available. Every pin length is available on request.



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A

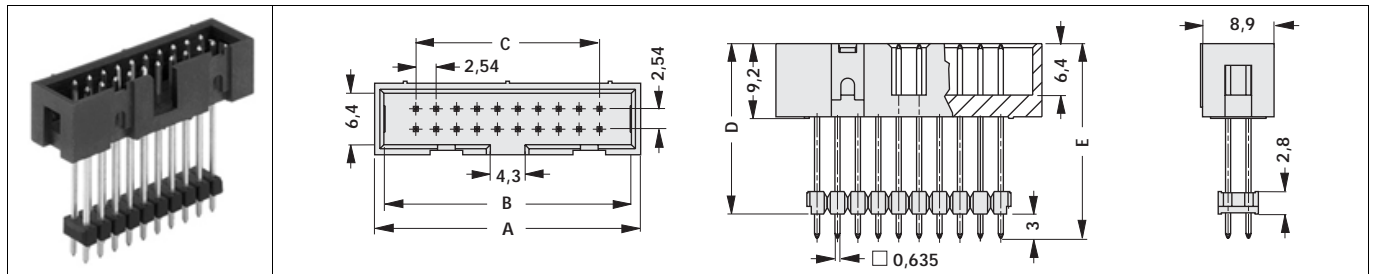
**Male headers soldering technique**

B

**Shroud male header, with coding, boltable**

suitable for many flat cable connectors in 2.54 mm pitch

C



D

art. no.	no. of contacts	dim. [mm]		
		A	B	C
<b>SLU 10 ...</b>	10	20.40	17.80	10.16
<b>SLU 16 ...</b>	16	28.00	25.40	17.78
<b>SLU 20 ...</b>	20	33.10	30.50	22.86
<b>SLU 26 ...</b>	26	40.70	38.10	30.48
<b>SLU 40 ...</b>	40	58.50	55.90	48.26
<b>SLU 50 ...</b>	50	71.20	68.60	60.96

F

please indicate:	... surface	... height "E"
	<b>S = selective gold-plated</b>	<b>165</b>
	<b>Z = tin-plated</b>	<b>191</b>
		<b>241</b>
		<b>266</b>

G

height "E"	dim. [mm]	
	D	E (max.)
<b>165</b>	13.50	16.50
<b>191</b>	16.10	19.10
<b>241</b>	21.10	24.10
<b>266</b>	23.60	26.60

H

I

K

L

M

N

**G 17**
**Technical data**  
 High-prec. fem. headers 2.54 sold.  
 Special male & female headers  
 Jumpers

 → G 75 - 80  
 → G 31 - 34  
 → G 19  
 → G 77 - 78

**Female headers 2.54 SMD**  
**Female headers 2.54 solder**  
**Fem. head. 2.54 solder, put through**  
**IDC-connectors**

 → G 46 - 49  
 → G 27  
 → G 29  
 → H 1 - 14

Male headers soldering technique

Three rows, □ 0.635 mm - standard

straight

art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
<b>SL KG 3 113 ...</b>	11.30	3.30	5.50	<b>SL KG 3 147 ...</b>	14.70	3.30	8.90
<b>SL KG 3 126 ...</b>	12.60	3.30	6.80				
<b>please indicate:</b>	... no. of contacts three rows 3-150			... surface G=gold-plated Z=tin-plated			

angled

art. no.	dim. [mm]			art. no.	dim. [mm]		
	A	B	C		A	B	C
<b>SL KA 3 072 ...</b>	7.20	3.30	3.40	<b>SL KA 3 108 ...</b>	10.80	3.30	7.00
<b>SL KA 3 085 ...</b>	8.50	3.30	4.70				
<b>please indicate:</b>	... no. of contacts three rows 3-150			... surface G=gold-plated Z=tin-plated			

IDC-connectors

Female headers 2.54 solder

Jumpers

Fem. head. 2.54 solder, put through

→ H 1 - 14

→ G 27

→ G 77 - 78

→ G 29

Female headers 2.54 SMD

Special male & female headers

High-prec. fem. headers 2.54 sold.

Technical data

→ G 46 - 49

→ G 19

→ G 31 - 34

→ G 75 - 80

G 18

A

B

C

D

E

F

G

H

I

K

L

M

N



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# Jumper links

## Grid spacing 2.54 mm, □ 0.635 mm

<b>art. no.</b>	dim. [mm]		
	A	C	
<b>LB SL 0508 ...</b>	5.08	6.10	
<b>LB SL 0762 ...</b>	7.62	6.10	
<b>LB SL 1016 ...</b>	10.16	6.10	
<b>LB SL 1524 ...</b>	15.24	6.10	
<b>please indicate:</b>	... surface <b>G = gold-plated</b> <b>Z = tin-plated</b>		

## Grid spacing 2.00 mm, □ 0.5 mm

<b>art. no.</b>	dim. [mm]		
	A	C	
<b>LB SLY 06 ...</b>	6.00	4.50	
<b>please indicate:</b>	... surface <b>G = gold-plated</b> <b>Z = tin-plated</b>		

Dimension "A" available in 4 versions. Dimension "C" variable (on request).

Jumper links are also available in grid spacing 1.27 mm.

V-notches permit breaking! Therefore any required number of contacts is available.

A

**High-precision female headers soldering technique**

 for  $\varnothing 0.5$  mm

<b>art. no.</b>          <b>MK 01 ...</b>			<b>art. no.</b>          <b>MK 201 ...</b>		
<b>art. no.</b>          <b>MK 17 ...</b>			<b>art. no.</b>          <b>MK 217 ...</b>		
<b>art. no.</b>          <b>MK 12 X 2 ...</b>			<b>art. no.</b>          <b>MK 212 X 2 ...</b>		
<b>art. no.</b>          <b>MK 13 X 1 ...</b> <b>MK 13 X 2 ...</b>			<b>art. no.</b>          <b>MK 213 X 1 ...</b> <b>MK 213 X 2 ...</b>		
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 1 - 50</b> <b>two rows 2 - 100</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>		

**contact spring:** gold-plated

K

L

M

N

**G 21**

 Special male & female headers  
 Single precision contacts  
 High-precision female headers  
 Jump. links 2.00 & 2.54 solder

 → G 19  
 → F 2 - 3  
 → G 3 - 5  
 → G 20

 Peel-off terminal strips  
 Single contacts metal strip  
 Technical data

 → G 25  
 → G 26  
 → G 75 - 80

# High-precision female headers soldering technique

for  $\varnothing 0.5$  mm

<p>art. no.</p> <p><b>MK 06 ...</b></p>			<p>art. no.</p>		
<p>art. no.</p> <p><b>MK 07 ...</b></p>			<p>art. no.</p> <p><b>MK 207 ...</b></p>		
<p>please indicate:</p>		<p>... no. of contacts</p> <p>one row 1 - 50</p> <p>two rows 2 - 100</p>		<p>... surface</p> <p>G = gold-plated</p> <p>Z = tin-plated</p>	

contact spring: gold-plated

A

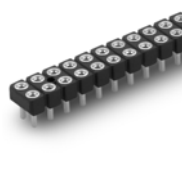
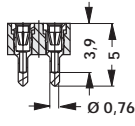
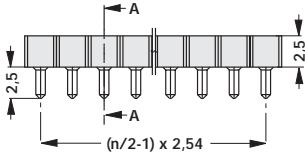
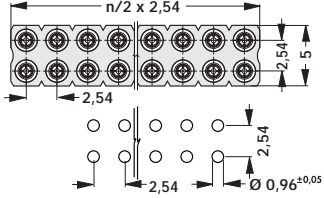
High precision female header in through-hole-reflow-soldering technique

B

High-precision female headers THR soldering technique for Ø 0.5 mm

THR: Through-Hole-Reflow-soldering technique, connector to be soldered with modified insert technique in Reflow-soldering method)

C

<p>art. no.  MK 228 THR ...</p>						
<p>please indicate:</p> <table> <tr> <td data-bbox="467 530 690 592">... no. of contacts two rows 2-40</td> <td data-bbox="878 530 1101 626">... surface <b>G</b>=gold-plated <b>Z</b>=tin-plated</td> </tr> </table>					... no. of contacts two rows 2-40	... surface <b>G</b> =gold-plated <b>Z</b> =tin-plated
... no. of contacts two rows 2-40	... surface <b>G</b> =gold-plated <b>Z</b> =tin-plated					

D

contact spring: gold-plated

E

F

G

H

I

K

L

M

N

G 23

Peel-off terminal strips  
 Single precision contacts  
 Mounting tool for DIL/PLCC  
 Technische Daten

→ G 25  
 → F 2 - 3  
 → F 14  
 → G 75 - 80

High-precis.male head.solder.techn. → G 4 - 18  
 High-prec.male head.in SMD mount. → G 35  
 Jump. links 2.00 & 2.54 solder → G 20

# High-precision female headers soldering technique

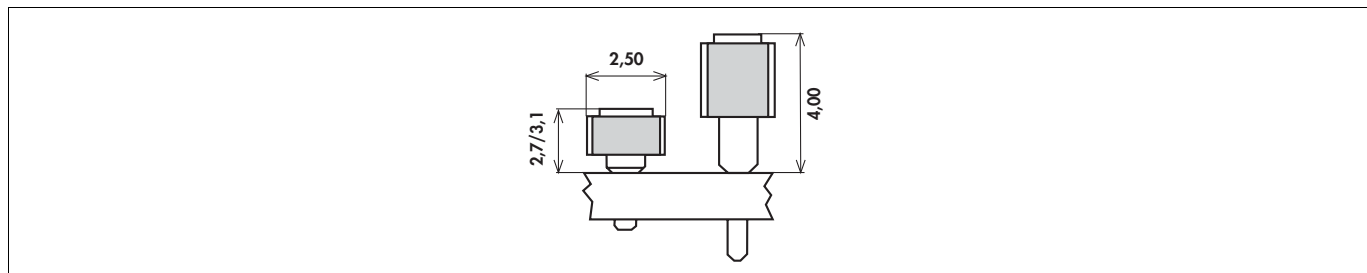
Low profile, less than 2.7/3.1 mm above P.C.B. - with contact spring for Ø 0.5 mm pins

solder and plug pin Ø 0.76 mm

<p>art. no.</p> <p><b>MK LP 18 ...</b></p>			<p>art. no.</p> <p><b>MK LP 218 ...</b></p>		
<p>art. no.</p> <p><b>MK LP 19 ...</b></p>			<p>art. no.</p> <p><b>MK LP 219 ...</b></p>		
<p>please indicate:</p> <p>... no. of contacts                  one row 1 - 50                  two rows 4 - 100</p> <p>... surface                  G = gold-plated                  Z = tin-plated</p>					

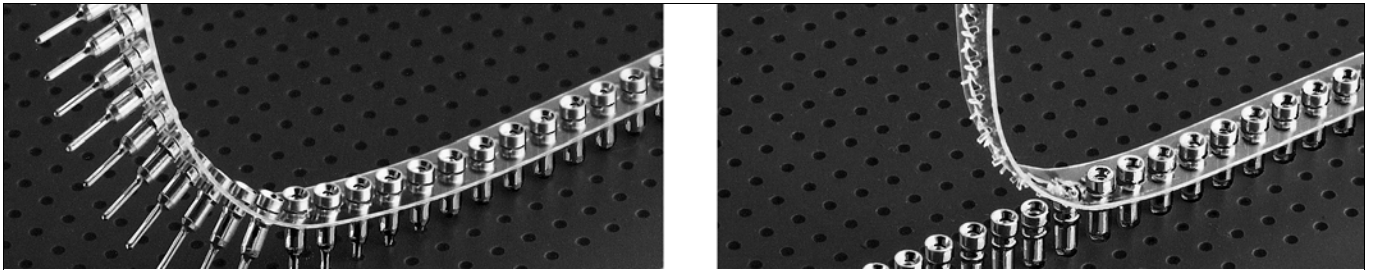
contact spring: gold-plated

Low profile: 2.7/3.1 mm above P.C.B.; standard profile: 4 mm



- |                                    |             |                                |        |
|------------------------------------|-------------|--------------------------------|--------|
| High-prec. fem. headers 2.54 sold. | → G 31 - 34 | Jump. links 2.00 & 2.54 solder | → G 20 |
| Single precision contacts          | → F 2 - 3   | Single contacts metal strip    | → G 26 |
| Technical data                     | → G 75 - 80 | Special male & female headers  | → G 19 |
| High-precision female headers      | → G 3 - 5   |                                |        |

**G 24**

**Terminal strips soldering technique**
**Peel-off**


High-precision contacts are mounted into a temperature resistant carrier strip, which will be peeled off after soldering.  
Specially equipped on request.

**Technical data of carrier foil:**

max. tensile strength (MD): 193 N/mm<sup>2</sup>

max. thermal expansion - longitudinal direction: 1.7 x 10<sup>-5</sup> mm/°C

melting point: 250 °C

<b>art. no.</b>		
<b>PO A ...</b>		
<b>art. no.</b>		
<b>PO B ...</b>		
<b>please indicate:</b>	<b>... no. of contacts</b> <b>customer's request</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>

**contact spring:** gold-plated

**number of contacts:** from 2 pins to endless

**G 25**

Special male & female headers  
Female headers 2.54 press-fit  
Single contacts metal strip  
Technical data

→ G 19  
→ G 53  
→ G 26  
→ G 75 - 80

Jump. links 2.00 & 2.54 solder  
Single precision contacts  
High-prec. male head.in SMD mount.  
Male headers 2.54 press-fit

→ G 20  
→ F 2 - 3  
→ G 35  
→ G 51

## Terminal strips soldering technique

### Single in-line carrier

art. no.		
art. no.		
art. no.		
<b>please indicate:</b>	<b>... no. of contacts</b> <b>one row 2 - 100</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>

contact spring: gold-plated

Female headers 2.54 press-fit  
Special male & female headers  
Jump. links 2.00 & 2.54 solder  
Technical data

→ G 53  
→ G 19  
→ G 20  
→ G 75 - 80

Peel-off terminal strips  
Single precision contacts  
Jump. links 2.00 & 2.54 solder  
Male headers 2.54 press-fit

→ G 25  
→ F 2 - 3  
→ G 20  
→ G 51

### G 26




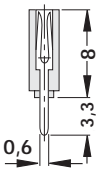
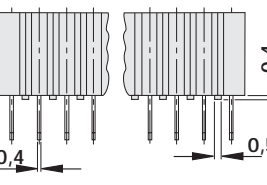
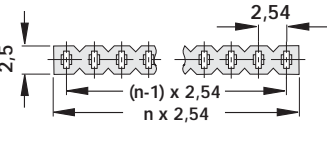

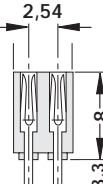
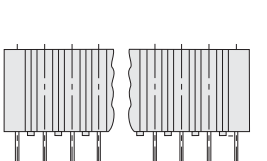
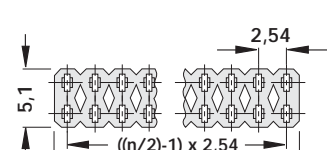
A

**Female headers soldering technique**

B

**Stamped contact spring (fork contact)**

for □ 0.635 mm, straight


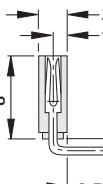
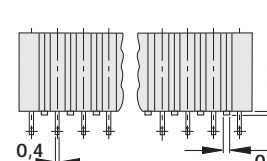
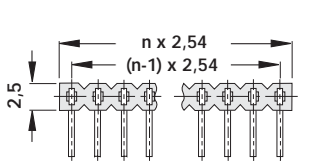

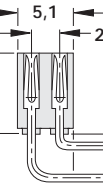
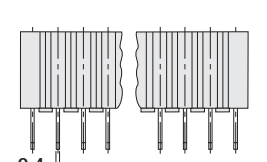
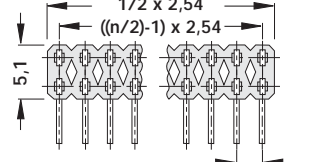
<b>art. no.</b>          <b>BL 1 ...</b>						
<b>art. no.</b>          <b>BL 2 ...</b>						
<p><b>please indicate:</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <p>... no. of contacts one row 1-36 two rows 2-72</p> </td> <td style="width: 50%; border: none;"> <p>... surface G = gold-plated Z = tin-plated</p> </td> </tr> </table>					<p>... no. of contacts one row 1-36 two rows 2-72</p>	<p>... surface G = gold-plated Z = tin-plated</p>
<p>... no. of contacts one row 1-36 two rows 2-72</p>	<p>... surface G = gold-plated Z = tin-plated</p>					

F

V-notches permit breaking! Therefore any required number of contacts is available.

G

for □ 0.635 mm, angled

<b>art. no.</b>          <b>BL 3 ...</b>						
<b>art. no.</b>          <b>BL 4 ...</b>						
<p><b>please indicate:</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <p>... no. of contacts one row 1-36 two rows 2-72</p> </td> <td style="width: 50%; border: none;"> <p>... surface G = gold-plated Z = tin-plated</p> </td> </tr> </table>					<p>... no. of contacts one row 1-36 two rows 2-72</p>	<p>... surface G = gold-plated Z = tin-plated</p>
<p>... no. of contacts one row 1-36 two rows 2-72</p>	<p>... surface G = gold-plated Z = tin-plated</p>					

K

V-notches permit breaking! Therefore any required number of contacts is available.

L

**BL 4 ...:** packing (option) bar magazine (min. 6 contacts)

M

N

**G 27**

High-prec. fem. headers 2.54 sold. → G 31 - 34  
 Female headers 2.54 press-fit → G 53  
 Technical data → G 75 - 80  
 Fem. head. 2.54 solder, put through → G 29

Female headers 2.54 SMD → G 46 - 49  
 Jump. links 2.00 & 2.54 solder → G 20  
 Direct female connectors → G 54 - 55

Female headers soldering technique

Low profile, fork contact

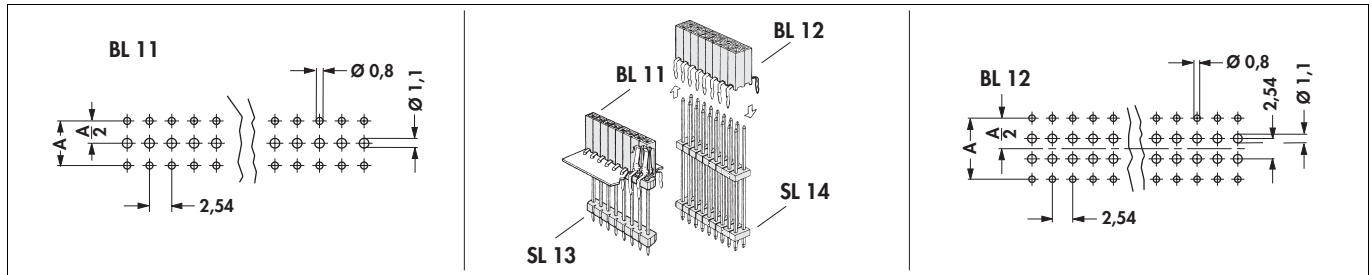
for □ 0.635 mm, straight

<p>art. no.</p> <p><b>BL LP 1 ...</b></p>				
<p>art. no.</p> <p><b>BL LP 2 ...</b></p>				
<p>art. no.</p> <p><b>BL LP 3 ...</b></p>				
<p>art. no.</p> <p><b>BL LP 4 ...</b></p>				
<p>please indicate:      ... no. of contacts                                            one row 1-36                                            two rows 2-72</p> <p>                                  ... surface                                            S = selective gold-plated                                            Z = tin-plated</p>				

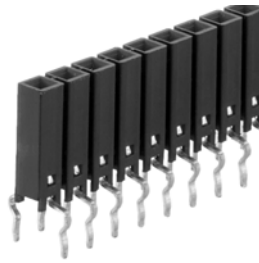
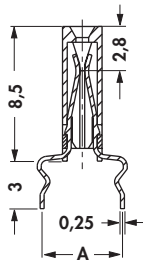
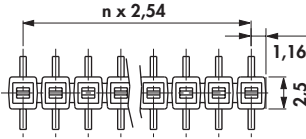
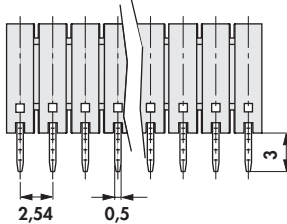
V-notches permit breaking! Therefore any required number of contacts is available.

**BL LP 4 ...:** packing (option) bar magazine (min. 6 contacts)

## Female headers soldering technique



for  $\square$  0.635 mm, can be put through from above or below / 260 °C Reflow

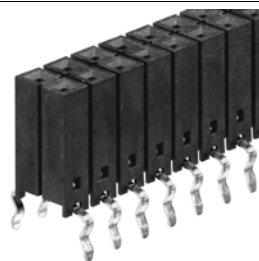
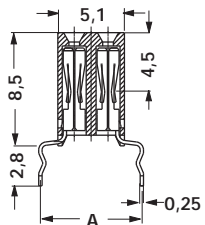
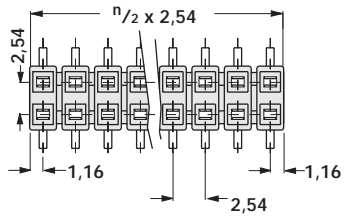
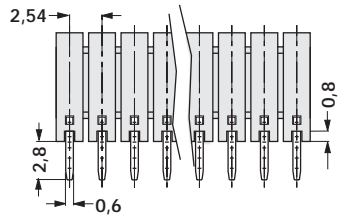
			
<b>art. no.</b>	dim. [mm]		
<b>BL 11 254 ...</b>	A		
<b>BL 11 508 ...</b>	2.54		
	5.08		
<b>please indicate:</b>	<b>... no. of contacts</b> one row 1 - 45	<b>... surface</b> <b>S</b> = selective gold-plated <b>Z</b> = tin-plated	

**packed:** bar magazine

Stamped contact spring.

Can be cut! Every desired number of contacts can be delivered.

for  $\square$  0,635 mm, can be put through from above or below

			
<b>art. no.</b>	dim. [mm]		
<b>BL 12 650 ...</b>	A		
<b>BL 12 762 ...</b>	6.50		
	7.62		
<b>please indicate:</b>	<b>... no. of contacts</b> two rows 2 - 90	<b>... surface</b> <b>S</b> = selective gold-plated <b>Z</b> = tin-plated	

**packed:** bar magazine

Stamped contact spring.

Can be cut! Every desired number of contacts can be delivered.

**G 29**

Male headers 2.54 solder  
Male headers 2.54 SMD  
Technical data  
Special male & female headers

→ G 8  
→ G 37 - 42  
→ G 75 - 80  
→ G 19

Male headers 2.00 SMD  
Male headers 2.00 solder  
High-prec. fem. headers 2.54 sold.  
Female headers 2.54 solder

→ G 61 - 62  
→ G 56 - 58  
→ G 31 - 34  
→ G 27

## Female headers soldering technique

for  $\square$  0,635 mm, can be put through from above

<p><b>art. no.</b></p>	<p>dim. [mm] A</p>	
<p><b>BL 21 650 ...</b></p>	<p>6.50</p>	
<p><b>BL 21 762 ...</b></p>	<p>7.62</p>	
<p><b>please indicate:</b></p>	<p><b>... no. of contacts</b> two rows 2-64</p>	<p><b>... surface</b> <b>S = selective gold-plated</b> <b>Z = tin-plated</b></p>

**packed:** bar magazine

Stamped contact spring.

Can be cut! Every desired number of contacts can be delivered.

A

**High-precision female headers soldering technique**

 for  $\square$  0.635 mm and up to 0.85 mm  $\varnothing$ 

<b>art. no.</b>          <b>BL 5 ...</b>			
<b>art. no.</b>          <b>BL 6 ...</b>			
<b>art. no.</b>          <b>BL KG 3 ...</b>			
<b>art. no.</b>          <b>BL 7 ...</b>			
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 1-36</b> <b>two rows 2-72</b> <b>three rows 9-96</b>	
<b>art. no.</b>          <b>BL 8 ...</b>			
<b>please indicate:</b>		<b>... no. of contacts</b> <b>two rows 4-72</b>	

**contact shell surface:** tin-plated

**contact spring:** gold-plated

**BL 8 ...:** packing (option) bar magazine (min. 6 contacts)

No capillary action when soldering due to protected contact insert.

V-notches permit breaking! Therefore any required number of contacts is available.

**G 31**
**Female headers 2.00 solder**  
**Female headers 2.00 SMD**  
**Technical data**  
**High-precision female headers**

 → G 60  
 → G 64  
 → G 75 - 80  
 → G 3 - 5

**Male headers 2.00 solder**  
**Male headers 2.54 solder**  
**Male headers 2.54 SMD**

 → G 56 - 58  
 → G 8  
 → G 37 - 42

N

# High-precision female headers soldering technique

for □ 0.635 mm and up to 0.85 mm Ø

<p>art. no.</p> <p><b>MK 21 ...</b></p>			
<p>art. no.</p> <p><b>MK 221 ...</b></p>			
<p><b>please indicate:</b></p>		<p><b>... no. of contacts</b>  <b>one row 1 - 50</b>  <b>two rows 2 - 100</b></p>	

**contact shell surface:** tin-plated

**contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.


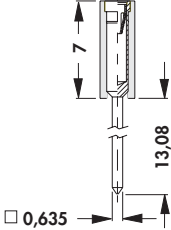
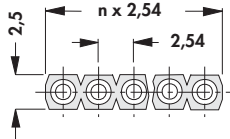

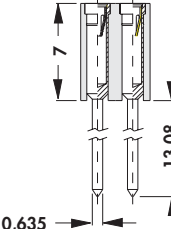
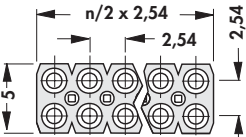
V-notches permit breaking! Therefore any required number of contacts is available.

A

## High-precision female headers soldering technique

for  $\square$  0.635 mm and up to 0.85 mm  $\varnothing$

with aligned contact pin

<b>art. no.</b>          <b>BL 9 ...</b>		 	
<b>art. no.</b>          <b>BL 10 ...</b>		 	
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 1-36</b> <b>two rows 2-72</b>	

**contact shell surface:** tin-plated


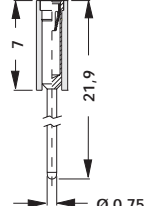
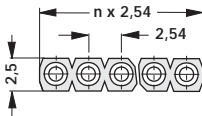

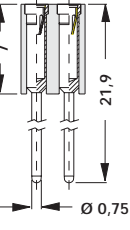
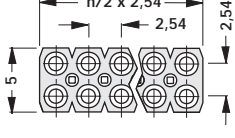
**contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.

V-notches permit breaking! Therefore any required number of contacts is available.

G

for PC 104 modules

<b>art. no.</b>          <b>BL 13 ...</b>		 	
<b>art. no.</b>          <b>BL 14 ...</b>		 	
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 1-36</b> <b>two rows 2-72</b>	

**contact shell surface:** gold-plated

**contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.

V-notches permit breaking! Therefore any required number of contacts is available.

M

N

**G 33**

Male headers 2.00 solder  
 High-precision female headers  
 Male headers 2.54 solder  
 Male headers 2.54 SMD

→ G 56 - 58  
 → G 3 - 5  
 → G 8  
 → G 37 - 42

Female headers 2.00 solder  
 Female headers 2.00 SMD  
 Technical data

→ G 60  
 → G 64  
 → G 75 - 80

# High-precision female headers soldering technique

for □ 0.635 mm and up to 0.85 mm Ø - for PC 104 modules

one row, 1-36 contacts

<b>art. no.</b>	dim. [mm]	
	A	
<b>BL 18 141 ...</b>	14.10	
<b>BL 18 219 ...</b>	21.90	
<b>please indicate:</b>	<b>... no. of contacts one row 1-36</b>	

two rows, 2-72 contacts

<b>art. no.</b>	dim. [mm]	
	A	
<b>BL 19 141 ...</b>	14.10	
<b>BL 19 219 ...</b>	21.90	
<b>please indicate:</b>	<b>... no. of contacts two rows 2-72</b>	

**contact shell surface and contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.

V-notches permit breaking! Therefore any required number of contacts is available.

Technical data → G 75 - 80  
 Female headers 2.00 solder → G 60  
 Female headers 2.00 SMD → G 64  
 High-prec. male headers 2.54 solder → G 5 - 21

Male headers 2.00 solder  
 Male headers 2.54 solder  
 Male headers 2.54 SMD

→ G 56 - 58  
 → G 8  
 → G 37 - 42

**G 34**

A

B

C

D

E

F

**G**

H

I

K

L

M

N



A

**High-precision male headers in SMD mounting**

B

C

D

E

F

<b>art. no.</b>          <b>MK 26 SMD ...</b>					
<b>please indicate:</b>	<b>... no. of contacts</b> <b>one row 4-20</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	<b>... packing (option)</b> <b>SM = bar magazine</b> <b>B SM = pick and place pad and bar magazine</b>		
<b>art. no.</b>          <b>MK 226 SMD ...</b>					
<b>please indicate:</b>	<b>... no. of contacts</b> <b>two rows 4-40</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	<b>... packing (option)</b> <b>SM = bar magazine 6 pol.</b> <b>B SM = pick and place pad and bar magazine</b>		

... packing (option) - additions: MK 226 SMD ... SM and ... B SM: 6-40 contacts

For further informations please see "for automatic assembly" following this series!

G

H

I

K

L

M

<b>art. no.</b>          <b>MK 27 SMD ...</b>					
<b>please indicate:</b>	<b>... no. of contacts</b> <b>one row 2-20</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>			

N

**G 35**

 Female headers 2.54 solder  
 Female headers 2.54 SMD  
 Female headers 2.54 press-fit  
 Female headers 1.27 SMD

 → G 27  
 → G 46 - 49  
 → G 53  
 → G 74

 Female headers 2.00 SMD  
 High-precision female headers

 → G 64  
 → G 3 - 5

**High-precision male headers in SMD mounting**

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## Male headers in SMD mounting

□ 0.635 mm

<b>art. no.</b>	dim. [mm]		
	C		
<b>SL 10 SMD 040 ...</b>	4.00		
<b>SL 10 SMD 052 ...</b>	5.50		
<b>SL 10 SMD 062 ...</b>	6.70		
<b>SL 10 SMD 078 ...</b>	8.20		
<b>SL 10 SMD 104 ...</b>	10.80		
<b>SL 10 SMD 130 ...</b>	13.40		
<b>please indicate:</b>	<b>... no. of contacts</b> one row 4-20	<b>... surface</b> S = sel. gold-plated G = gold-plated Z = tin-plated	<b>... packing (option)</b> SM = bar magazine B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (250 pcs/reel)
<b>art. no.</b>	dim. [mm]		
	C		
<b>SL 11 SMD 040 ...</b>	4.00		
<b>SL 11 SMD 052 ...</b>	5.50		
<b>SL 11 SMD 062 ...</b>	6.70		
<b>SL 11 SMD 078 ...</b>	8.20		
<b>SL 11 SMD 104 ...</b>	10.80		
<b>SL 11 SMD 130 ...</b>	13.40		
<b>please indicate:</b>	<b>... no. of contacts</b> two rows 4-40	<b>... surface</b> S = sel. gold-plated G = gold-plated Z = tin-plated	<b>... packing (option)</b> SM = bar magazine B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (250 pcs/reel)

... packing (option) - additions:

SL 10 SMD 052-104 ...: ... SM; ... B SM, 4-20 contacts

SL 10 SMD 052-078 ...: ... B TR, 4-12 contacts

SL 11 SMD 052-104 ...: ... SM; ... B SM, 6-40 contacts

**Male headers in SMD mounting****SL 11 SMD 052-078 ...: ... B TR, 6-24 contacts****For further informations please see "for automatic assembly" following this series!****Male headers 2.54 solder**  
**Male headers 2.00 SMD**  
**Single contacts metal strip**  
**Technical data**→ **G 8**  
→ **G 61 - 62**  
→ **G 26**  
→ **G 75 - 80****High-prec. fem. headers 2.54 sold.**  
**Female headers 2.00 SMD**  
**Female headers 2.54 press-fit**  
**Jumpers**→ **G 31 - 34**  
→ **G 64**  
→ **G 53**  
→ **G 77 - 78****G 38**

A

**Male headers in SMD mounting**
 **0.635 mm**

<b>art. no.</b>	surface	dim. [mm]	
		B	C
<b>SL 12 SMD 031 ...</b>	<i>S/ G/ Z</i>	5.20	3.10
<b>SL 12 SMD 032 ...</b>	<i>G/ Z</i>	3.20	5.80
<b>SL 12 SMD 058 ...</b>	<i>S/ G/ Z</i>	5.20	5.80
<b>SL 12 SMD 083 ...</b>	<i>S/ G/ Z</i>	5.20	8.30
<b>SL 12 SMD 109 ...</b>	<i>S/ G/ Z</i>	5.20	10.90
<p> <b>please indicate:</b>    ... <b>no. of contacts</b>                                              <b>one row 2-20</b> </p> <p>                                             ... <b>surface</b>  <b>S = sel. gold-plated</b>  <b>G = gold-plated</b>  <b>Z = tin-plated</b> </p> <p>                                             ... <b>packing (option)</b>  <b>B SM = pick and place pad and bar magazine</b>  <b>B TR = pick and place pad and tape and reel (500 pcs/reel)</b> </p>			
<b>art. no.</b>	dim. [mm]		
	C		
<b>SL 17 SMD 058 ...</b>	5.80		
<b>SL 17 SMD 083 ...</b>	8.30		
<b>SL 17 SMD 109 ...</b>	10.90		
<p> <b>please indicate:</b>    ... <b>no. of contacts</b>                                              <b>two rows 4-40</b> </p> <p>                                             ... <b>surface</b>  <b>G = gold-plated</b>  <b>Z = tin-plated</b> </p> <p>                                             ... <b>packing (option)</b>  <b>B SM = pick and place pad and bar magazine</b>  <b>B TR = pick and place pad and tape and reel (300 pcs/reel)</b> </p>			

... packing (option) - additions:

**SL 12 SMD ... B TR: 2-13 contacts**  
**SL 17 SMD ... B TR: 6-24 contacts**

For further informations please see "for automatic assembly" following this series!

M

N

**G 39**

 Female headers 2.54 press-fit  
 Female headers 2.00 SMD  
 Jumpers  
 Technical data

 → G 53  
 → G 64  
 → G 77 - 78  
 → G 73 - 78

 High-prec. fem. headers 2.54 sold.  
 Male headers 2.54 solder  
 Male headers 2.00 SMD  
 Male headers 2.54 solder

 → G 31 - 34  
 → G 8  
 → G 61 - 62  
 → G 8

Male headers in SMD mounting

Low profile in SMD □ 0.635 mm

<b>art. no.</b>	dim. [mm] C	<b>art. no.</b>	dim. [mm] C
<b>SL LP 5 SMD 038 ...</b>	3.80	<b>SL LP 5 SMD 066 ...</b>	6.60
<b>SL LP 5 SMD 051 ...</b>	5.10		
<p><b>please indicate:</b></p> <p>... <b>no. of contacts</b> one row 4-20</p> <p>... <b>surface</b> S = sel. gold-plated G = gold-plated Z = tin-plated</p> <p>... <b>packing (option)</b> SM = bar magazine B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (250 pcs/reel)</p>			
<b>art. no.</b>	dim. [mm] C	<b>art. no.</b>	dim. [mm] C
<b>SL LP 6 SMD 038 ...</b>	3.80	<b>SL LP 6 SMD 066 ...</b>	6.60
<b>SL LP 6 SMD 051 ...</b>	5.10		
<p><b>please indicate:</b></p> <p>... <b>no. of contacts</b> two rows 4-40</p> <p>... <b>surface</b> S = sel. gold-plated G = gold-plated Z = tin-plated</p> <p>... <b>packing (option)</b> SM = bar magazine B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (250 pcs/reel)</p> <p>... <b>position (option)</b> PS = locating pin (2 pcs/bar bigger than 6 contacts)</p>			

... packing (option) - additions:

SL LP 5 SMD ...: ... SM; ... B SM; 4-20 contacts

SL LP 5 SMD ...: ... B TR, 4-12 contacts

SL LP 6 SMD ...: ... SM; ... B SM; 6-40 contacts

SL LP 6 SMD ...: ... B TR, 6-24 contacts

For further informations please see "for automatic assembly" following this series!

Female headers 1.27 solder  
Female headers 2.00 SMD  
Jumpers  
Technical data

→ G 70  
→ G 64  
→ G 77 - 78  
→ G 75 - 80

High-prec. fem. headers 1.27 solder → G 72  
High-prec. male head. 1.27 solder → G 71  
Male headers 2.00 solder → G 56 - 58

G 40

A

B

C

D

E

F

G

H

I

K

L

M

N

A



2.54

**Male headers in SMD mounting**

B

Empty page

C

D

E

F

**G**

H

I

K

L

M

N

Male headers in SMD mounting

□ 0.635 mm – for interconnections of stacked PCBs

one row, 4-20 contacts

<b>art. no.</b>	dim. [mm]								
	A								
<b>SL 15 SMD 107 ...</b>	10.70								
<b>SL 15 SMD 182 ...</b>	18.20								
<b>SL 15 SMD 207 ...</b>	20.70								
<b>please indicate:</b>	<b>... no. of contacts</b> one row 4-20	<b>... surface</b> S = sel. gold-plated G = gold-plated Z = tin-plated	<b>... position (option)</b> P = end pins straight for positioning						

Male headers 2.00 SMD

High-prec. male headers 1.27 SMD

Male headers 2.54 solder

Technical data

→ G 61 - 62

→ G 75

→ G 8

→ G 75 - 80

Jumpers

High-prec. fem. headers 2.54 sold.

Female headers 2.00 SMD

Female headers 2.54 press-fit

→ G 77 - 78

→ G 31 - 34

→ G 64

→ G 53

**G 42**

A

B

C

D

E

F

G

H

I

K

L

M


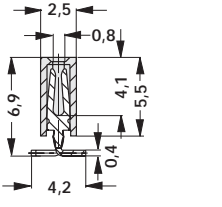
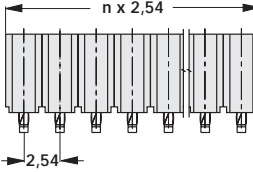
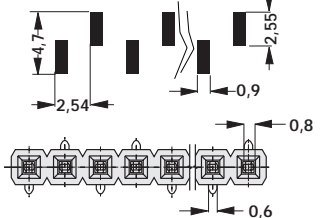
N



A

**High-precision female headers in SMD mounting**

for □ 0.635 mm and up to 0.85 mm Ø

<b>art. no.</b>          <b>BL LP 5 SMD ...</b>				
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 4-20</b>		<b>... packing (option)</b> <b>SM = bar magazine</b> <b>B SM = pick and place pad and bar magazine</b> <b>B TR = pick and place pad and tape and reel</b> <b>(250 pcs/reel)</b>

D

E

F

G

H

I

K


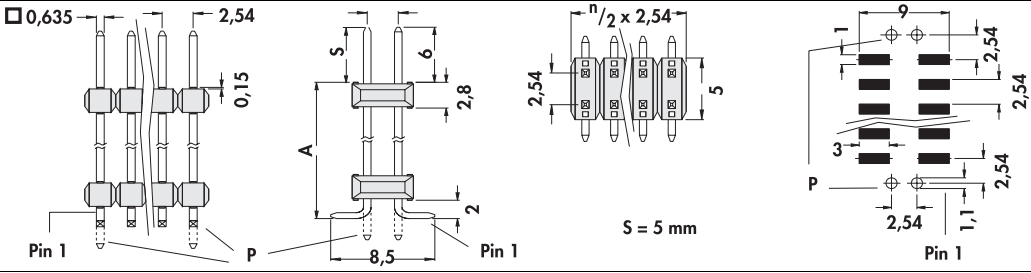
L

M

N

**Male headers in SMD mounting**

two rows, 4-40 contacts

			
<b>art. no.</b>	dim. [mm] A		
<b>SL 16 SMD 107 ...</b>	10.70		
<b>SL 16 SMD 157 ...</b>	15.70		
<b>SL 16 SMD 182 ...</b>	18.20		
<b>SL 16 SMD 207 ...</b>	20.70		
<b>SL 16 SMD 247 ...</b>	24.70		
<b>please indicate:</b>	... <b>no. of contacts</b> two rows 4-40	... <b>surface</b> S = sel. gold-plated G = gold-plated Z = tin-plated	... <b>position (option)</b> P = end pins straight for positioning

Within the total length the insulator can be changed according to customer's request.

A


**High-precision female headers in SMD mounting**

B

C

D

E

F

G

H


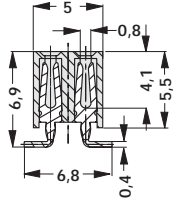
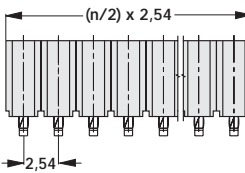
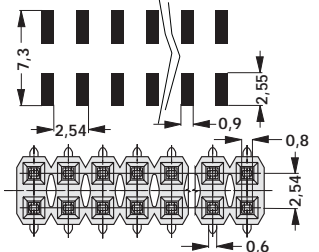
I

K

L

M

N

<b>art. no.</b>          <b>BL LP 6 SMD ...</b>				
<b>please indicate:</b>	<b>... no. of contacts</b> <b>two rows 4-40</b>	<b>... packing (option)</b> <b>SM = bar magazine</b> <b>B SM = pick and place pad and bar magazine</b> <b>B TR = pick and place pad and tape and reel</b> <b>(250 pcs/reel)</b>		

# High-precision female headers in SMD mounting

for □ 0.635 mm and up to 0.85 mm Ø

<b>art. no.</b>	dim. [mm]
	A B C
<b>BL 15 SMD 043...</b>	4.30 5.00 2.50
<b>BL 15 SMD 089...</b>	8.90 9.50 4.80
<b>please indicate:</b>	... no. of contacts one row 4-20
	... packing (option) SM = bar magazine B SM = pick and place pad and bar magazine
<b>art. no.</b>	dim. [mm]
	A B C
<b>BL 16 SMD 067 ...</b>	6.70 7.50 2.50
<b>BL 16 SMD 113 ...</b>	11.30 12.00 4.80
<b>please indicate:</b>	... no. of contacts two rows 4-40
	... packing (option) SM = bar magazine B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (250 pcs/reel)
	... position (option) PS = locating pin (2 pcs/bar bigger than 6 contacts)

**contact shell surface:** tin-plated

**contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.

V-notches permit breaking! Therefore any required number of contacts is available.

**... packing (option) - additions:**

**BL 16 SMD ... B TR: 6-24 contacts**

**For further informations please see "for automatic assembly" following this series!**

Female headers 1.27 SMD → G 74  
 Female headers 2.00 SMD → G 64  
 Female headers 2.54 press-fit → G 53  
 Fem. head. 2.54 solder, put through → G 29

Technical data → G 75 - 80  
 Male headers 2.54 solder → G 8  
 Male headers 2.54 SMD → G 37 - 42

**G 46**

A

B

C

D

E

F

**G**

H

I

K

L

M

N

A

## High-precision female headers in SMD mounting

for □ 0.635 mm and up to 0.85 mm Ø

<b>art. no.</b>          <b>BL 17 SMD ...</b>					
<b>art. no.</b>          <b>BL 20 SMD ...</b>					
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 2-20</b> <b>two rows 4-40</b>		<b>... packing (option)</b> <b>SM = bar magazine</b>	
<b>art. no.</b>          <b>MK 22 SMD ...</b>					
<b>art. no.</b>          <b>MK 222 SMD ...</b>					
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 4-20</b> <b>two rows 4-40</b>		<b>... packing (option)</b> <b>B SM = pick and place pad and bar magazine</b>	
<b>art. no.</b>          <b>MK 24 SMD ...</b>					
<b>please indicate:</b>		<b>... no. of contacts</b> <b>one row 2-20</b>			

**contact shell surface:** tin-plated; **contact spring:** gold-plated  
 No capillary action when soldering due to protected contact insert.

**... packing (option) - additions:**

**BL 17 SMD ... SM:** 5-20 contacts; **BL 20 SMD ... SM:** 10-40 contacts

**For further informations please see "for automatic assembly" following this series!**

**G 47**

Technical data  
 Male headers 2.54 solder  
 Male headers 2.54 SMD  
 Fem. head. 2.54 solder, put through

→ G 75 - 80  
 → G 8  
 → G 37 - 42  
 → G 29

Female headers 1.27 SMD  
 Female headers 2.00 SMD  
 Female headers 2.54 press-fit

→ G 74  
 → G 64  
 → G 53

N

**High-precision female headers in SMD mounting**

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A

B

C

D

E

F

**G**

H

I

K

L

M

N

A

**High-precision female headers in SMD mounting**
**for Ø 0.5 mm**

one and two rows

<b>art. no.</b>  <b>MK 23 SMD ...</b>				
<b>art. no.</b>  <b>MK 223 SMD ...</b>				
<b>please indicate:</b>		<b>... no. of contacts</b> one row 4-20 two rows 4-40	<b>... packing (option)</b> <b>B SM = pick and place pad and bar magazine</b>	

Two row

<b>art. no.</b>  <b>MK 220 SMD ...</b>				
<b>please indicate:</b>		<b>... no. of contacts</b> two rows 4-40	<b>... packing (option)</b> <b>B SM = pick and place pad and bar magazine</b> <b>B TR = pick and place pad and tape and reel</b> <b>(4-12 contacts 800 pcs/reel, 4-12 contacts; 14-40 contacts 500 pcs/reel)</b>	

**For further informations please see "for automatic assembly" following this series!**

one row

<b>art. no.</b>  <b>MK 25 SMD ...</b>				
<b>please indicate:</b>		<b>... no. of contacts</b> one row 2-20		

**contact shell surface:** tin-plated

**contact spring:** gold-plated

**G 49**
**Fem. head. 2.54 solder, put through** → G 29  
**Technical data** → G 75 - 80  
**Female headers 1.27 SMD** → G 74  
**Female headers 2.00 SMD** → G 64

**Female headers 2.54 press-fit** → G 53  
**High-precision female headers** → G 3 - 5  
**Female headers 2.54 solder** → G 27

N

High-precision female headers in SMD mounting


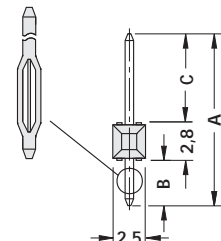
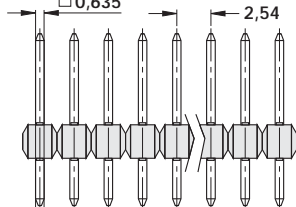
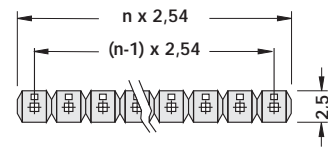
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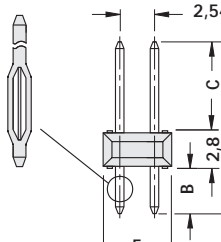
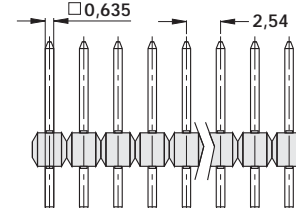
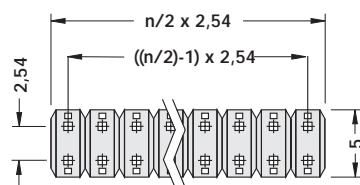
## Connectors in press-fit mounting

## Male connectors

one row, 1-36 contacts, for PCB thickness  $\geq 1.6$  mm dimension B = 3.5 mm and  $\geq 3.0$  mm dimension B = 4.5 mm

			
art. no.	dim. [mm]		
	A	B	C
SLP 1 16 117 ...	11.70	3.50	5.40
SLP 1 16 129 ...	12.90	3.50	6.60
SLP 1 16 144 ...	14.40	3.50	8.10
SLP 1 16 195 ...	19.50	3.50	13.20
SLP 1 32 139 ...	13.90	4.50	6.60
SLP 1 32 164 ...	16.40	4.50	9.10
<b>please indicate:</b>	<b>... no. of contacts</b> <b>one row 1-36</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	

two rows, 2-72 contacts, for PCB thickness  $\geq 1.6$  mm dimension B = 3.5 mm and  $\geq 3.0$  mm dimension B = 4.5 mm

			
art. no.	dim. [mm]		
	A	B	C
SLP 2 16 117 ...	11.70	3.50	5.40
SLP 2 16 129 ...	12.90	3.50	6.60
SLP 2 16 144 ...	14.40	3.50	8.10
SLP 2 16 195 ...	19.50	3.50	13.20
SLP 2 32 139 ...	13.90	4.50	6.60
SLP 2 32 164 ...	16.40	4.50	9.10
<b>please indicate:</b>	<b>... no. of contacts</b> <b>two rows 2-72</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>	

**contact material:** Cu Sn 6

Press-fit mounting without soldering, resilient press-fit area, easy insertion into PCB. V-notches permit breaking!

Any required number of contacts available.

**PCB layout please see BLP ...**

**G 51**

**Technical data**  
Jumpers  
Female headers 2.54 press-fit  
Programmable headers

→ G 73 - 78  
→ G 77 - 78  
→ G 53  
→ F 23

**Male headers 2.00 solder**  
**Single contacts metal strip**  
**Male headers 2.54 solder**

→ G 56 - 58  
→ G 26  
→ G 8

Connectors in press-fit mounting

Male header with shroud

suitable for bolttable female header VFL, can be combined with many other female headers with grid spacing 2,54 mm (e. g.: PV, BL)

	<b>art. no.</b>	no. of contacts	dim. [mm]			
		A	B	C	D	E (max.)
<b>SLUP 31 10 ...</b>	10	20.40	17.80	10.16	12.60	3.50
<b>SLUP 31 16 ...</b>	16	28.00	25.40	17.78	12.60	3.50
<b>SLUP 31 20 ...</b>	20	33.10	30.50	22.86	12.60	3.50
<p><b>please indicate:</b> ... <b>surface</b>  <b>G = gold-plated</b>  <b>Z = tin-plated</b></p>						

**contact material:** Cu Sn 6


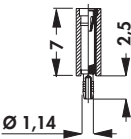
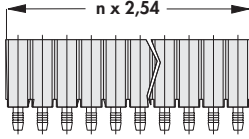
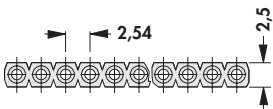

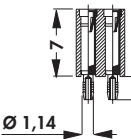
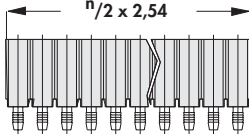
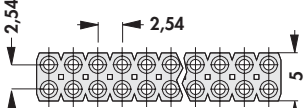
Press-fit mounting without soldering, resilient press-fit area, easy insertion into PCB.

**PCB layout please see BLP ...**

## Connectors in press-fit mounting

## High-precision female headers □ 0,635 mm and pins up to 0,85 mm Ø

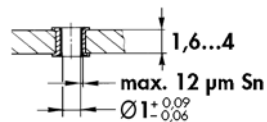
Press-fit mounting without soldering, resilient press-fit area.

art. no.  <b>BLP 1 ...</b>				
art. no.  <b>BLP 2 ...</b>				
please indicate:		... no. of contacts one row 1-36 two rows 2-72		

**contact-insert:** gold-plated**contact shell:** tin-plated

V-notches permit breaking! Therefore any required numbers of contacts are available.

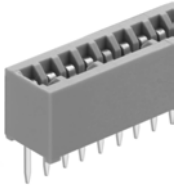
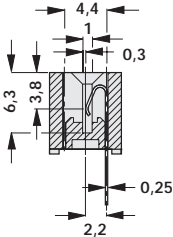
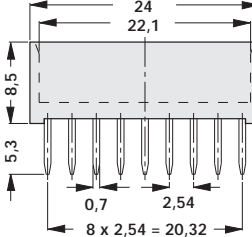
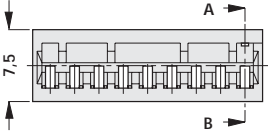
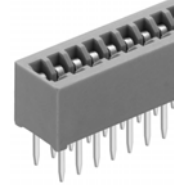
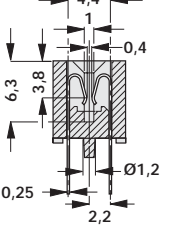
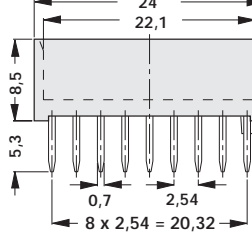
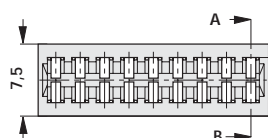
## Hole diameter in PCB - PCB hole structure acc. to DIN EN 60352-5



Direct female connector

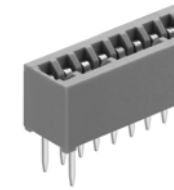
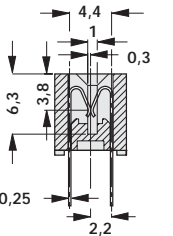
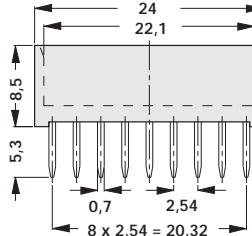
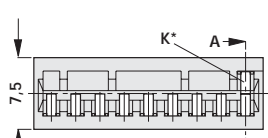
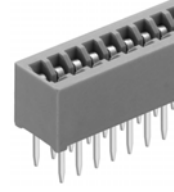
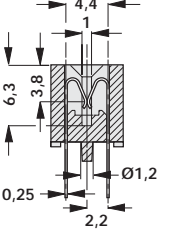
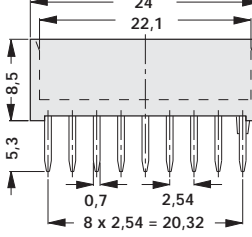
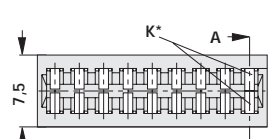
Without short circuit contact for PCB thickness: 0.7-0.9 mm

for removable connection of digital displays, coding switches, impulse counters

<p>art. no.</p> <p><b>DF 1 OK 9 Z</b></p>		 <p>A-B</p>		
<p>art. no.</p> <p><b>DF 2 OK 9 Z</b></p>		 <p>A-B</p>		

With short circuit contact for PCB thickness: 0.7-0.9 mm

for removable connection of digital displays, coding switches, impulse counters

<p>art. no.</p> <p><b>DF 1 MK 9 Z</b></p>		 <p>A-B</p>		
<p>art. no.</p> <p><b>DF 2 MK 9 Z</b></p>		 <p>A-B</p>		

K\* = arcing contact

Female headers 2.54 solder  
IDC-connectors  
Male con./fem. con. 6.00 solder  
Technical data

→ G 27  
→ G 19  
→ G 2  
→ G 75 - 80

Male headers 2.54 SMD  
Male headers 2.54 solder

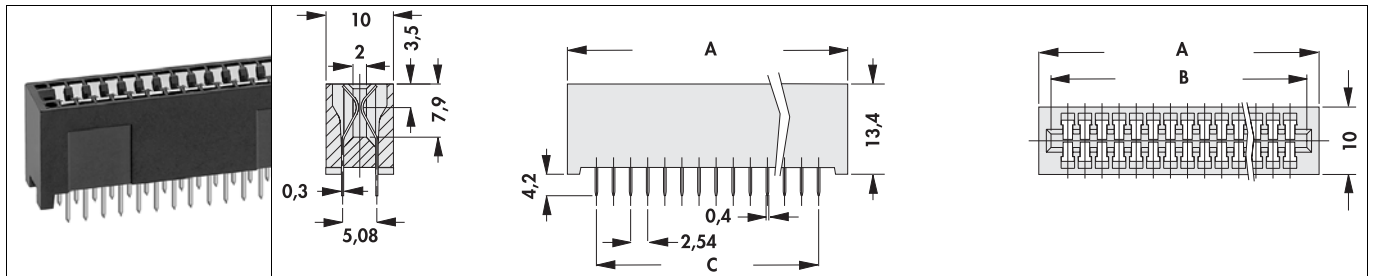
→ G 37 - 44  
→ G 8

**G 54**

A


**Direct female connector**

for PCB thickness: 1.4-1.8 mm



art. no.	no. of contacts	dim. [mm]		
		A	B	C
<b>DF OB 06</b>	12	21.33	17.70	12.70
<b>DF OB 07</b>	14	23.87	20.24	15.24
<b>DF OB 10</b>	20	31.49	27.86	22.86
<b>DF OB 17</b>	34	49.27	45.64	40.64
<b>DF OB 18</b>	36	51.81	48.18	43.18

**contact surface finish:** tin-plated

F

G

H

I

K

L

M

N

**G 55**

Male headers 2.54 solder  
 Screw fastening  
 Male con./fem. con. 6.00 solder  
 Technical data

→ G 8  
 → I 28  
 → G 2  
 → G 75 - 80

Special male & female headers  
 Female headers 2.54 solder

→ G 19  
 → G 27

Male headers soldering technique

□ 0.5 mm, straight

	<p>S = 3,5 mm</p>		
<p><b>art. no.</b></p>	<p>dim. [mm]</p>		
<p><b>SLY 1 081 ...</b></p>	<p>A</p> <p>8.10</p>	<p>B</p> <p>3.00</p>	<p>C</p> <p>3.60</p>
<p><b>SLY 1 085 ...</b></p>	<p>8.50</p>	<p>3.00</p>	<p>4.00</p>
<p><b>SLY 1 098 ...</b></p>	<p>9.80</p>	<p>3.00</p>	<p>5.30</p>
<p><b>SLY 1 104 ...</b></p>	<p>10.40</p>	<p>3.00</p>	<p>5.90</p>
<p><b>SLY 1 139 ... G</b></p>	<p>13.90</p>	<p>3.00</p>	<p>9.40</p>
<p><b>SLY 1 139 ... Z</b></p>	<p>13.90</p>	<p>3.00</p>	<p>9.40</p>
<p><b>please indicate:</b></p> <p>... no. of contacts one row 1 - 50</p> <p>... surface S = selective gold-plated G = gold-plated Z = tin-plated</p>			
	<p>S = 3,5 mm</p>		
<p><b>art. no.</b></p>	<p>dim. [mm]</p>		
<p><b>SLY 2 081 ...</b></p>	<p>A</p> <p>8.10</p>	<p>B</p> <p>3.00</p>	<p>C</p> <p>3.60</p>
<p><b>SLY 2 085 ...</b></p>	<p>8.50</p>	<p>3.00</p>	<p>4.00</p>
<p><b>SLY 2 098 ...</b></p>	<p>9.80</p>	<p>3.00</p>	<p>5.30</p>
<p><b>SLY 2 104 ...</b></p>	<p>10.40</p>	<p>3.00</p>	<p>5.90</p>
<p><b>SLY 2 139 ... G</b></p>	<p>13.90</p>	<p>3.00</p>	<p>9.40</p>
<p><b>SLY 2 139 ... Z</b></p>	<p>13.90</p>	<p>3.00</p>	<p>9.40</p>
<p><b>please indicate:</b></p> <p>... no. of contacts two rows 4 - 100</p> <p>... surface S = selective gold-plated G = gold-plated Z = tin-plated</p>			

A

**Male headers soldering technique**
 **0.5 mm, angled**

<b>art. no.</b>	<b>dim. [mm]</b>		
<b>SLY 3 035 ...</b>	A 1.50	B 2.80	C 3.50
<b>SLY 3 041 ...</b>	A 1.50	B 2.80	C 4.10
<b>SLY 3 082 ...</b>	A 1.50	B 2.80	C 8.20
<b>please indicate:</b>	<b>... no. of contacts one row 1-50</b>		<b>... surface</b> <b>S = selective gold-plated</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>
<b>art. no.</b>	<b>dim. [mm]</b>		
<b>SLY 4 035...</b>	A 1.50	B 2.80	C 3.50
<b>SLY 4 041...</b>	A 1.50	B 2.80	C 4.10
<b>SLY 4 082...</b>	A 1.50	B 2.80	C 8.20
<b>please indicate:</b>	<b>... no. of contacts two rows 4-100</b>		<b>... surface</b> <b>S = selective gold-plated</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>

Therefore any required number of contacts is available.

I

K

L

M

N

**G 57**
**Technical data**  
 Female headers 2.00 SMD  
 Jumpers  
 Male headers .05" solder

 → G 73 - 78  
 → G 64  
 → G 77 - 78  
 → G 67

**Male headers 2.00 solder**  
**Male headers 2.54 solder**  
**Female headers 2.00 solder**

 → G 56 - 58  
 → G 8  
 → G 60

# Male headers soldering technique

□ 0.5 mm

suitable for female headers BLY

<b>art. no.</b>	dim. [mm]		<b>art. no.</b>	dim. [mm]	
	A	L		A	L
<b>SLY 5 040 ...</b>	4.00	10.40	<b>SLY 5 101 ...</b>	10.10	16.50
<b>SLY 5 075 ...</b>	7.50	13.90	<b>SLY 5 122 ...</b>	12.20	18.60
<b>SLY 5 081 ...</b>	8.10	14.50			
<b>art. no.</b>	dim. [mm]		<b>art. no.</b>	dim. [mm]	
	A	L		A	L
<b>SLY 6 040 ...</b>	4.00	10.40	<b>SLY 6 101 ...</b>	10.10	16.50
<b>SLY 6 075 ...</b>	7.50	13.90	<b>SLY 6 122 ...</b>	12.20	18.60
<b>SLY 6 081 ...</b>	8.10	14.50			
<b>please indicate:</b>	... <b>no. of contacts</b> one row 1-50 two rows 2-100		... <b>surface</b> S = selective gold-plated G = gold-plated Z = tin-plated		

Are used for interconnections of stacked PCBs.

The position of the insulator can be changed within the total length of the pin.

Therefore any required number of contacts is available.



A



**Male headers soldering technique**

B

Empty page

C

D

E

F

**G**

H

I

K

L

M

N

# High-precision female headers soldering technique

for □ 0.5 mm and up to 0.56 mm Ø

<p>art. no.</p> <p><b>BLY 1 ...</b></p>		
<p>art. no.</p> <p><b>BLY 2 ...</b></p>		
<p>art. no.</p> <p><b>BLY 3 ...</b></p>		
<p>art. no.</p> <p><b>BLY 4 ...</b></p>		
<p><b>please indicate:</b></p>		<p><b>... no. of contacts</b>  <b>one row 1-50</b>  <b>two rows 2-100</b></p>

**contact shell surface:** tin-plated

**contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.

V-notches permit breaking! Therefore any required number of contacts is available.

A

**Male headers in SMD mounting**
 **0.5 mm**

<b>art. no.</b>	dim. [mm]			
<b>SLY 7 SMD 036 ...</b>	A	B	C	S
<b>SLY 7 SMD 045 ...</b>	5.60	6.30	3.60	3.00
<b>SLY 7 SMD 062 ...</b>	6.50	4.60	4.50	3.50
<b>SLY 7 SMD 062 ...</b>	8.20	4.60	6.20	3.50
<p> <b>please indicate:</b> ... <b>no. of contacts</b> one row 4-20      ... <b>surface</b>  <b>S</b> = sel. gold-plated      ... <b>packing (option)</b>  <b>G</b> = gold-plated      <b>SM</b> = bar magazine  <b>Z</b> = tin-plated      <b>B SM</b> = pick and place pad and bar magazine         </p>				
<b>art. no.</b>	dim. [mm]			
<b>SLY 8 SMD 036 ...</b>	A	B	C	S
<b>SLY 8 SMD 045 ...</b>	5.60	8.50	3.60	3.00
<b>SLY 8 SMD 045 ...</b>	6.50	6.50	4.50	3.50
<b>SLY 8 SMD 062 ...</b>	8.20	6.50	6.20	3.50
<p> <b>please indicate:</b> ... <b>no. of contacts</b> two rows 4-40      ... <b>surface</b>  <b>S</b> = sel. gold-plated      ... <b>packing (option)</b>  <b>G</b> = gold-plated      <b>SM</b> = bar magazine  <b>Z</b> = tin-plated      <b>B SM</b> = pick and place pad and bar magazine  <b>B TR</b> = pick and place pad and tape and reel (650 pcs/reel)         </p>				

... packing (option) - additions:

**SLY 8 SMD ... SM; ... B SM: 6-40 contacts**
**SLY 8 SMD 036/045 B TR: 6-30 contacts**
**For further informations please see "for automatic assembly" following this series!**

K

L

M

N

**G 61**

Male headers 2.00 solder

High-prec.male head.in SMD mount.

Special male &amp; female headers

Female header grid 2.00

→ G 56 - 58

→ G 35

→ G 19

→ H 10

Female headers 2.00 solder

Female headers 2.00 SMD

Technical data

Jumpers

→ G 60

→ G 64

→ G 75 - 80

→ G 77 - 78

Male headers in SMD mounting

□ 0.5 mm

<b>art. no.</b>	dim. [mm]			
	A	B	C	S
<b>SLY 9 SMD 040 ...</b>	8.80	3.30	4.00	3.50
<b>SLY 9 SMD 055 ...</b>	10.30	3.30	5.50	3.50
<b>please indicate:</b>	<b>... no. of contacts one row 2-20</b>	<b>... surface S = sel. gold-plated G = gold-plated Z = tin-plated</b>	<b>... packing (option) B SM = pick and place pad and bar magazine</b>	
<b>art. no.</b>	dim. [mm]			
	A	B	C	S
<b>SLY 10 SMD 040 ...</b>	12.30	6.80	4.00	3.50
<b>please indicate:</b>	<b>... no. of contacts two rows 4-40</b>	<b>... surface S = sel. gold-plated G = gold-plated Z = tin-plated</b>	<b>... packing (option) B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (700 pcs/reel)</b>	

... packing (option) - additions:

SLY 10 SMD 040 ...: ... B TR, 4-16 contacts

For further informations please see "for automatic assembly" following this series!

Jumpers

Female header grid 2.00

Female headers 2.00 solder

Female headers 2.00 SMD

→ G 77 - 78

→ H 10

→ G 60

→ G 64

Special male & female headers

High-prec.male head.in SMD mount.

Male headers 2.00 solder

Technical data

→ G 19

→ G 35

→ G 56 - 58

→ G 75 - 80

**G 62**

A

B

C

D

E

F

**G**

H

I

K

L

M

N

A



**Male headers in SMD mounting**

B

Empty page

C

D

E

F

**G**

H

I

K

L

M

N

# High-precision female headers in SMD mounting

for □ 0.5 mm and up to 0.56 mm Ø

<p>art. no.</p> <p><b>BLY 5 SMD ...</b></p>			
<p>please indicate:</p>		<p>... no. of contacts one row 4-20</p>	<p>... packing (option) B SM = pick and place pad and bar magazine</p>
<p>art. no.</p> <p><b>BLY 6 SMD ...</b></p>			
<p>please indicate:</p>		<p>... no. of contacts one row 2-20</p>	<p>... packing (option) TR = tape and reel (2.400 pcs/reel)</p>
<p>art. no.</p> <p><b>BLY 8 SMD ...</b></p>			
<p>please indicate:</p>		<p>... no. of contacts two rows 4-40</p>	<p>... packing (option) B SM = pick and place pad and bar magazine B TR = pick and place pad and tape and reel (650 pcs/reel)</p>

contact shell surface: tin-plated  
contact spring: gold-plated

No capillary action when soldering due to protected contact insert.  
V-notches permit breaking! Therefore any required number of contacts is available.

... packing (option) - additions:

**BLY 6 SMD ... TR: 2-10 contacts**  
**BLY 8 SMD ... B TR: 6-30 contacts**

For further informations please see "for automatic assembly" following this series!

A



**High-precision female headers in SMD mounting**

B

Empty page

C

D

E

F

**G**

H

I

K

L

M

N

Male headers soldering technique

**Straight, narrow insulator □ 0.3 mm**

suitable for female header BLM, one row 1-20 contacts

<b>art. no.</b>	dim. [mm]		
	A	B	C
<b>SLM N 1 063 ...</b>	11.10	3.10	6.30
<b>SLM N 1 092 ...</b>	14.00	3.10	9.20
<b>SLM N 1 117 ...</b>	16.50	3.10	11.70
<b>SLM N 11 063 ...</b>	12.80	4.80	6.30
<b>SLM N 11 117 ...</b>	18.20	4.80	11.70
<b>please indicate:</b>	<b>... no. of contacts one row 1-20</b>	<b>... surface G = gold-plated Z = tin-plated</b>	



## Male headers soldering technique

### □ 0,4 mm

suitable for female header BLM, one row 1-36 contacts

	<b>art. no.</b>	dim. [mm]								
	A	B			C					
<b>SLV W 1 055 ...</b>	9.70	2.50			5.50					
<b>SLV W 1 080 ...</b>	12.20	2.50			8.00					
<b>SLV W 1 105 ...</b>	14.70	2.50			10.50					
<b>SLV W 1 130 ...</b>	17.20	2.50			13.00					
<b>please indicate:</b>	... no. of contacts one row 1-36			... surface <b>G</b> =gold-plated <b>Z</b> =tin-plated						

suitable for female header BLM, two rows 4-72 contacts, grid spacing 1,27 x 2,54 mm

	<b>art. no.</b>	dim. [mm]								
	A	B			C					
<b>SLV W 2 055 ...</b>	9.70	2.50			5.50					
<b>SLV W 2 080 ...</b>	12.20	2.50			8.00					
<b>SLV W 2 105 ...</b>	14.70	2.50			10.50					
<b>SLV W 2 130 ...</b>	17.20	2.50			13.00					
<b>please indicate:</b>	... no. of contacts two rows 4-72			... surface <b>G</b> =gold-plated <b>Z</b> =tin-plated						

# Male headers soldering technique

## □ 0.4 mm, 90° angled

one row 1-36 contacts

art. no.	dim. [mm]		
	A	B	C
<b>SLV W 1 KA 030 ...</b>	3.90	2.50	3.00
<b>SLV W 1 KA 055 ...</b>	3.90	2.50	5.50
<b>SLV W 1 KA 080 ...</b>	3.90	2.50	8.00
<b>SLV W 1 KA 105 ...</b>	3.90	2.50	10.50
<b>please indicate:</b>	<b>... no. of contacts</b> one row 1-36	<b>... surface</b> <b>G</b> =gold-plated <b>Z</b> =tin-plated	

suitable for female header BLM, two rows 6-72 contacts, grid spacing 1,27 x 2,54 mm

art. no.	no. of contacts	VPE	dim. [mm]			art. no.	no. of contacts	VPE	dim. [mm]		
			A	B	C				A	B	C
<b>SLVW2 KA 030 10...</b>	10	78	3.70	2.50	3.00	<b>SLVW2 KA 054 10...</b>	10	78	3.70	2.50	5.40
<b>SLVW2 KA 030 14...</b>	14	55	3.70	2.50	3.00	<b>SLVW2 KA 054 14...</b>	14	55	3.70	2.50	5.40
<b>SLVW2 KA 030 16...</b>	16	50	3.70	2.50	3.00	<b>SLVW2 KA 054 16...</b>	16	50	3.70	2.50	5.40
<b>SLVW2 KA 030 20...</b>	20	40	3.70	2.50	3.00	<b>SLVW2 KA 054 20...</b>	20	40	3.70	2.50	5.40
<b>SLVW2 KA 030 26...</b>	26	31	3.70	2.50	3.00	<b>SLVW2 KA 054 26...</b>	26	31	3.70	2.50	5.40
<b>SLVW2 KA 030 30...</b>	30	27	3.70	2.50	3.00	<b>SLVW2 KA 054 30...</b>	30	27	3.70	2.50	5.40
<b>SLVW2 KA 030 34...</b>	34	24	3.70	2.50	3.00	<b>SLVW2 KA 054 34...</b>	34	24	3.70	2.50	5.40
<b>SLVW2 KA 030 40...</b>	40	20	3.70	2.50	3.00	<b>SLVW2 KA 054 40...</b>	40	20	3.70	2.50	5.40
<b>SLVW2 KA 030 50...</b>	50	16	3.70	2.50	3.00	<b>SLVW2 KA 054 50...</b>	50	16	3.70	2.50	5.40
<b>SLVW2 KA 030 72...</b>	72	11	3.70	2.50	3.00	<b>SLVW2 KA 054 72...</b>	72	11	3.70	2.50	5.40
<b>please indicate:</b>	<b>... surface</b> <b>G</b> =gold-plated <b>Z</b> =tin-plated										

### SLV W 2 KA ...: packing bar magazine

VPE = packing unit (pieces/tube);

preferred number of contacts, different ones between 6 and 72 can be made upon request

Female headers 1.27 SMD → G 74  
 High-prec. fem. headers 1.27 solder → G 72  
 High-prec. female headers SMD → G 76  
 Single contacts metal strip → G 26

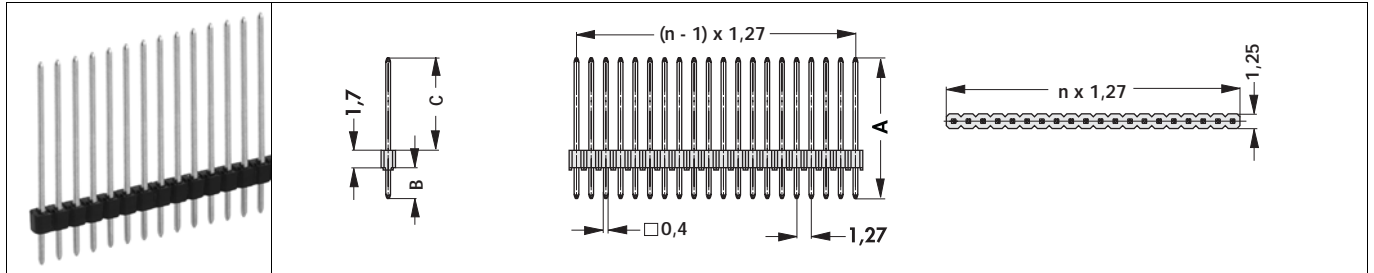
High-prec. male head.in SMD mount. → G 35  
 Jumpers → G 77 - 78  
 Jump. links 2.00 & 2.54 solder → G 20

**G 68**

## Male headers soldering technique

## Straight, narrow insulator □ 0.4 mm

suitable for female header BLM, one row 1-20 contacts



art. no.	dim. [mm]		
	A	B	C
SLV N 1 055 ...	9.70	2.50	5.50
SLV N 1 080 ...	12.20	2.50	8.00
SLV N 1 105 ...	14.70	2.50	10.50
SLV N 1 130 ...	17.20	2.50	13.00
SLV N 11 055 ...	12.20	5.00	5.50
SLV N 11 080 ...	14.70	5.00	8.00
SLV N 11 105 ...	17.20	5.00	10.50

please indicate:      ... no. of contacts  
one row 1-20

... surface  
G = gold-plated  
Z = tin-plated

# Female headers soldering technique

suitable for male header SLM and SLV, one row 1-36 contacts

<b>art. no.</b>	dim. [mm]	
<b>BLM KG 1 ...</b>	A	
<b>BLM LG 1 ...</b>	3.00	
	5.10	
<b>art. no.</b>		
<b>BLM LA 1 ...</b>		
<b>please indicate:</b>	<b>... no. of contacts</b> one row 1-36	<b>... surface</b> <b>G</b> =gold-plated <b>Z</b> =tin-plated

suitable for male header SLV, two rows 4-72 contacts - grid spacing 1.27 x 2.54 mm

<b>art. no.</b>	dim. [mm]	
<b>BLM KG 2 ...</b>	A	
<b>BLM LG 2 ...</b>	3.00	
	5.10	
<b>please indicate:</b>	<b>... no. of contacts</b> two rows 4-72	<b>... surface</b> <b>G</b> =gold-plated <b>Z</b> =tin-plated

A


**High-precision male headers soldering technique**
**Ø 0.43 mm**

turned precision contacts, less space required on PCB

<b>art. no.</b>	<b>no. of contacts</b>		
<b>SLR 1 025 ...</b>	25		
<b>SLR 1 050 ...</b>	50		
<b>art. no.</b>	<b>no. of contacts</b>		
<b>SLR 2 050 ...</b>	50		
<b>SLR 2 100 ...</b>	100		
<b>art. no.</b>	<b>no. of contacts</b>		
<b>SLR 3 025 ...</b>	25		
<b>SLR 3 050 ...</b>	50		
<b>art. no.</b>	<b>no. of contacts</b>		
<b>SLR 4 050 ...</b>	50		
<b>SLR 4 100 ...</b>	100		
<b>please indicate:</b>	<b>... surface</b> <b>G = gold-plated</b> <b>Z = tin-plated</b>		

Other number of contacts on request!

M

N

**G 71**
**Jumpers**  
**Male headers .05" solder**  
**Special male & female headers**  
**Technical data**

 → G 77 - 78  
 → G 67  
 → G 19  
 → G 73 - 78

**High-prec. fem. headers 1.27 solder** → G 72  
**High-prec. female headers SMD** → G 76  
**Single contacts metal strip** → G 26

# High-precision female headers soldering technique

for Ø 0.35–0.45 mm

		$(n \times 1,27) + 0,41$	$(n-1) \times 1,27$
<b>art. no.</b>	no. of contacts		
<b>BLR 1 025 Z</b>	25		
<b>BLR 1 050 Z</b>	50		
		$(n/2 \times 1,27) + 0,41$	$((n/2)-1) \times 1,27$
<b>art. no.</b>	no. of contacts		
<b>BLR 2 050 Z</b>	50		
<b>BLR 2 100 Z</b>	100		
		$(n \times 1,27) + 0,41$	$(n-1) \times 1,27$
<b>art. no.</b>	no. of contacts		
<b>BLR 3 025 Z</b>	25		
<b>BLR 3 050 Z</b>	50		
		$(n/2 \times 1,27) + 0,41$	$((n/2)-1) \times 1,27$
<b>art. no.</b>	no. of contacts		
<b>BLR 4 050 Z</b>	50		
<b>BLR 4 100 Z</b>	100		

**contact shell surface:** tin-plated

**contact spring:** gold-plated

No capillary action when soldering due to protected contact insert.

Other number of contacts on request!

Special male & female headers → G 19  
 Female headers 1.27 solder → G 70  
 High-prec. male headers 1.27 SMD → G 75  
 Technical data → G 75 - 80

Special male & female headers → G 19  
 High-prec.female headers SMD → G 76  
 High-prec. male head. 1.27 solder → G 71

**G 72**

A

B

C

D

E

F

G

H

I

K

L

M

N

A

**Male headers in SMD mounting**
 **0.4 mm**

suitable for female header BLM, one row 4-20 contacts

	<b>art. no.</b>	dim. [mm]	
	A	B	C
<b>SLV W 1 SMD 048...</b>	8.20	4.00	4.80
<b>SLV W 1 SMD 073...</b>	10.70	4.00	7.30
<b>please indicate:</b>	... no. of contacts one row 4-20		... surface <b>G</b> = gold-plated <b>Z</b> = tin-plated

suitable for female header BLM, two rows 4-40 contacts, grid spacing 1,27 x 2,54 mm

	<b>art. no.</b>	dim. [mm]	
	A	B	C
<b>SLV W 2 SMD 048...</b>	8.20	6.60	4.80
<b>SLV W 2 SMD 073...</b>	10.70	6.60	7.30
<b>please indicate:</b>	... no. of contacts two rows 4-40		... surface <b>G</b> = gold-plated <b>Z</b> = tin-plated

F

G

H

I

K

L

M

N

**G 73**

Female headers 1.27 solder → G 70

Jumpers → G 77 - 78

High-prec. fem. headers 1.27 solder → G 72

Technical data

→ G 70

→ G 77 - 78

→ G 72

→ G 75 - 80

High-prec.female headers SMD → G 76

High-prec.male head.in SMD mount. → G 35

# Female headers in SMD mounting

## Wide insulator with 0.3 mm and 0.4 mm

suitable for male header SLM and SLV, one row 4-20 contacts

	<b>art. no.</b> <b>BLM 1 SMD ...</b>	
	<b>please indicate:</b>	... <b>no. of contacts</b> one row 4-20

## Grid spacing 1.27 x 2.54 mm

suitable for male header SLV, two rows 4-40 contacts

	<b>art. no.</b> <b>BLM 2 SMD ...</b>	
	<b>please indicate:</b>	... <b>no. of contacts</b> two rows 4-40



A



## High-precision male headers in SMD mounting

### Turned precision contacts

less space required on PCB

<b>art. no.</b>	no. of contacts		
<b>SLR 5 SMD ...</b>	50		
<p><b>please indicate:</b> ... surface  <b>G = gold-plated</b>  <b>Z = tin-plated</b></p>			
<b>art. no.</b>	no. of contacts		
<b>SLR 6 SMD ...</b>	100		
<p><b>please indicate:</b> ... surface  <b>G = gold-plated</b>  <b>Z = tin-plated</b></p>			
<b>art. no.</b>	no. of contacts		
<b>SLR 7 SMD ...</b>	50		
<p><b>please indicate:</b> ... surface  <b>G = gold-plated</b>  <b>Z = tin-plated</b></p>			

Other number of contacts on request!

L

M

N

**G 75**

Male headers .05" solder  
 Peel-off terminal strips  
 High-prec. male head. 1.27 solder  
 Technical data

→ G 67  
 → G 25  
 → G 71  
 → G 73 - 78

High-prec. female headers SMD  
 High-prec. fem. headers 1.27 solder  
 Female headers 1.27 SMD  
 Female headers 1.27 solder

→ G 76  
 → G 72  
 → G 74  
 → G 70

# High-precision female headers in SMD mounting

## Turned precision contacts for Ø 0.35-0.45 mm

less space required on PCB

<p><b>art. no.</b> <b>BLR 5 SMD</b></p>	<p>no. of contacts 50</p>
<p><b>art. no.</b> <b>BLR 6 SMD</b></p>	<p>no. of contacts 100</p>
<p><b>art. no.</b> <b>BLR 7 SMD</b></p>	<p>no. of contacts 50</p>

**contact shell:** tin-plated

**contact insert:** gold-plated

Closed precision rotary part with 3-finger contact prevents rising of flux agents.

Other number of contacts on request!

A

**Jumpers**

for 0.6-0.64 mm wire wrap pins and Ø 0.6-0.7 mm

B

C

D

E

F

G

H

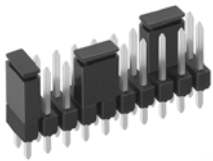

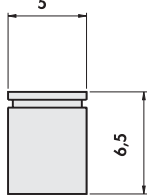
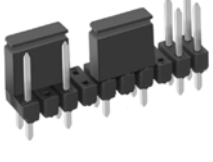

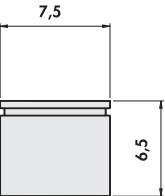
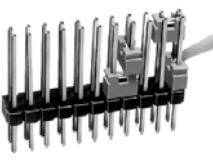

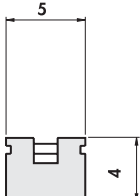

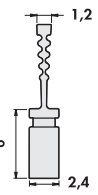
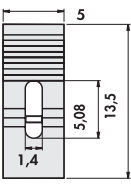
I

K

L

M

N

art. no.	no. of contacts	surface	version	grid			
<b>CAB 4 G ...</b>	2	0.1 µm gold	closed	2.54			
<b>CAB 4 Z ...</b>	2	5.0 µm tin	closed	2.54			
<b>CAB 5 05 G ...</b>	2	0.5 µm gold	closed, hole for probe trip	5.08			
<b>CAB 5 10 G ...</b>	2	1.0 µm gold	closed, hole for probe trip	5.08			
<b>CAB 5 Z ...</b>	2	5.0 µm tin	closed, hole for probe trip	5.08			
<b>CAB 6 05 G ...</b>	2	0.5 µm gold	open, suitable for miniature test probes	2.54			
<b>CAB 6 10 G ...</b>	2	1.0 µm gold	open, suitable for miniature test probes	2.54			
<b>CAB 6 Z ...</b>	2	5.0 µm tin	open, suitable for miniature test probes	2.54			
<b>CAB 9 G ...</b>	2	0.1 µm gold	tag, open	2.54			
<b>please indicate:</b>				<b>... colour</b> <b>B = blue</b> <b>G = grey</b> <b>R = red</b> <b>S = black</b>			

**Colour "grey" except for CAB 9.**

The flexible contacts are shorting two pins. The jumpers can be mounted behind and next to each other.

**G 77**
**Male headers 2.54 SMD**  
**Male headers 2.54 solder**  
**Male headers 2.54 press-fit**  
**Male headers 2.00 SMD**

 → G 37 - 42  
 → G 8  
 → G 51  
 → G 61 - 62

**Male headers 2.00 solder**  
**Technical data**  
**Special male & female headers**  
**Jump. links 2.00 & 2.54 solder**

 → G 56 - 58  
 → G 73 - 78  
 → G 19  
 → G 20

Jumpers

for square 0.5 mm and Ø 0.4-0.5 mm

art. no.	no. of contacts	surface	version	grid		
<b>CAB 10 G S</b>	2	0.1 µm gold	open, suitable for miniature test probes	2.00		
<b>CAB 11 G S</b>	2	0.1 µm gold	open, suitable for miniature test probes	2.00		
<b>CAB 14 G S</b>	2	<0,1 µm gold	tag, open, suitable for miniature test probes	2.00		

colour:  
black

for square 0.3-0.4 mm and Ø 0.4-0.5 mm

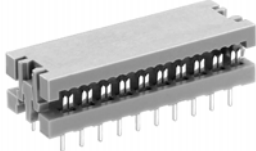
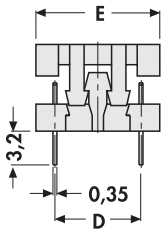
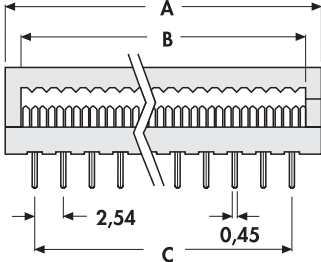
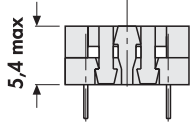
art. no.	no. of contacts	surface	version	grid		
<b>CAB 15 G S</b>	2	<0,1 µm gold	closed, tag	1.27		

colour:  
black

- Technical data → G 73 - 78
- High-prec. male head. 1.27 solder → G 71
- High-prec. male headers 1.27 SMD → G 75
- Male headers 2.54 press-fit → G 51
- Single contacts metal strip → G 26
- Male headers 2.00 solder → G 56 - 58
- Male headers 2.00 SMD → G 61 - 62

Printed circuit connector

Design DIL

art. no.	no. of contacts	dim. [mm]				
		A	B	C	D	E (max.)
<b>KK 04 Z</b>	4	8.00	5.10	2.54	7.62	11.00
<b>KK 06 Z</b>	6	10.30	7.60	5.08	7.62	11.00
<b>KK 08 Z</b>	8	13.00	10.20	7.62	7.62	11.00
<b>KK 10 Z</b>	10	15.40	12.70	10.16	7.62	11.00
<b>KK 12 Z</b>	12	18.00	15.30	5.08	7.62	11.00
<b>KK 14 Z</b>	14	20.50	17.80	15.24	7.62	11.00
<b>KK 16 Z</b>	16	23.00	20.30	17.78	7.62	11.00
<b>KK 18 Z</b>	18	25.60	22.90	20.32	7.62	11.00
<b>KK 20 Z</b>	20	28.10	25.40	22.86	7.62	11.00
<b>KK 24 Z</b>	24	33.00	30.50	27.94	15.24	18.70
<b>KK 28 Z</b>	28	38.10	35.60	33.02	15.24	18.70
<b>KK 40 Z</b>	40	53.30	50.80	48.26	15.24	18.70

Use with ribbon cable:

round conductor flat strip:  
 AWG 28 = solid or stranded  
 AWG 30 = solid

conductor diameter:  
 AWG 28 ... 30 = 0.09 ... 0.05 mm<sup>2</sup>  
 insulation-Ø:  
 max. 1.1 mm

Sockets for DIL-IC  
 Application tools  
 Male headers 2.54 press-fit  
 PC connectors

→ F 4 - 10  
 → H 11  
 → G 51  
 → H 8

Technical data  
 D-Sub connectors /flat cable  
 Single precision contacts

→ H 12  
 → I 11  
 → F 2 - 3

**H 2**

A

B

C

D

E

F

G

**H**

I

K

L

M

N

## Female connector

## One row

art. no.	no. of contacts	dim. [mm]			
		A	B	C	D
<b>FV 03 ...</b>	3	15.24	7.62	5.08	8.89
<b>FV 04 ...</b>	4	17.78	10.16	7.62	11.43
<b>FV 05 ...</b>	5	20.32	12.70	10.16	7.62
<b>FV 06 ...</b>	6	22.86	15.24	5.08	16.51
<b>FV 07 ...</b>	7	25.40	17.78	15.24	19.05
<b>FV 08 ...</b>	8	27.94	20.32	17.78	21.59
<b>FV 10 ...</b>	10	33.02	25.40	22.86	26.67
<b>FV 12 ...</b>	12	38.10	30.48	27.94	31.75
<b>FV 13 ...</b>	13	40.64	33.02	30.48	34.29
<b>FV 14 ...</b>	14	43.18	35.66	33.02	36.83
<b>FV 16 ...</b>	16	48.26	40.64	38.10	41.91
<b>FV 17 ...</b>	17	50.80	43.18	40.64	44.45
<b>FV 18 ...</b>	18	53.34	45.72	43.18	46.99
<b>FV 20 ...</b>	20	58.42	50.80	48.26	52.07
<b>FV 24 ...</b>	24	68.58	60.96	58.42	62.23
<b>FV 25 ...</b>	25	71.12	63.50	60.96	64.77
<b>FV 36 ...</b>	36	99.06	91.44	88.90	92.71

please indicate:    ... surface  
**G** = gold-plated  
**Z** = tin-plated

recommended plugs

□ 0.635 mm

length 5 ... 8 mm

#### Use with ribbon cable:

round conductor flat strip:

AWG 28 = solid or stranded

AWG 30 = solid

conductor diameter:

AWG 28 ... 30 = 0.09 ... 0.05 mm<sup>2</sup>


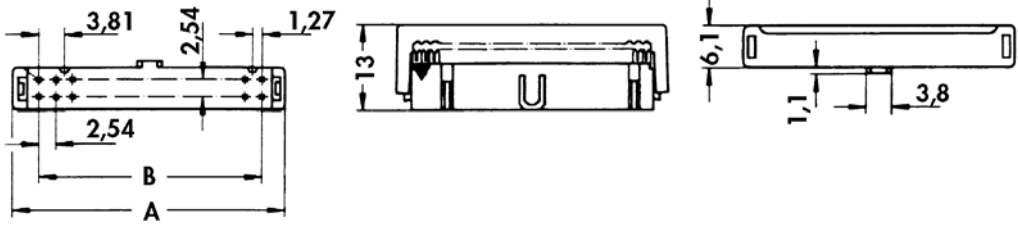

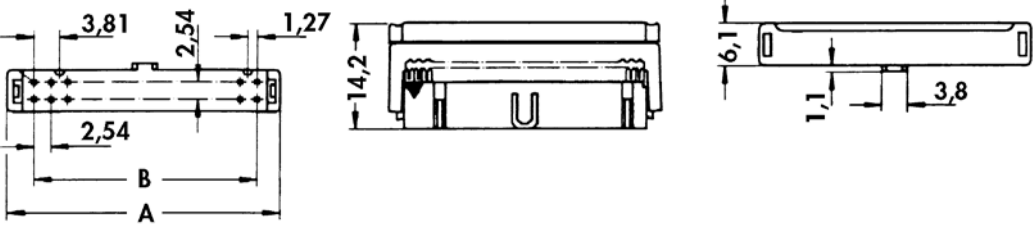
insulation-Ø:

max. 1.1 mm

Female connector

Two rows, with guiding nose

suitable for shrouded male header ASL ...

 <p><b>PV</b></p>				
 <p><b>PV + ZEPV</b></p>				
art. no.	no. of contacts	dim. [mm]		suitable strain relief
		A	B	
<b>PV 06 G</b>	6	12.20	5.08	<b>ZEPV 06</b>
<b>PV 10 G</b>	10	17.30	10.16	<b>ZEPV 10</b>
<b>PV 14 G</b>	14	22.40	15.24	<b>ZEPV 14</b>
<b>PV 16 G</b>	16	24.90	17.78	<b>ZEPV 16</b>
<b>PV 20 G</b>	20	30.00	22.86	<b>ZEPV 20</b>
<b>PV 26 G</b>	26	37.60	30.48	<b>ZEPV 26</b>
<b>PV 34 G</b>	34	47.80	40.64	<b>ZEPV 34</b>
<b>PV 40 G</b>	40	55.40	48.26	<b>ZEPV 40</b>
<b>PV 50 G</b>	50	68.10	60.96	<b>ZEPV 50</b>

contact surface finish: gold-plated

Use with ribbon cable:

round conductor flat strip:  
 AWG 28 = solid or stranded  
 AWG 30 = solid

conductor diameter:  
 AWG 28 ... 30 = 0.09 ... 0.05 mm<sup>2</sup>  
 insulation-Ø:  
 max 1.1 mm

Male headers 2.54 solder  
 Application tools  
 Single contacts metal strip  
 Technical data

→ G 8  
 → H 11  
 → G 26  
 → H 12

Boltable female header  
 Shroud. male header SMD  
 Shrouded male header

→ H 5  
 → H 7  
 → H 6

**H 4**

A

B

C

D

E

F

G

**H**

I

K

L

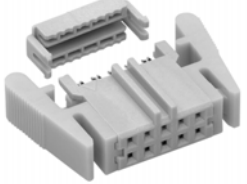
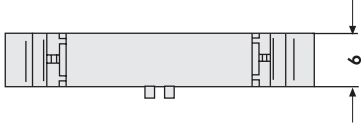
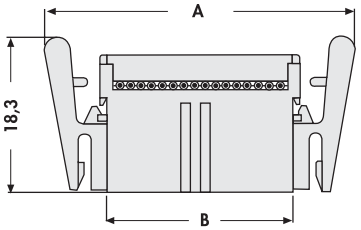
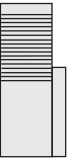
M

N

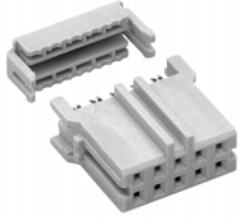
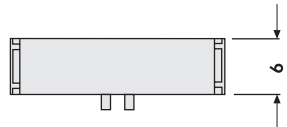
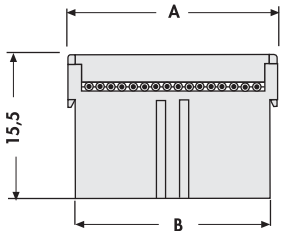
## Female connector

## Two rows, with guiding nose

bolttable female header, suitable for shrouded male header ASL ...

							
art. no.	no. of contacts	dim. [mm]		art. no.	no. of contacts	dim. [mm]	
		A	B			A	B
<b>VFL 06 ...</b>	6	23.58	9.56	<b>VFL 20 ...</b>	20	41.36	27.34
<b>VFL 08 ...</b>	8	26.12	12.10	<b>VFL 26 ...</b>	26	48.98	34.96
<b>VFL 10 ...</b>	10	28.66	14.64	<b>VFL 34 ...</b>	34	59.14	45.12
<b>VFL 12 ...</b>	12	31.20	17.18	<b>VFL 40 ...</b>	40	66.76	52.74
<b>VFL 14 ...</b>	14	33.74	19.72	<b>VFL 50 ...</b>	50	79.46	65.44
<b>VFL 16 ...</b>	16	36.28	22.26				
<b>please indicate:</b>							
				<b>... surface</b>			
				<b>G = gold-plated</b>			
				<b>Z = tin-plated</b>			

suitable for shrouded male header ASL ...

							
art. no.	no. of contacts	dim. [mm]		art. no.	no. of contacts	dim. [mm]	
		A	B			A	B
<b>FLMP 06 ...</b>	6	10.97	9.56	<b>FLMP 20 ...</b>	20	28.75	27.34
<b>FLMP 08 ...</b>	8	13.51	12.10	<b>FLMP 26 ...</b>	26	36.37	34.96
<b>FLMP 10 ...</b>	10	16.05	14.64	<b>FLMP 34 ...</b>	34	46.53	45.12
<b>FLMP 12 ...</b>	12	18.59	17.18	<b>FLMP 40 ...</b>	40	54.15	52.74
<b>FLMP 14 ...</b>	14	21.13	19.72	<b>FLMP 50 ...</b>	50	66.85	65.44
<b>FLMP 16 ...</b>	16	23.67	22.26				
<b>please indicate:</b>							
				<b>... surface</b>			
				<b>G = gold-plated</b>			
				<b>Z = tin-plated</b>			

## Use with ribbon cable:

round conductor flat strip:  
 AWG 28 = solid or stranded  
 AWG 30 = solid

conductor diameter:  
 AWG 28 ... 30 = 0.09 ... 0.05 mm<sup>2</sup>  
 insulation-Ø: max 1.1 mm



# Male header

## Straight, two rows, shrouded

suitable for bolttable female header VFL, FLMP, PV

art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
		A	B	C			A	B	C
<b>ASLG 06 ...</b>	6	15.30	12.70	5.08	<b>ASLG 20 ...</b>	20	33.10	30.50	22.86
<b>ASLG 08 ...</b>	8	17.80	15.20	7.62	<b>ASLG 26 ...</b>	26	40.70	38.10	30.48
<b>ASLG 10 ...</b>	10	20.40	17.80	10.16	<b>ASLG 34 ...</b>	34	50.90	48.30	40.64
<b>ASLG 12 ...</b>	12	22.90	20.30	12.70	<b>ASLG 40 ...</b>	40	58.50	55.90	48.26
<b>ASLG 14 ...</b>	14	25.40	22.90	15.24	<b>ASLG 50 ...</b>	50	71.20	68.60	60.96
<b>ASLG 16 ...</b>	16	28.00	25.40	17.78					

**please indicate:** ... surface  
**G** = gold-plated  
**Z** = tin-plated

## Angled, two rows, shrouded

suitable for bolttable female header VFL, FLMP, PV

art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
		A	B	C			A	B	C
<b>ASLA 06 ...</b>	6	15.30	12.70	5.08	<b>ASLA 20 ...</b>	20	33.10	30.50	22.86
<b>ASLA 08 ...</b>	8	17.80	15.20	7.62	<b>ASLA 26 ...</b>	26	40.70	38.10	30.48
<b>ASLA 10 ...</b>	10	20.40	17.80	10.16	<b>ASLA 34 ...</b>	34	50.90	48.30	40.64
<b>ASLA 12 ...</b>	12	22.90	20.30	12.70	<b>ASLA 40 ...</b>	40	58.50	55.90	48.26
<b>ASLA 14 ...</b>	14	25.40	22.90	15.24	<b>ASLA 50 ...</b>	50	71.20	68.60	60.96
<b>ASLA 16 ...</b>	16	28.00	25.40	17.78					

**please indicate:** ... surface  
**G** = gold-plated  
**Z** = tin-plated

Gold-plated resp. tin-plated contacts are available with either straight or squared terminations. In addition they can be combined with many other stripline connectors in 2.54 mm pitch.

Shroud. male header SMD  
 Application tools  
 Male headers 2.54 solder  
 Technical data

→ H 7  
 → H 11  
 → G 8  
 → H 12

Bolttable female header  
 Female header two rows  
 Single contacts metal strip

→ H 5  
 → H 4  
 → G 26

**H 6**

A

B

C

D

E

F

G

**H**

I

K

L

M

N

A

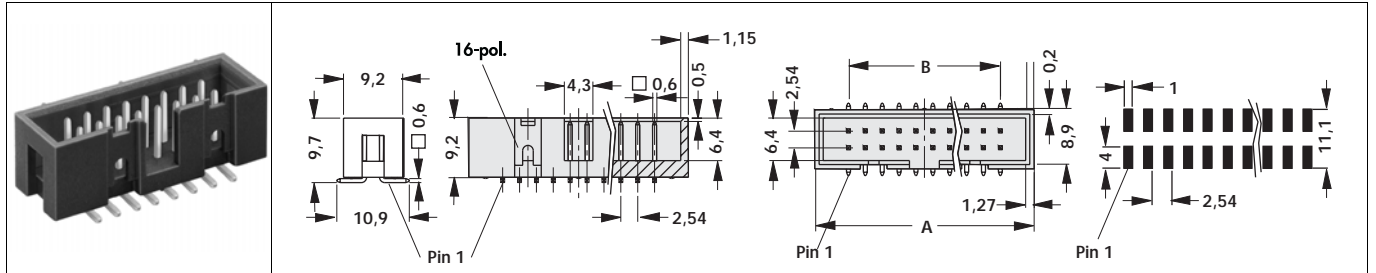
**Male header**

B

**SMD, two rows, shrouded**

suitable for boltable female header VFL, FLMP, PV

C



D

art. no.	no. of contacts	VPE	dim. [mm]		art. no.	no. of contacts	VPE	dim. [mm]	
			A	B				A	B
<b>ASL 06 SMD ...</b>	6	32	15.30	5.08	<b>ASL 20 SMD ...</b>	20	15	33.10	22.86
<b>ASL 08 SMD ...</b>	8	27	17.80	7.62	<b>ASL 26 SMD ...</b>	26	12	40.70	30.48
<b>ASL 10 SMD ...</b>	10	24	20.40	10.16	<b>ASL 34 SMD ...</b>	34	9	50.90	40.64
<b>ASL 12 SMD ...</b>	12	21	22.90	12.70	<b>ASL 40 SMD ...</b>	40	8	58.50	48.26
<b>ASL 14 SMD ...</b>	14	19	25.40	15.24	<b>ASL 50 SMD ...</b>	50	7	71.20	60.96
<b>ASL 16 SMD ...</b>	16	17	28.00	17.78					

**please indicate:**

... surface	... packing (option)
<b>G</b> = gold-plated	<b>SM</b> = bar magazine
<b>Z</b> = tin-plated	<b>B SM</b> = pick and place pad and bar magazine

E

F

**VPE** = packing unit (pieces/tube); Gold-plated resp. tin-plated contacts are available with either straight or squared terminations.

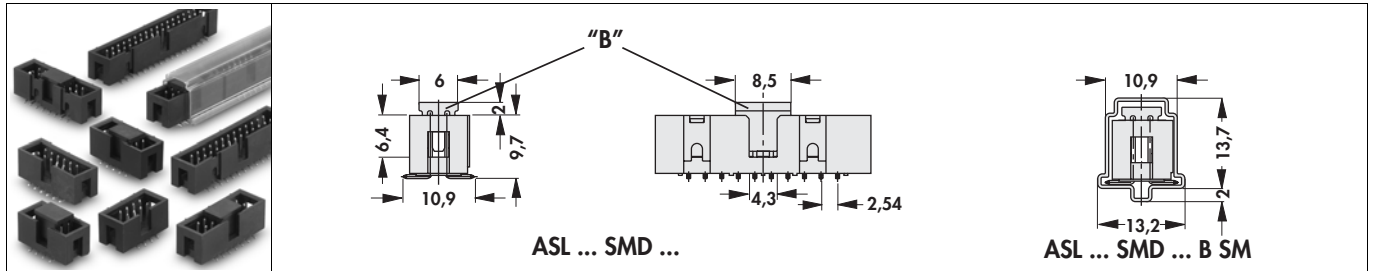
G

In addition they can be combined with many other strip-line connectors in 2.54 mm pitch.

H

**For automatic assembly: Pick and place pad "B" and tube magazin "SM"**

– position in the middle



I

K

L

M

N

**H 7**
**Female header two rows**  
**Application tools**  
**Male headers 2.54 solder**  
**Technical data**

 → H 4  
 → H 11  
 → G 8  
 → H 12

**Boltable female header**  
**Shrouded male header**

 → H 5  
 → H 6

Printed circuit connector

One row

art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
		A	B	C			A	B	C
<b>SBAU 1 04 Z</b>	4	17.78	10.16	7.62	<b>SBAU 1 14 Z</b>	14	43.18	35.56	33.02
<b>SBAU 1 06 Z</b>	6	22.86	15.24	12.70	<b>SBAU 1 16 Z</b>	16	48.26	40.64	38.10
<b>SBAU 1 08 Z</b>	8	27.94	20.32	17.78	<b>SBAU 1 17 Z</b>	17	50.80	43.18	40.64
<b>SBAU 1 10 Z</b>	10	33.02	25.40	22.86	<b>SBAU 1 18 Z</b>	18	53.34	45.72	43.18
<b>SBAU 1 12 Z</b>	12	38.10	30.48	27.94	<b>SBAU 1 20 Z</b>	20	58.42	50.80	48.26

contact surface finish: tin-plated

Two rows

art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
		A	B	C			A	B	C
<b>SBAU 06 S</b>	6	12.90	7.80	5.08	<b>SBAU 20 S</b>	20	30.70	25.60	22.86
<b>SBAU 10 S</b>	10	18.00	12.90	10.16	<b>SBAU 26 S</b>	26	38.30	33.20	30.48
<b>SBAU 14 S</b>	14	23.00	18.00	15.24	<b>SBAU 34 S</b>	34	48.50	43.40	40.64
<b>SBAU 16 S</b>	16	25.60	20.50	17.78					

contact surface finish: selective gold-plated: solder area gold-plated, IDC area nickel-plated

Use with ribbon cable:

round conductor flat strip:

AWG 28 = solid or stranded, AWG 30 = solid

conductor diameter:

AWG 28 ... 30 = 0.09 ... 0.05 mm<sup>2</sup>

insulation-Ø:

max. 1.1 mm

Sockets for DIL-IC  
D-Sub connectors /flat cable  
Male headers 2.54 solder  
Technical data

→ F 4 - 10  
→ I 11  
→ G 8  
→ H 12

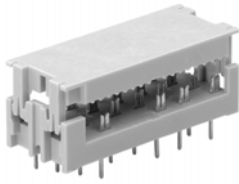
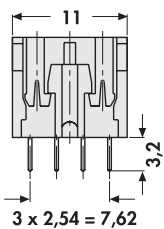
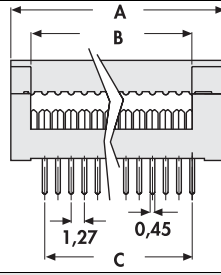
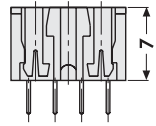
Application tools  
PC connector design DIL  
Female header grid 2.00

→ H 11  
→ H 2  
→ H 10

**H 8**

## Printed circuit connector

## Four rows

									
art. no.	no. of contacts	dim. [mm]			art. no.	no. of contacts	dim. [mm]		
		A	B	C			A	B	C
<b>SBAU 4 10 S</b>	10	17.78	12.70	11.43	<b>SBAU 4 26 S</b>	26	38.10	33.02	31.75
<b>SBAU 4 16 S</b>	16	25.40	20.32	19.05	<b>SBAU 4 50 S</b>	50	68.58	63.50	62.23
<b>SBAU 4 20 S</b>	20	30.48	25.40	24.13					

**contact surface finish: S** = selective-gold-plated: soldering area gold plated, IDC nickel-plated

**Use with ribbon cable:**

round conductor flat strip:

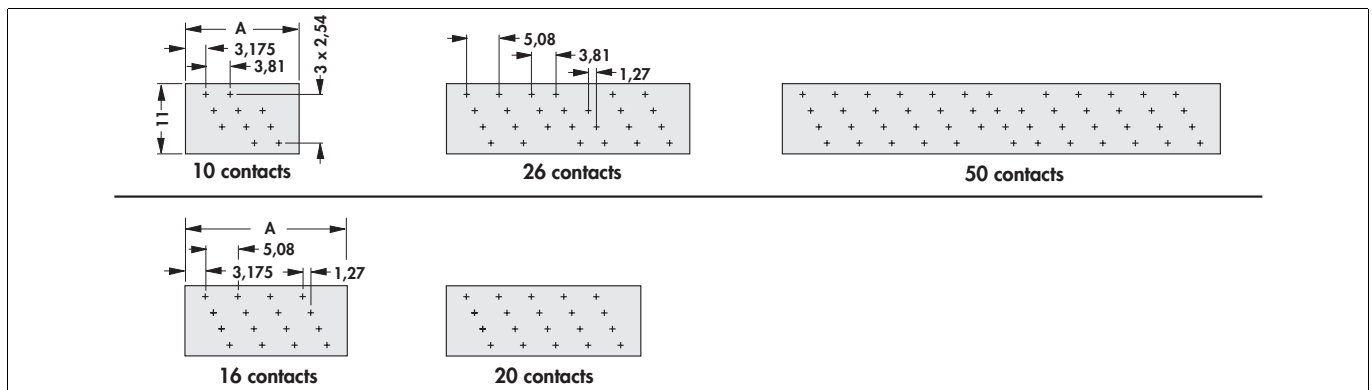
AWG 28 = solid or stranded, AWG 30 = solid

conductor diameter:

AWG 28 ... 30 = 0.09 ... 0.05 mm<sup>2</sup>

insulation-Ø:

max. 1.1 mm

**Print-layout for SBAU 4 ...**

Female connector

Two rows

art. no.	no. of contacts	dim. [mm]	
		A	B
PVY 20 S	20	25.10	18.00
PVY 40 S	40	45.30	38.00
PVY 44 S	44	49.30	42.00
PVY 50 S	50	55.10	48.00

contact surface finish: selective gold-plated

Male headers 2.00 solder  
 Female headers 2.00 solder  
 Male headers 2.00 SMD  
 Female headers 2.00 SMD

→ G 56 - 58  
 → G 60  
 → G 61 - 62  
 → G 64

Application tools  
 Boltable female header  
 Technical data  
 Female header two rows

→ H 11  
 → H 5  
 → H 12  
 → H 4

H 10

A

B

C

D

E

F

G

H

I

K


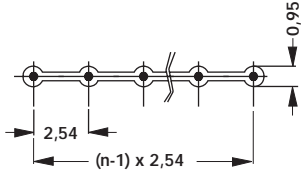
L

M

N

## Accessories for flat ribbon cable and application tools

## Flat ribbon cable - spacing 2,54 mm - suitable for connectors FV, SBAU 1

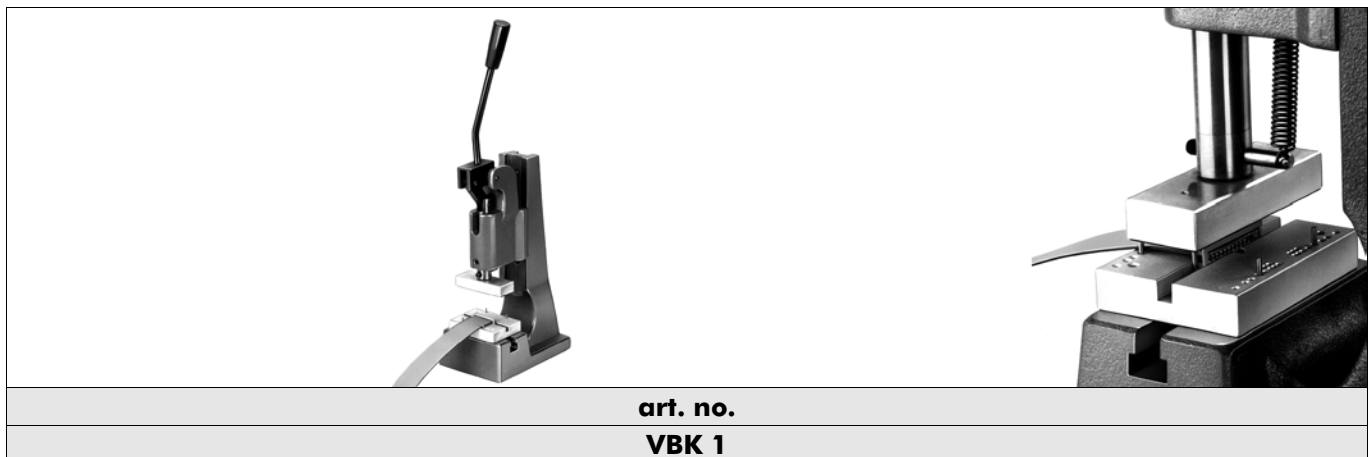
	
<b>art. no.</b>	no. of contacts
<b>BK 01 32</b>	32

**Technical data:**

current rating: 2 A; conductor resistance:  $\leq 230 \text{ m}\Omega/\text{m}$ ; capacitance:  $\leq 65 \text{ pF}/\text{m}$  symmetrical; wave impedance:  $170 \Omega$  symmetrical  
 cross section: AWG 28/ $\sim 0.089 \text{ mm}^2$ ; conductor:  $7 \times \text{Ø } 0,127 \text{ mm}$ ; operating voltage:  $300 \text{ V}_{\text{eff}}$  max. operating temperature range:  
 $-30 \dots +105 \text{ °C}$

**Bench press**

height without handle: 28 cm, weight: 9.02 kg



The bench press VBK 1 connects all contacts of IDC connector types KK, SB, FV, PV, PVZ and VFL in one simple operation.

By piercing through the insulation, the contacts form, due to their conception, a gas-tight and corrosion-proof connection.

**Accessories, suitable for strip-line connector**

<b>art. no.</b>	suitable for male connectors and female headers
<b>KK W</b>	KK
<b>SB W</b>	SB
<b>PV W</b>	PV, VFL, FLMP
<b>PVY W</b>	PVY
<b>D W 9 37</b>	D-Sub (9-37 contacts)

Removable locating frames for every indicated type available.

**H 11**

**Boltable female header**  
**Female header two rows**  
**Female header grid 2.00**  
**D-Sub connectors /flat cable**

→ H 5  
 → H 4  
 → H 10  
 → I 11

**Female header one row**  
**PC connectors**

→ H 3  
 → H 8  
 → H 8


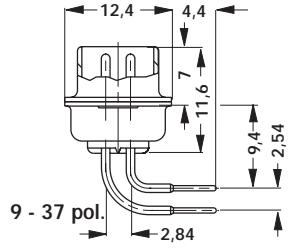
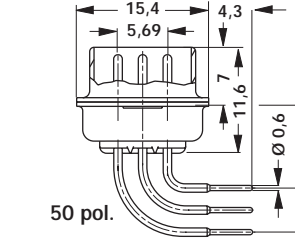
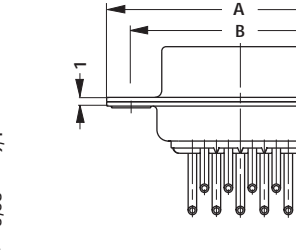
Male headers manual soldering

	9 - 37 pol.	50 pol.			
art. no.	no. of contacts	contact	connection type	dim. [mm]	
<b>DS 09 L</b>	9	male	manual soldering	A	B
<b>DS 15 L</b>	15	male	manual soldering	30.80	25.00
<b>DS 25 L</b>	25	male	manual soldering	39.20	33.30
<b>DS 37 L</b>	37	male	manual soldering	53.10	47.00
<b>DS 50 L</b>	50	male	manual soldering	69.50	63.50
				67.00	61.10

	9 - 37 pol.	50 pol.			
art. no.	no. of contacts	contact	connection type	dim. [mm]	
<b>DS 09 T</b>	9	male	dip soldering	A	B
<b>DS 15 T</b>	15	male	dip soldering	30.80	25.00
<b>DS 25 T</b>	25	male	dip soldering	39.20	33.30
<b>DS 37 T</b>	37	male	dip soldering	53.10	47.00
<b>DS 50 T</b>	50	male	dip soldering	69.50	63.50
				67.00	61.10

	9 - 37 pol.	50 pol.			
art. no.	no. of contacts	contact	connection type	dim. [mm]	
<b>DS 09 WW 3</b>	9	male	wire wrap	A	B
<b>DS 15 WW 3</b>	15	male	wire wrap	30.80	25.00
<b>DS 25 WW 3</b>	25	male	wire wrap	39.20	33.30
<b>DS 37 WW 3</b>	37	male	wire wrap	53.10	47.00
<b>DS 50 WW 3</b>	50	male	wire wrap	69.50	63.50
				67.00	61.10


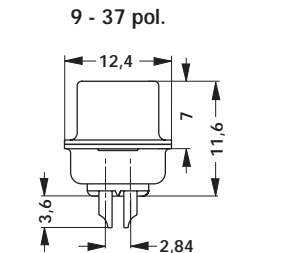
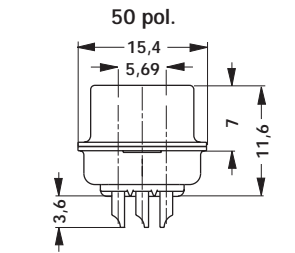
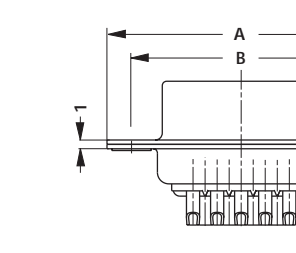
## D-Sub standard connectors

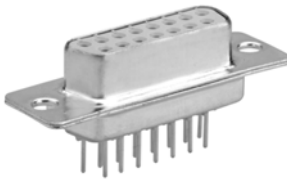
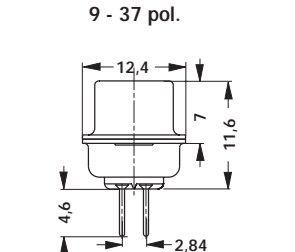
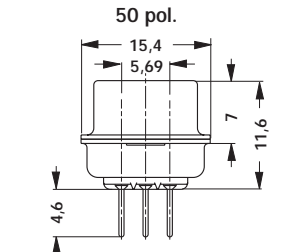
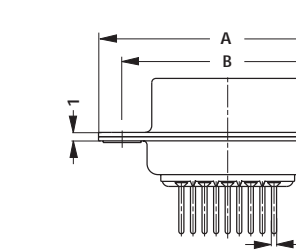
					
	9 - 37 pol.	50 pol.			
art. no.	no. of contacts	contact	connection type	dim. [mm]	
				A	B
<b>DS 37 LA</b>	37	male	90° angled	69.50	63.50
<b>DS 50 LA</b>	50	male	90° angled	67.00	61.10

**cases:** tin-plated

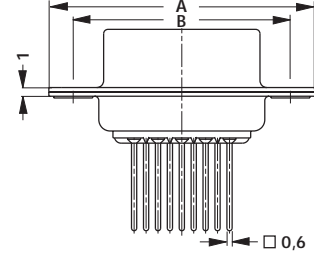
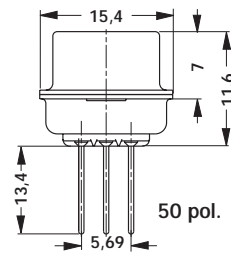
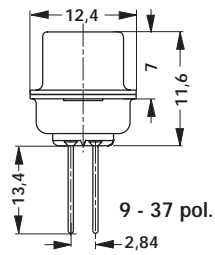
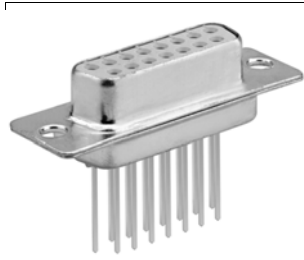
With turned precision contacts. The screened version.

### Female headers manual soldering

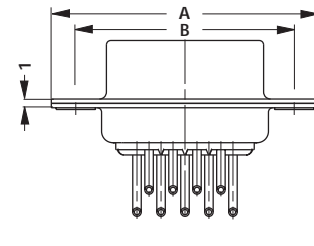
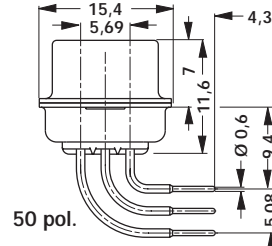
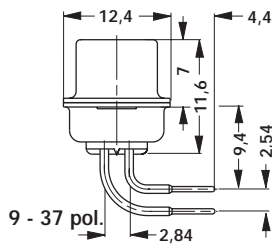
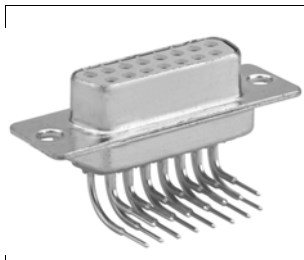
					
	9 - 37 pol.	50 pol.			
art. no.	no. of contacts	contact	connection type	dim. [mm]	
				A	B
<b>DB 09 L</b>	9	female	manual soldering	30.80	25.00
<b>DB 15 L</b>	15	female	manual soldering	39.20	33.30
<b>DB 25 L</b>	25	female	manual soldering	53.10	47.00
<b>DB 37 L</b>	37	female	manual soldering	69.50	63.50
<b>DB 50 L</b>	50	female	manual soldering	67.00	61.10

					
	9 - 37 pol.	50 pol.			
art. no.	no. of contacts	contact	connection type	dim. [mm]	
				A	B
<b>DB 09 T</b>	9	female	dip soldering	30.80	25.00
<b>DB 15 T</b>	15	female	dip soldering	39.20	33.30
<b>DB 25 T</b>	25	female	dip soldering	53.10	47.00
<b>DB 37 T</b>	37	female	dip soldering	69.50	63.50
<b>DB 50 T</b>	50	female	dip soldering	67.00	61.10





art. no.	no. of contacts	contact	connection type	dim. [mm]	
				A	B
<b>DB 09 WW 3</b>	9	female	wire wrap	30.80	25.00
<b>DB 15 WW 3</b>	15	female	wire wrap	39.20	33.30
<b>DB 25 WW 3</b>	25	female	wire wrap	53.10	47.00
<b>DB 37 WW 3</b>	37	female	wire wrap	69.50	63.50
<b>DB 50 WW 3</b>	50	female	wire wrap	67.00	61.10

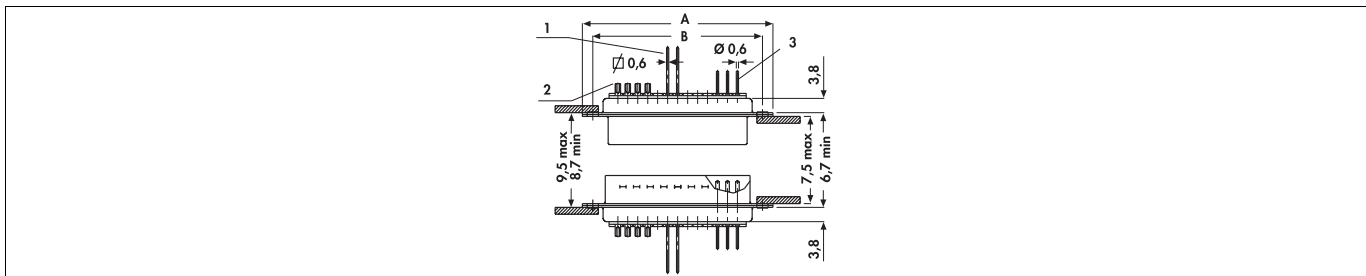


art. no.	no. of contacts	contact	connection type	dim. [mm]	
				A	B
<b>DB 25 LA</b>	25	female	90° angled	53.10	47.00
<b>DB 37 LA</b>	37	female	90° angled	69.50	63.50
<b>DB 50 LA</b>	50	female	90° angled	67.00	61.10

cases: tin-plated

With turned precision contacts. The screened version.

**Einbaudarstellung**



- 1 = wire wrap pin
- 2 = solder terminal
- 3 = solder pin for PCB

Screw fastening  
D-Sub mixed layout  
D-Sub w. mount. bracket

→ I 28  
→ I 13 - 14  
→ I 5 - 6

D-Sub connectors /flat cable  
Technical data

→ I 11  
→ I 29 - 30

A

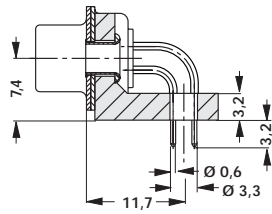
**D-Sub standard connectors with mounting bracket**

B

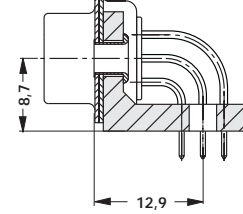
C



9 - 37 pol.



50 pol.

**art. no.**

contact

mounting angle

**DB WK 9**

female

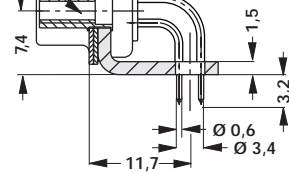
plastic angle, riveted

D

E



UNC 4-40

**art. no.**

contact

mounting angle

**DS WMV 4 ...**

male

metal angle with screw fastening, thread UNC 4-40

**DB WMV 4 ...**

female

metal angle with screw fastening, thread UNC 4-40

F

**please indicate:****... no. of contacts****9, 25**

G

H

I

K

L

M

N

**I 5**


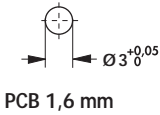
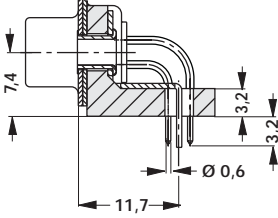
Technical data

→ I 29 - 30

Accessories for HF  
D-Sub standard connectors→ I 29  
→ I 2 - 4D-Sub connectors /flat cable  
D-Sub high density→ I 11  
→ I 7

D-Sub standard connectors with mounting bracket


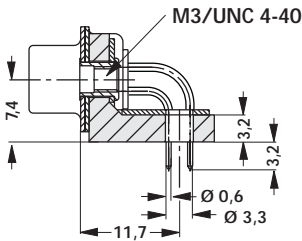
A

			
	<b>art. no.</b>	contact	
<b>DS WR ...</b>	male	plastic angle with earthing plate and snap-on clip	
<b>DB WR ...</b>	female	plastic angle with earthing plate and snap-on clip	
<p><b>please indicate:</b> ... <b>no. of contacts</b> <b>25, 37</b></p>			

B

C


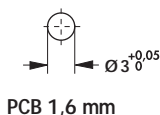
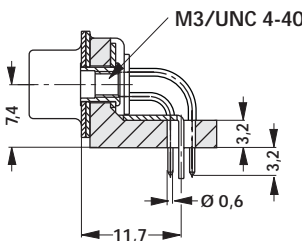
D

			
	<b>art. no.</b>	contact	mounting angle
<b>DS WE 3 ...</b>	male	plastic angle with earthing plate and threaded rivet M3	
<b>DS WE 4 ...</b>	male	plastic angle with earthing plate and threaded rivet UNC 4-40	
<b>DB WE 3 ...</b>	female	plastic angle with earthing plate and threaded rivet M3	
<b>DB WE 4 ...</b>	female	plastic angle with earthing plate and threaded rivet UNC 4-40	
<p><b>please indicate:</b> ... <b>no. of contacts</b> <b>9, 15, 25, 37</b></p>			

E

F

G

			
	<b>art. no.</b>	contact	
<b>DS WR 3 ...</b>	male	plastic angle with earthing plate, snap-on clip and threaded rivet M3	
<b>DS WR 4 ...</b>	male	plastic angle with earthing plate, snap-on clip & threaded rivet UNC 4-40	
<b>DB WR 3 ...</b>	female	plastic angle with earthing plate, snap-on clip and threaded rivet M3	
<b>DB WR 4 ...</b>	female	plastic angle with earthing plate, snap-on clip & threaded rivet UNC 4-40	
<p><b>please indicate:</b> ... <b>no. of contacts</b> <b>9, 15, 25, 37</b></p>			

H

I

K

L

M

Technical data

D-Sub connectors /flat cable  
D-Sub high density

→ I 29 - 30

→ I 11  
→ I 7

Accessories for HF  
D-Sub standard connectors  
D-Sub high density

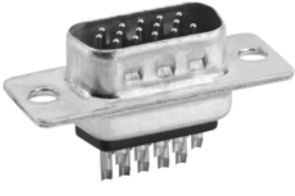
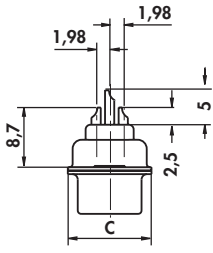
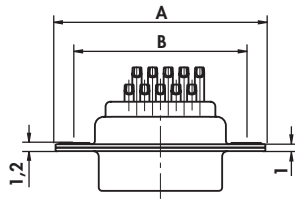
→ I 29  
→ I 2 - 4  
→ I 7

N

A

B

**Male headers**

								
	art. no.	no. of contacts	contact	dim. [mm]				
<b>HD S 15 L</b>	15	male	A	B	C	D	E (max.)	F
<b>HD S 26 L</b>	26	male	30.60	25.00	12.20	7.10	7.60	2.29
<b>HD S 44 L</b>	44	male	39.00	33.30	12.20	6.80	7.00	2.29
			52.80	47.00	12.20	7.00	6.80	2.29

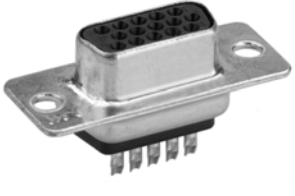
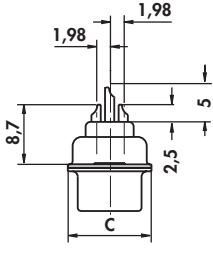
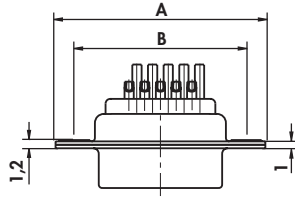
**cases:** tin-plated; **kind of terminal:** manual soldering

With turned precision contacts. The screened version.

E

F

**Female headers**

								
	art. no.	no. of contacts	contact	dim. [mm]				
<b>HD B 15 L</b>	15	female	A	B	C	D	E (max.)	F
<b>HD B 26 L</b>	26	female	30.80	25.00	12.20	7.60	7.10	2.29
<b>HD B 44 L</b>	44	female	39.20	33.30	12.20	7.00	6.80	2.29
			53.00	47.00	12.20	6.80	7.00	2.29

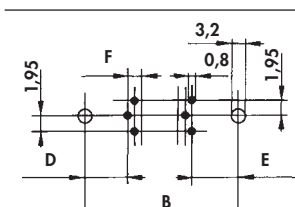
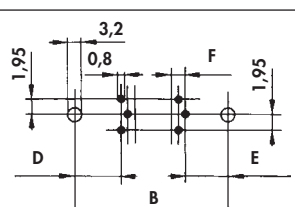
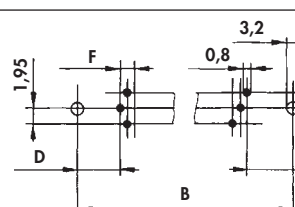
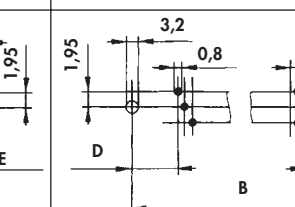
**cases:** tin-plated; **kind of terminal:** manual soldering

With turned precision contacts. The screened version.

H

I

K

<b>1</b> 	<b>2</b> 	<b>3</b> 	<b>4</b> 
---	---	--	---

**1** = male, 15 contacts; **2** = female, 15 contacts

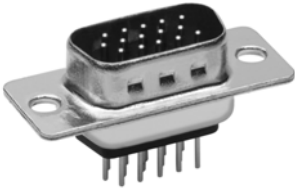
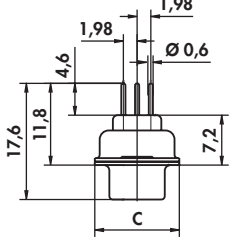
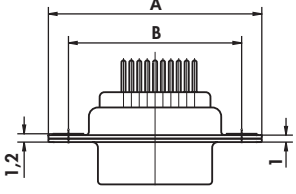
**3** = male, 26/44 contacts; **4** = female, 26/44 contacts

L

M

N

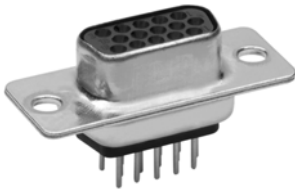
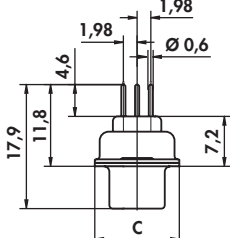
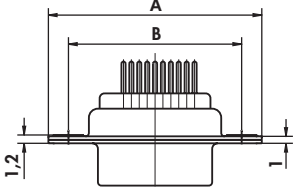
Male headers

								
art. no.	no. of contacts	contact	dim. [mm]					
			A	B	C	D	E (max.)	F
<b>HD S 15 T</b>	15	male	30.60	25.00	12.20	7.10	7.60	2.29

cases: tin-plated; kind of terminal: dip soldering

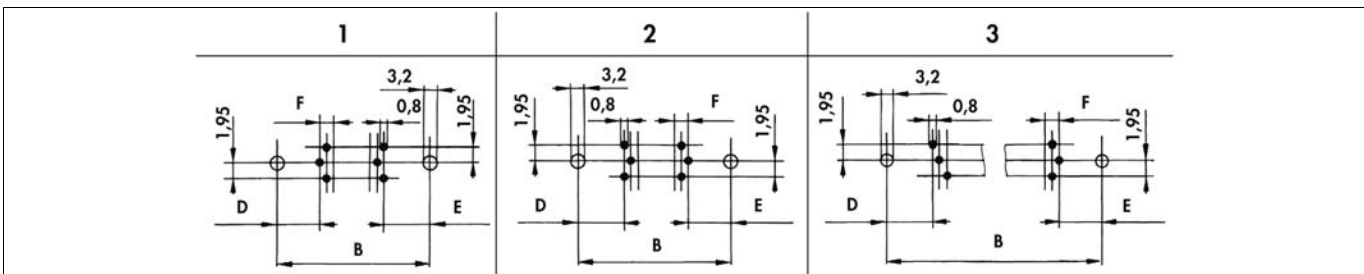
With turned precision contacts. The screened version.

Female headers

								
art. no.	no. of contacts	contact	dim. [mm]					
			A	B	C	D	E (max.)	F
<b>HD B 15 T</b>	15	female	30.80	25.00	12.20	7.60	7.10	2.29
<b>HD B 26 T</b>	26	female	39.20	33.30	12.20	7.00	6.80	2.29

cases: tin-plated; kind of terminal: dip soldering

With turned precision contacts. The screened version.



1 = male, 15 contacts; 2 = female, 15 contacts; 3 = female, 26 contacts

Technical data  
Screw fastening

→ I 29 - 30  
→ I 28

High-prec.male head.in SMD mount. → G 35  
Accessories for HF → I 29  
D-Sub cut-out cover → I 27

D-Sub connectors /flat cable

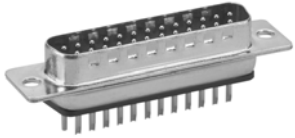
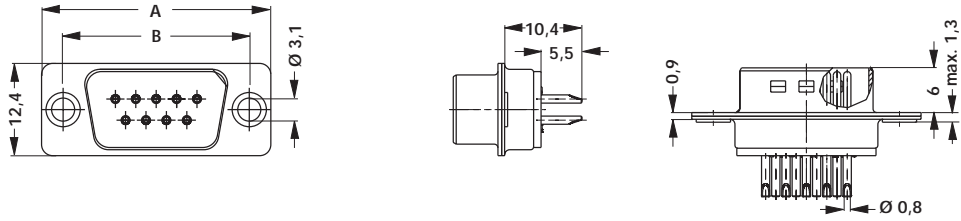
→ I 11



## D-Sub filter connector

### Male headers, mit Lötkelch

capacity per contact: 1000 pF - other components on request; geeignet für Kabel AWG 22

				
art. no.	no. of contacts	contact	dim. [mm]	
			A	B
<b>FD S 09 L 1000</b>	9	male	30.80	25.00
<b>FD S 15 L 1000</b>	15	male	39.20	33.30
<b>FD S 25 L 1000</b>	25	male	53.10	47.00
<b>FD S 37 L 1000</b>	37	male	69.50	63.50

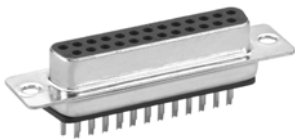
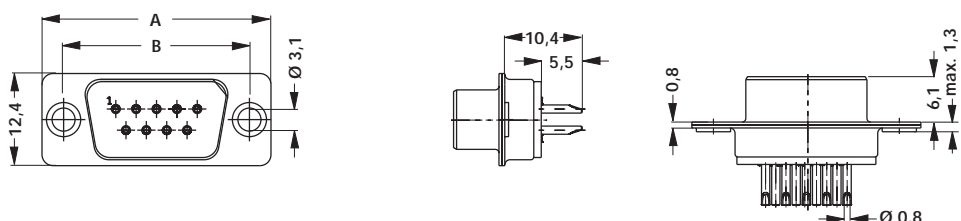
Standard installation dimensions.

HF-tight, closed metal rear panel.

Compatible with standard accessories.

### Female headers, mit Lötkelch

capacity per contact: 1000 pF - other components on request; geeignet für AWG 22

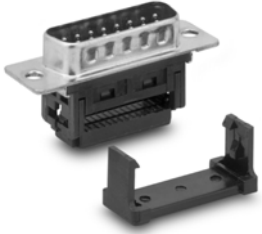
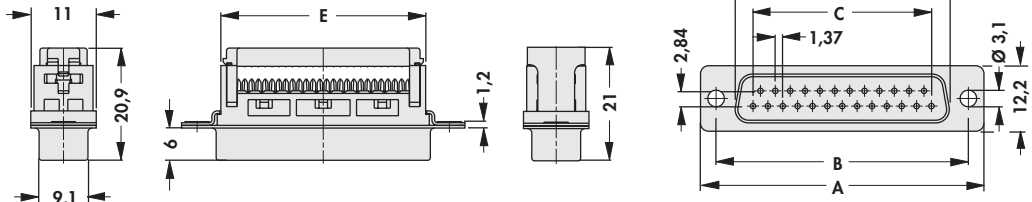
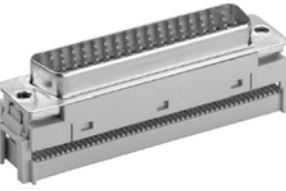
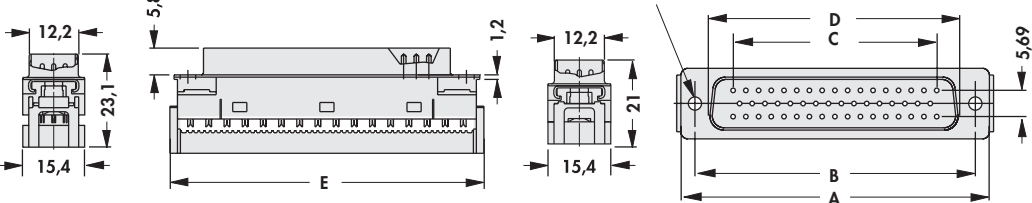

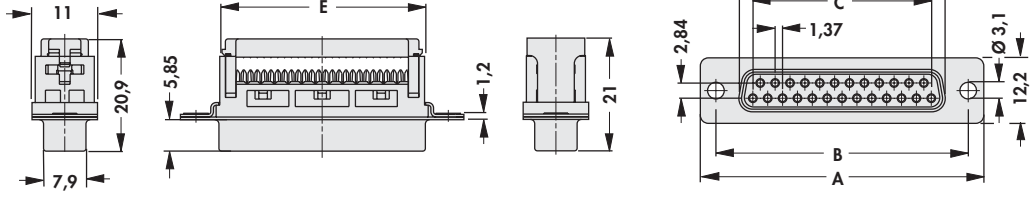
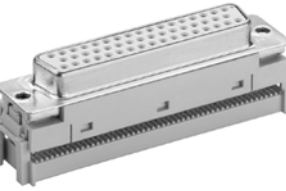
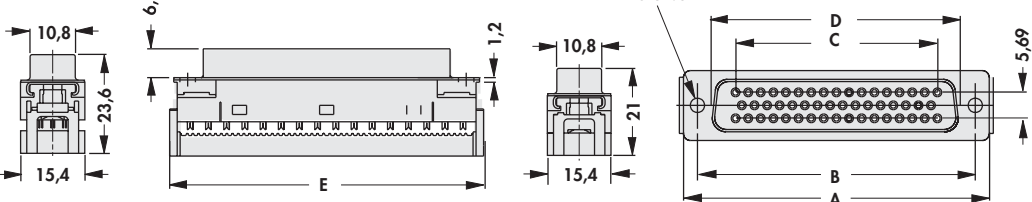
				
art. no.	no. of contacts	contact	dim. [mm]	
			A	B
<b>FD B 09 L 1000</b>	9	female	30.80	25.00
<b>FD B 15 L 1000</b>	15	female	39.20	33.30
<b>FD B 25 L 1000</b>	25	female	53.10	47.00
<b>FD B 37 L 1000</b>	37	female	69.50	63.50

Standard installation dimensions.

HF-tight, closed metal rear panel.

Compatible with standard accessories.

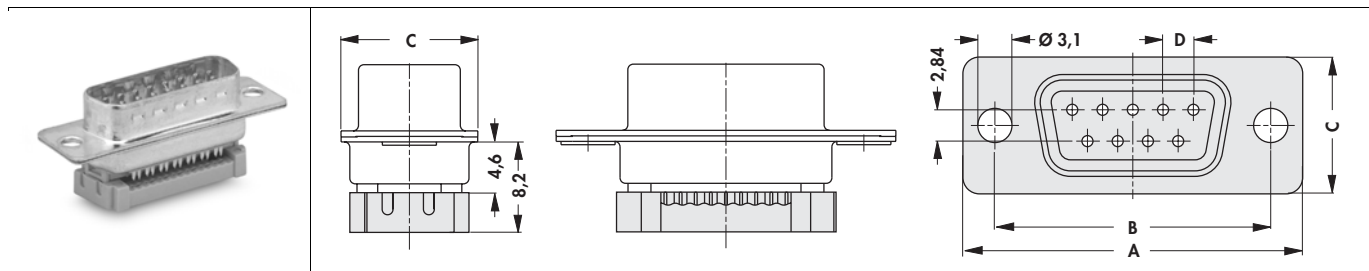
### Male headers and female headers

							
<b>art. no.</b>	no. of contacts	contact	dim. [mm]				
<b>DS BK 09</b>	9	male	A	B	C	D	E (max.)
<b>DS BK 15</b>	15	male	39.00	33.30	19.33	26.20	23.90
<b>DS BK 25</b>	25	male	52.80	47.00	33.13	39.90	38.10
<b>DS BK 37</b>	37	male	69.20	63.50	49.70	56.30	54.70
							
<b>art. no.</b>	no. of contacts	contact	dim. [mm]				
<b>DS BK 50</b>	50	male	A	B	C	D	E (max.)
<b>DS BK 50</b>	50	male	66.80	61.10	44.20	54.00	68.60
							
<b>art. no.</b>	no. of contacts	contact	dim. [mm]				
<b>DB BK 09</b>	9	female	A	B	C	D	E (max.)
<b>DB BK 15</b>	15	female	39.00	33.30	19.33	24.50	23.90
<b>DB BK 25</b>	25	female	52.80	47.00	33.13	38.50	38.10
<b>DB BK 37</b>	37	female	69.20	63.50	49.70	54.80	54.70
							
<b>art. no.</b>	no. of contacts	contact	dim. [mm]				
<b>DB BK 50</b>	50	female	A	B	C	D	E (max.)
<b>DB BK 50</b>	50	female	66.80	61.10	44.20	52.40	68.60



D-Sub connector for flat ribbon cable

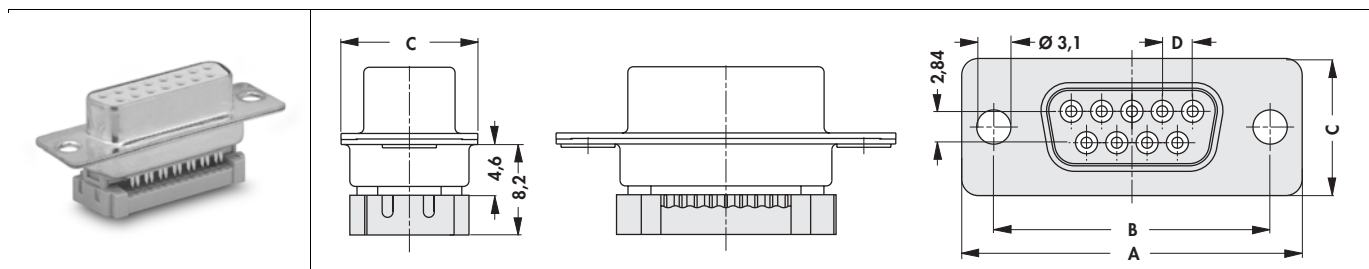
Male headers, low profile



art. no.	no. of contacts	contact	dim. [mm]			
			A	B	C	D
<b>DS BK 09 LP</b>	9	male	30.80	25.00	12.40	2.74
<b>DS BK 15 LP</b>	15	male	39.20	33.30	12.40	2.74
<b>DS BK 25 LP</b>	25	male	53.10	47.00	12.40	2.77
<b>DS BK 37 LP</b>	37	male	69.50	63.50	12.40	2.77

useable ribbon cable: AWG 26 - 28

Female headers, low profile



art. no.	no. of contacts	contact	dim. [mm]			
			A	B	C	D
<b>DB BK 09 LP</b>	9	female	30.80	25.00	12.40	2.74
<b>DB BK 25 LP</b>	25	female	53.10	47.00	12.40	2.77
<b>DB BK 37 LP</b>	37	female	69.50	63.50	12.40	2.77

useable ribbon cable: AWG 26 - 28

A

**D-Sub mixed layout connectors**

B

**Male headers - suitable for standard D-Sub accessories**

3 high current contacts

<b>art. no.</b> <b>DSM 3K3 L20</b>	contact male			

D

2 high current contacts, 5 signal contacts

<b>art. no.</b> <b>DSM 7K2 L20</b>	contact male			

E

F

G

3 high current contacts, 10 signal contacts

<b>art. no.</b> <b>DSM 13K3 L20</b>	contact male			

H

I

Gold-plated contacts.

With high current contacts up to 20 A.

For cables up to AWG 16.

K

L

M

N

**I 13**
**D-Sub high density**
**→ I 7**
**D-Sub standard connectors**
**→ I 2 - 3**
**D-Sub cut-out cover**
**→ I 27**
**Accessories for HF  
Screw fastening**
**→ I 29**
**→ I 28**

Female headers - suitable for standard D-Sub accessories

3 high current contacts

<p><b>art. no.</b> <b>DBM 3K3 L20</b></p>	<p>contact female</p>			

2 high current contacts, 5 signal contacts

<p><b>art. no.</b> <b>DBM 7K2 L20</b></p>	<p>contact female</p>			

3 high current contacts, 10 signal contacts

<p><b>art. no.</b> <b>DBM 13K3 L20</b></p>	<p>contact female</p>			

Gold-plated contacts.

With high current contacts up to 20 A.

For cables up to AWG 16.


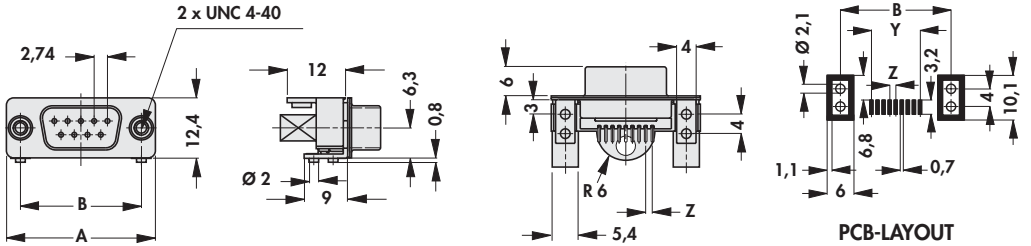
A


**D-Sub in SMD-mounting**

B

C

**Male headers**

					
art. no.	no. of contacts	dim. [mm]			
		A	B	Y	Z
<b>DS 09 SMD TR</b>	9	30.80	25.00	10.98	1.37
<b>DS 15 SMD TR</b>	15	39.20	33.30	19.20	1.37
<b>DS 25 SMD TR</b>	25	53.10	47.00	33.12	1.38
<b>DS 37 SMD TR</b>	37	69.50	63.50	49.68	1.38

D

**packing:** tape and reel (150 pcs/reel); reel outer diameter 330 mm

E

F

G

H

I

K

L

M

N

**I 15**
**D-Sub mixed layout**
**→ I 13 - 14**
**D-Sub standard connectors**
**→ I 2 - 4**
**D-Sub connectors /flat cable**
**→ I 11**
**D-Sub high density**
**→ I 7**
**D-Sub cut-out cover**
**→ I 27**

D-Sub hoods, standard

A

B

C

D

E

F

G

H

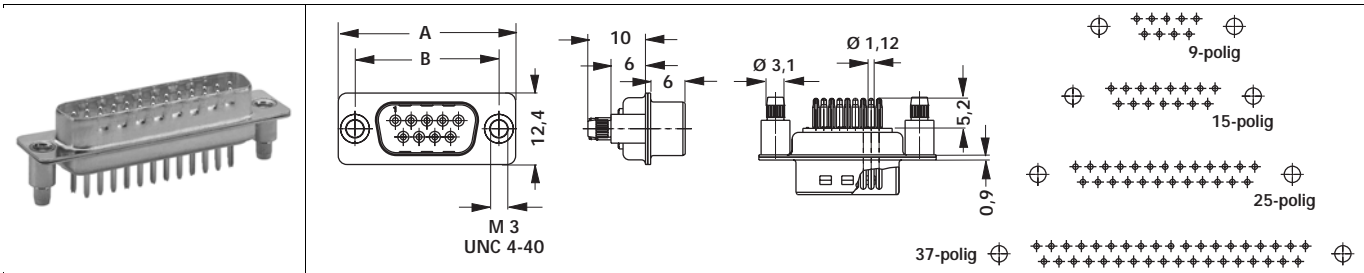
I

K

L

M

N



art. no.	no. of contacts	type of thread	dim. [mm]	
			A	B
DS ... 9 P	9	3	30.80	25.00
DS ... 15 P	15	3	39.20	33.30
DS ... 25 P	25	3	53.10	47.00
DS ... 37 P	37	3	69.50	63.50


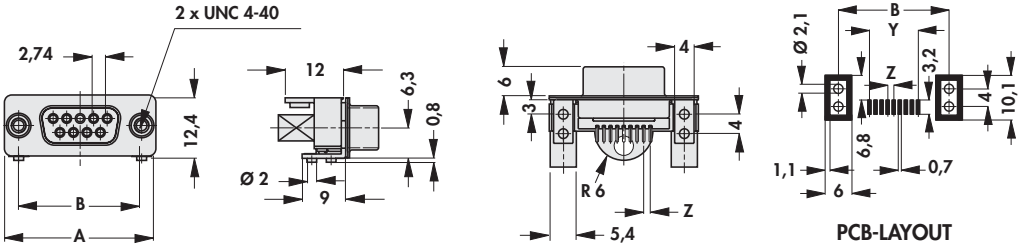
**please indicate:** ... type of thread  
**3 = M 3**  
**4 = UNC 4-40**

A

B

C

**Female headers**

					
art. no.	no. of contacts	dim. [mm]			
		A	B	Y	Z
<b>DB 09 SMD TR</b>	9	30.80	25.00	10.98	1.37
<b>DB 15 SMD TR</b>	15	39.20	33.30	19.20	1.37
<b>DB 25 SMD TR</b>	25	53.10	47.00	33.12	1.38
<b>DB 37 SMD TR</b>	37	69.50	63.50	49.68	1.38

D

E

**packing:** tape and reel (150 pcs/reel); reel outer diameter 330 mm

F

G

H

I

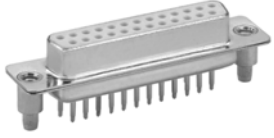
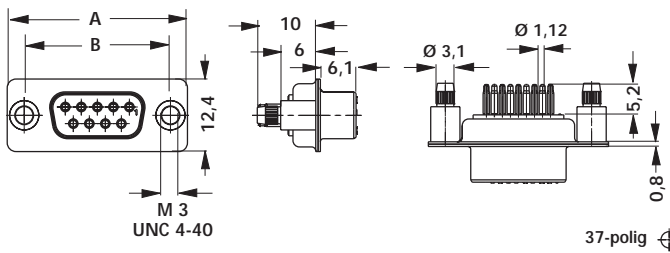
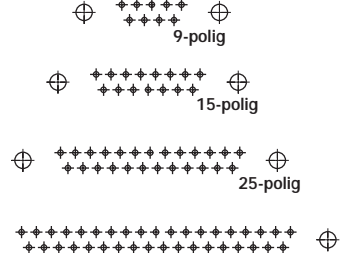
K

L

M

N

D-Sub hoods, standard

art. no.	no. of contacts	type of thread	dim. [mm]	
			A	B
<b>DB ... 9 P</b>	9	3	30.80	25.00
<b>DB ... 15 P</b>	15	3	39.20	33.30
<b>DB ... 25 P</b>	25	3	53.10	47.00
<b>DB ... 37 P</b>	37	3	69.50	63.50

**please indicate:** ... type of thread  
**3 = M 3**  
**4 = UNC 4-40**

A

B

C

D

E

F

G

H

I

K

L

M

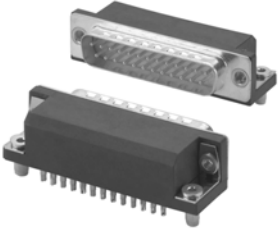
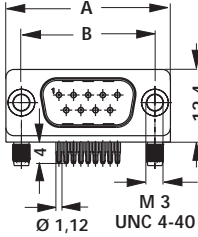
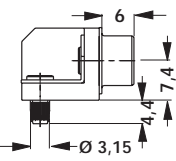
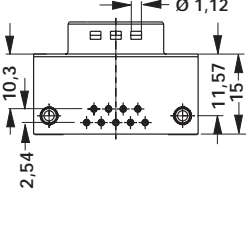
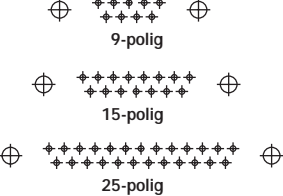
N

A

**D-Sub hoods, standard**

B

C

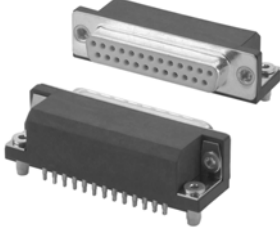
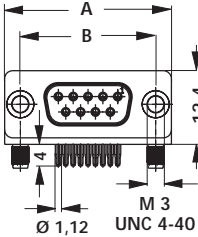
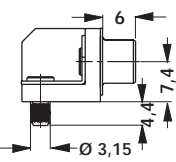
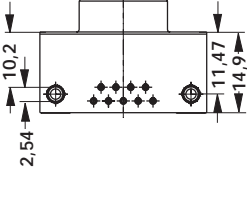
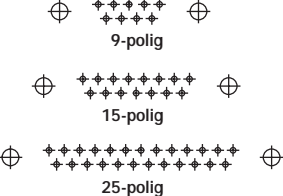
				
<b>art. no.</b>	no. of contacts	type of thread	dim. [mm]	
<b>DS WP ... 9</b>	9	3	A	B
<b>DS WP ... 15</b>	15	3	30.80	25.00
<b>DS WP ... 25</b>	25	3	39.20	33.30
<b>DS WP ... 37</b>	37	3	53.10	47.00
<b>please indicate:</b>				
... type of thread				
3 = M 3				
4 = UNC 4-40				

E

F

G

H

				
<b>art. no.</b>	no. of contacts	type of thread	dim. [mm]	
<b>DB WP ... 9</b>	9	3	A	B
<b>DB WP ... 15</b>	15	3	30.80	25.00
<b>DB WP ... 25</b>	25	3	39.20	33.30
<b>DB WP ... 37</b>	37	3	53.10	47.00
<b>please indicate:</b>				
... type of thread				
3 = M 3				
4 = UNC 4-40				

I

K

L

M

N



D-Sub hoods, standard

<b>art. no.</b>	no. of contacts	dim. [mm]				
		E (max.)	A	B	C	D
<b>DH 09 ...</b>	9	8.50	31.50	25.00	15.20	31.00
<b>please indicate:</b>		<b>... case surface:</b> S = plastic, black M = plastic, metallized				

<b>art. no.</b>	no. of contacts	dim. [mm]				
		E (max.)	A	B	C	D
<b>DH 15 ...</b>	15	8.50	40.00	33.30	15.20	33.50
<b>DH 25 ...</b>	25	11.00	53.50	47.00	15.20	38.00
<b>DH 37 ...</b>	37	11.00	70.00	63.50	15.20	40.00
<b>DH 50 ...</b>	50	12.00	67.50	61.10	18.20	40.00
<b>please indicate:</b>		<b>... case surface:</b> S = plastic, black M = plastic, metallized				

E = max. diameter of the bushing in mm  
Threaded bolt UNC 4-40. Large cable space with few components.

**version:** 9-37 can be mounted in series in 3 HP grid, thus especially suitable for 19" technology.  
**plastic material according:** to UL 94:V-0

Suitable cable bushing

Protects the cable against damage by buckling.

<b>art. no.</b>	for no. of contacts	
<b>KT 0915</b>	9, 15	
<b>KT 2550</b>	25, 37, 50	

D-Sub connectors /flat cable  
D-Sub mixed layout


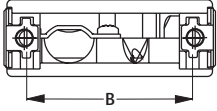
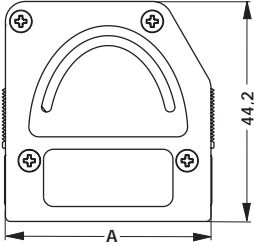
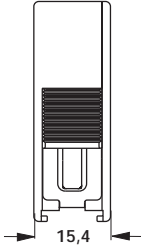
Screw fastening

→ I 11  
I 13  
- 14  
I 28



D-Sub hoods with quick-action locking system


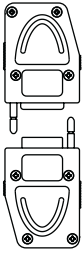
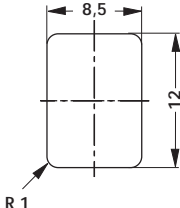
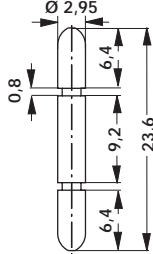
straight and side-gated cable outlet

			
art. no.	no. of contacts	dim. [mm]	
		A	B
<b>DH SV 09 S</b>	9	33.00	25.00
<b>DH SV 15 S</b>	15	41.30	33.30
<b>DH SV 25 S</b>	25	55.00	47.00

option: metallised surface on request


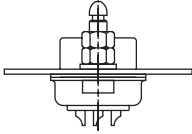
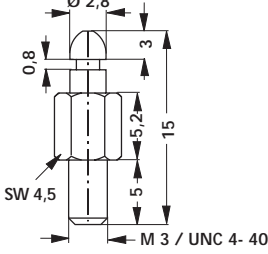
material: thermoplastic ABS

Accessories – latch pin for hood – hood connection

			
<b>art. no.</b>			
<b>RS HH</b>			

Accessories – latch pin for plug connector – hood connection

latch pin for connectors with thread M3 / UNC 4-40


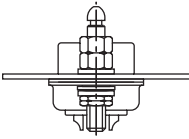
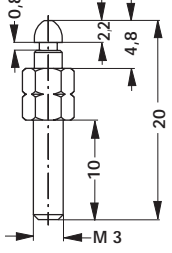
		
art. no.	type of thread	
<b>RS SH 3</b>	M 3	
<b>RS SH 4</b>	UNC 4-40	

A

B

**Accessories – latch pin for plug connector – hood connection**


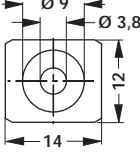
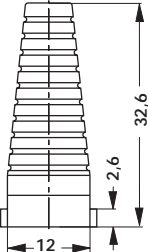
latch pin for existing connector with through hole

		
<b>art. no.</b> <b>RS SH D</b>		

D

**Cable sleeve - quick-acting closure hood DH SV ...**

for cable diameters 3-9 mm

		
<b>art. no.</b> <b>KT SV</b>	<b>no. of contacts</b> 9, 15, 25	

E

F

G

Cable sleeves are supplied with chamfers, which are adequate to a diameter-grading of 0.5 mm. They can be cut off depending on the existing diameter of the cable.

H

**flammability:** UL 94 HB

I

K

L

M

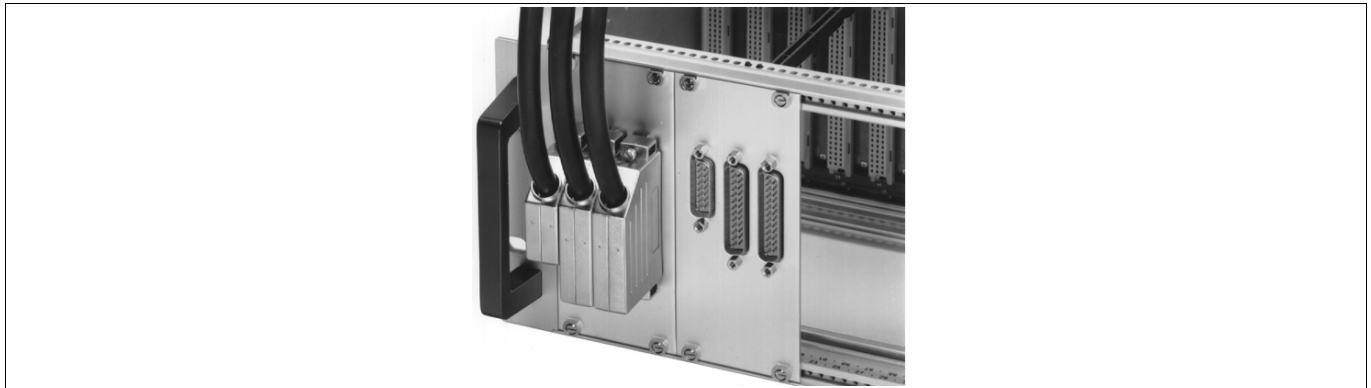
N

**I 23**

Screw fastening → I 28  
 D-Sub cut-out cover → I 27  
 Accessories for HF → I 29  
 D-Sub connectors /flat cable → I 11

**D-Sub High Density**
**→ I 8**

9-50 pins



Width C - 3 HP.

**version:** 9-37 pins can be mounted in series in 3 HP grid, thus especially suitable for 19" technology

**plastic material:** according to UL 94 V-0

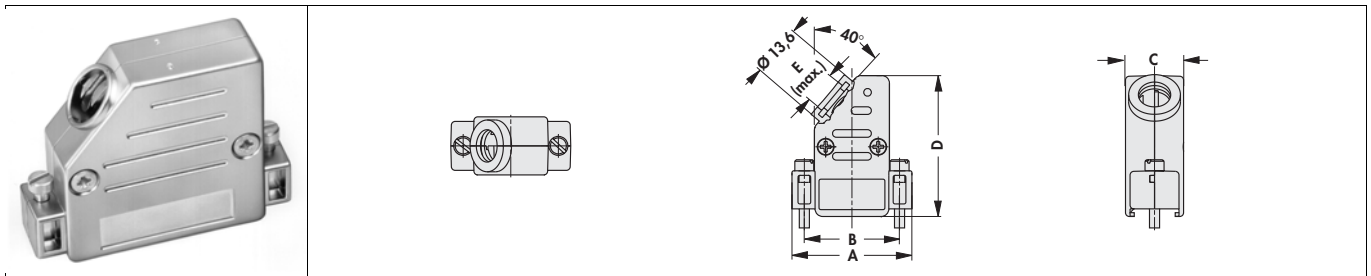
Metallized version with excellent shielding against electrical and magnetic alternating fields.

2-at side cable outputs (25-50 pins).

40° opening, open (9-50 pins). 90° opening, covered (25-50 pins).

Integrated dust protective shroud.

Captive latching screws with UNC 4-40 treads.



art. no.	no. of contacts	dim. [mm]				
		A	B	C	D	E (max.)
DH 09 ...	9	31.50	25.00	15.20	37.00	8.50
DH 15 ...	15	40.00	33.30	15.20	37.00	8.50
DH 25 ...	25	53.50	47.00	15.20	41.00	11.00
DH 37 ...	37	70.00	63.50	15.20	41.00	11.00
DH 50 ...	50	67.80	61.10	18.20	41.00	12.00

please indicate: ... case surface:  
**K = plastic, black**  
**KM = plastic, metallized**

**E = max. diameter of the bushing in mm**

A


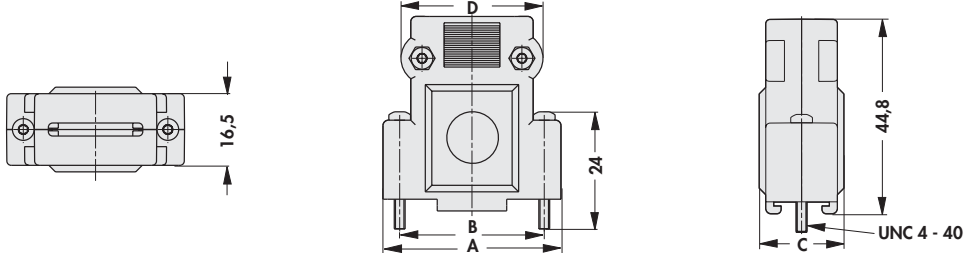
**D-Sub cover for flat cable**

B

**D-Sub cover for flat cable, 9-25 contacts**

for D-Sub connectors DS BK ... and DB BK ...

C

					
art. no.	no. of contacts	dim. [mm]			
		A	B	C	D
<b>DH BK 09 ...</b>	9	33.00	25.00	19.50	24.60
<b>DH BK 25 ...</b>	25	54.80	47.00	19.50	47.60
<b>please indicate:</b>		<b>... case surface:</b> <b>K = plastic, grey</b> <b>KM = plastic, metallized</b>			

D

E

**material:** ABS; Internal strain relief. Two-part plastic hood with UNC 4-40 screws.

F

G

H

I

K

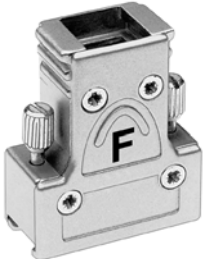
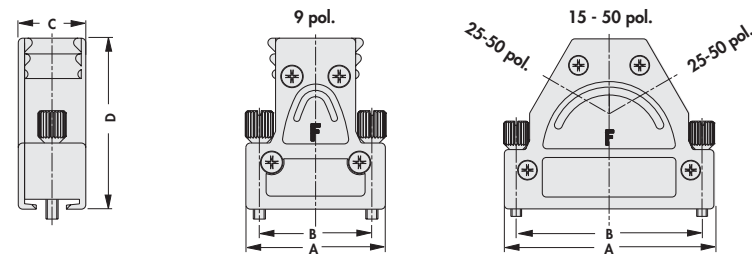
L

M

N

**I 25**
**Male headers 2.54 solder**  
**Female header two rows**  
**Single contacts metal strip**  
**Boltable female header**
**→ G 8**  
**→ H 4**  
**→ G 26**  
**→ H 5**
**Application tools**  
**Female header grid 2.00**  
**Peel-off terminal strips**
**→ H 11**  
**→ H 10**  
**→ G 25**

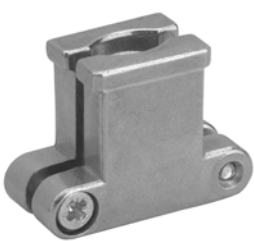
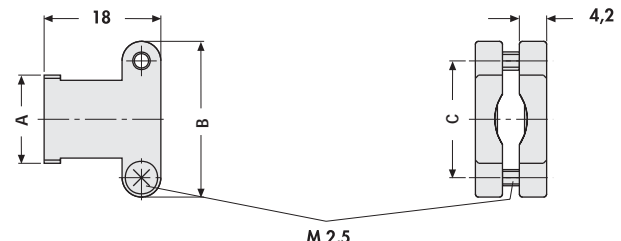
Vertical cable clamp

								
	art. no.	no. of contacts	cable clamps	crimp flange	crimp sleeve	dim. [mm]		
<b>DH 09 VM</b>	9	KKS 937	CF ...	CH ...	A	B	C	D
<b>DH 15 VM</b>	15	KKS 937	CF ...	CH ...	31.00	25.00	15.00	38.00
<b>DH 25 VM</b>	25	KKS 937	CF ...	CH ...	39.50	33.30	15.00	35.00
<b>DH 37 VM</b>	37	KKS 937	CF ...	CH ...	53.00	47.00	15.00	43.00
<b>DH 50 VM</b>	50	KKS 050	CF ...	CH ...	69.50	63.50	15.00	43.00
					67.20	61.10	17.80	43.00

Lateral knurled screws with UNC 4-40 thread. Easy mounting due to pre-tapped thread.  
 HF-tight due to crimp flange CF ...

Accessories for D-Sub hoods made of full metal - screwable cable clamp

For clamping the screen and as strain relief.

					
	art. no.	no. of contacts	dim. [mm]		
			A	B	C
<b>KKS 050</b>	50		19.80	25.00	19.00

A

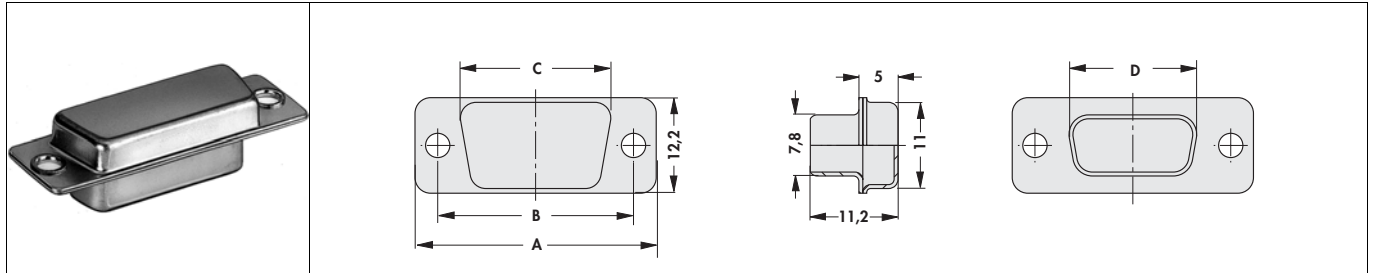
**Cut-out cover**

B

**Cover for D-Sub cut outs in front and backpanel**

suitable for EMC application, closed one side

C



D

art. no.	no. of contacts	dim. [mm]			
		A	B	C	D
<b>BADM 09</b>	9	30.80	25.00	19.20	16.30
<b>BADM 15</b>	15	39.30	33.30	27.50	24.50
<b>BADM 25</b>	25	53.00	47.00	41.20	38.30
<b>BADM 37</b>	37	69.40	63.50	57.70	54.80

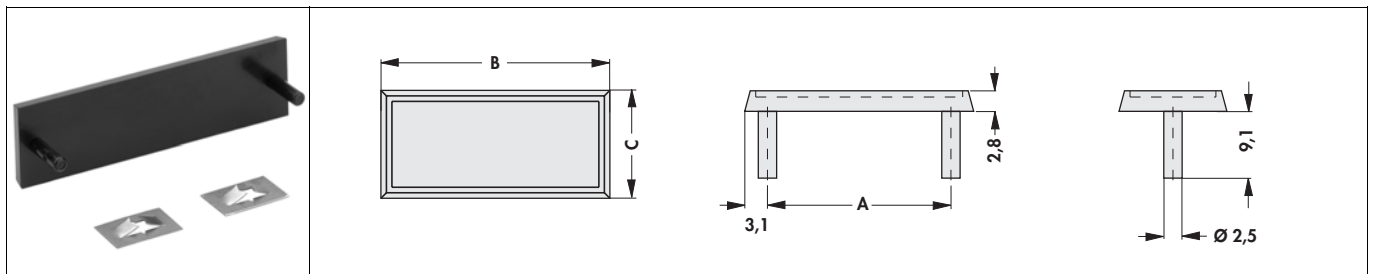
E

**surface metal case:** tin-plated

F

 Blank covers for exact sealing of unused D-Sub cut outs in front- and backpanels.  
 Size and form are as D-Sub housings.

G



H

art. no.	no. of contacts	dim. [mm]		
		A	B	C
<b>BADP 09</b>	9	25.00	31.20	14.70
<b>BADP 15</b>	15	33.30	39.60	14.70
<b>BADP 25</b>	25	47.00	53.30	14.70
<b>BADP 37</b>	37	63.50	69.90	14.70
<b>BADP 50</b>	50	61.10	67.60	14.70

I

K

 Plastic cover, blank, for blind D-Sub and other connector cutouts in front and rear panels.  
 Easy to mount with enclosed clamping springs.

**material:** ABS

**flammability:** UL 94 V-0

**colour:** black

**clamping spring:** steel

L

M

N

**I 27**
**D-Sub standard connectors**  
**Technical data**
**Screw fastening**

 → I 2 - 4  
 → I 27 - 28

→ I 28

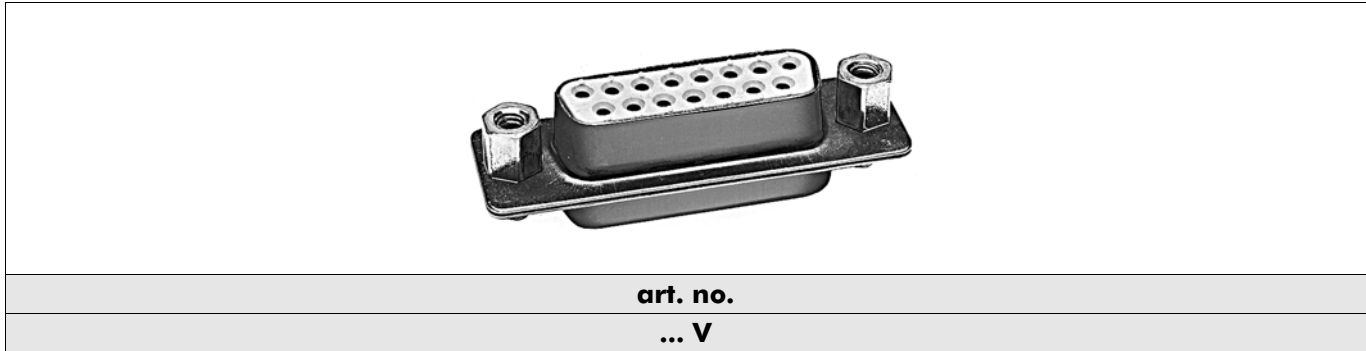
**D-Sub connectors /flat cable**  
**D-Sub high density**

 → I 11  
 → I 17



**Screw fastening, mounted**

2 screw fastenings incl. spacer, washer, nut

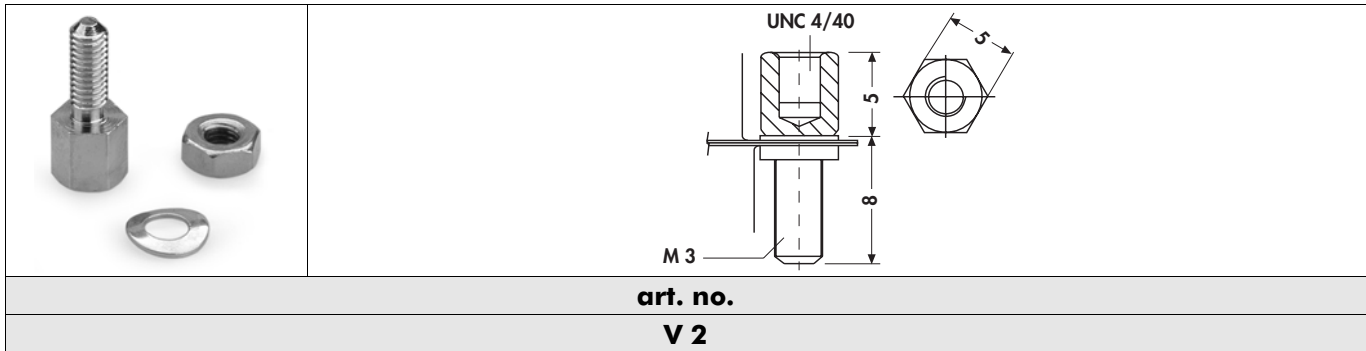


art. no.  
... V

Please add a V to the corresponding art. no. ...

**Screw fastening, loose**

2 separate screw fasteners, with washer and nut



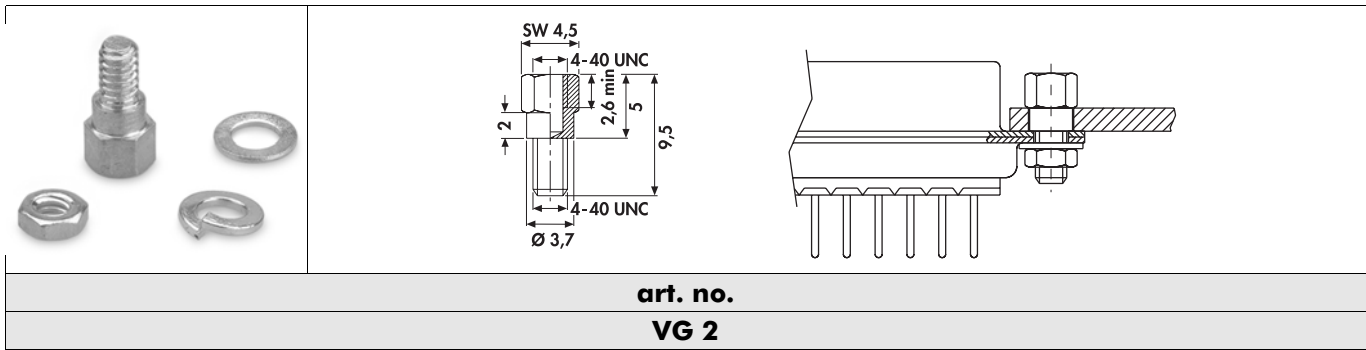
art. no.  
V 2

**material:**

**screw** - brass nickel-plated; **screw-nut** - steel nickel-plated; **washer** - steel tin-plated

**Screw fastening for assembly of cases, separate**

2 screw fastenings incl. spacer, washer, nut



art. no.  
VG 2

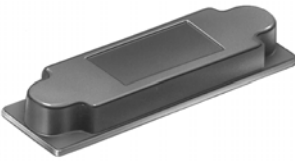
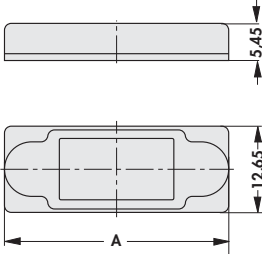
**material:**

**screw and screw-nut** - steel nickel-plated; **washer** - steel tin-plated

## HF-tight caps, HF-seals

### HF-tight caps, male headers and female headers

prevent HF-radiation at open interfaces

				
	art. no.	no. of contacts	colour	contact
<b>HFK S 09</b>	9	blue	male	32.90
<b>HFK S 15</b>	15	blue	male	41.30
<b>HFK S 25</b>	25	blue	male	55.70
<b>HFK B 09</b>	9	red	female	32.90
<b>HFK B 15</b>	15	red	female	41.30
<b>HFK B 25</b>	25	red	female	55.70


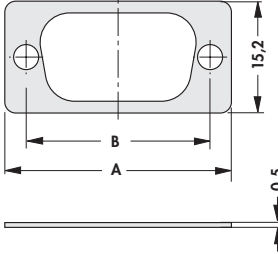
**material:** ABS plastics UL 94:V-0, nickel-plated on the inside

**flammability:** <1 Ω

**temperature range:** -25 °C ... +70 °C

### HF-seals

as seal between plug and housing


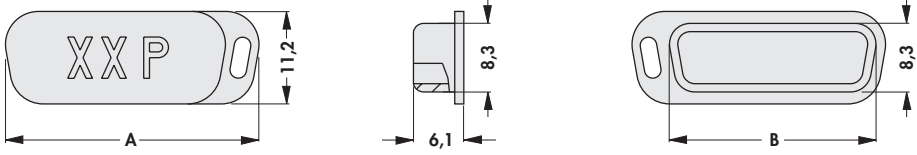
				
	art. no.	no. of contacts	dim. [mm]	
			A	B
<b>HFD 09</b>	9		30.80	25.00
<b>HFD 15</b>	15		39.40	33.30
<b>HFD 25</b>	25		53.40	47.00
<b>HFD 37</b>	37		70.70	63.50

**material:** silicone, filling of silvered copper particles

Extremely low contact resistance.


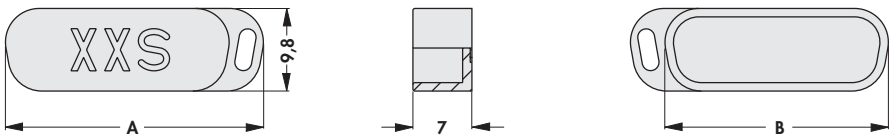
Dust protection caps

For male headers

			
art. no.	no. of contacts	dim. [mm]	
		A	B
<b>SSK S 09</b>	9	22.50	18.20
<b>SSK S 15</b>	15	30.60	26.50
<b>SSK S 25</b>	25	43.70	39.80
<b>SSK S 37</b>	37	60.30	56.20

material: polyethylere

For female headers

			
art. no.	no. of contacts	dim. [mm]	
		A	B
<b>SSK B 09</b>	9	22.30	17.00
<b>SSK B 15</b>	15	30.60	25.00
<b>SSK B 25</b>	25	44.10	38.65
<b>SSK B 37</b>	37	60.70	55.30

material: polyethylere

A

B

C

D

E

F

G

H

**I**

K

L

M

N

**I 31**

**Technische Daten**  
**D-Sub für Filtersteckverbinder**  
**D-Sub für Bandkabel**  
**D-Sub Crimp**

→ G 21 - 22  
→ G 6  
→ G 7  
→ G 9 - 10

A

**Brackets for PC**

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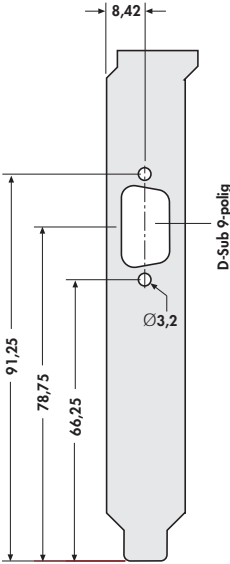
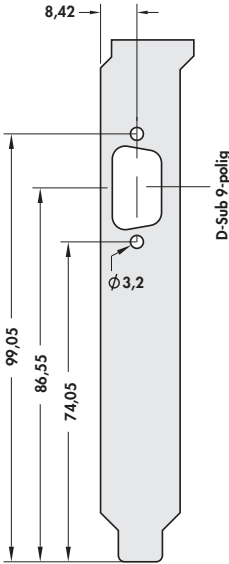
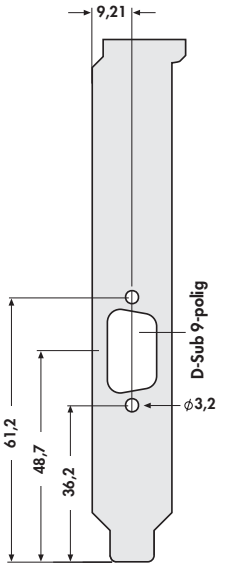
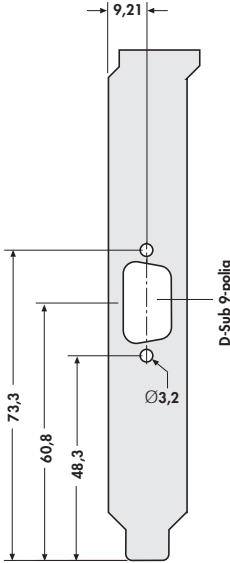
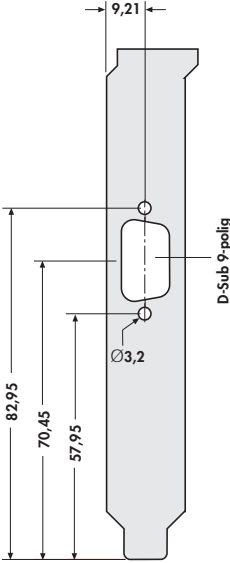
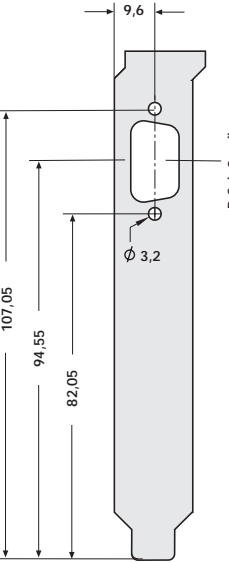
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	<b>PCI 006 ...</b> 	<b>PCI 007 ...</b> 	<b>PCI 055 ...</b> 
<b>PCI 004 ...</b> 	<b>PCI 005 ...</b> 	<b>PCI 029 L</b> 	

PCI 011 ...	PCI 013 ...	PCI 039 ...	
PCI 041 ...	PCI 012 ...	PCI 040 O	

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

**Brackets for PC**

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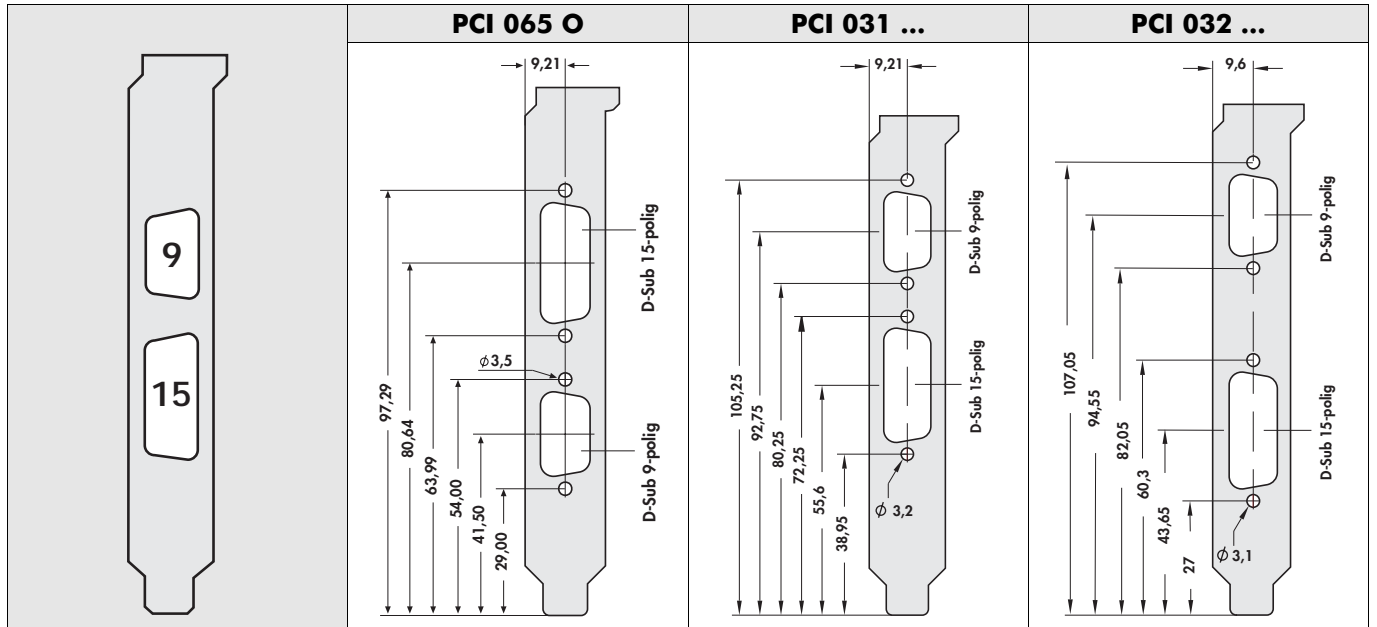
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**K 9**

If you do not find a suitable bracket,  
please use the PCI / KHPC design sheet  
at the end of section "K".

PCI 033 ...			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab



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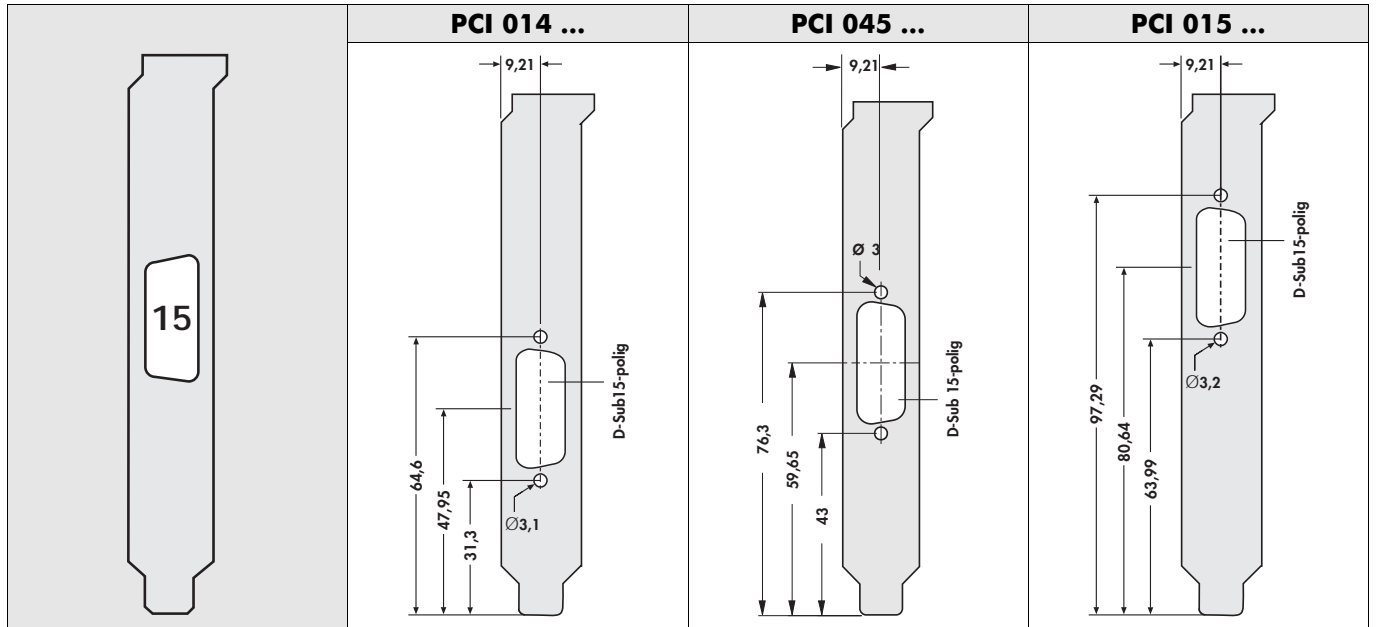
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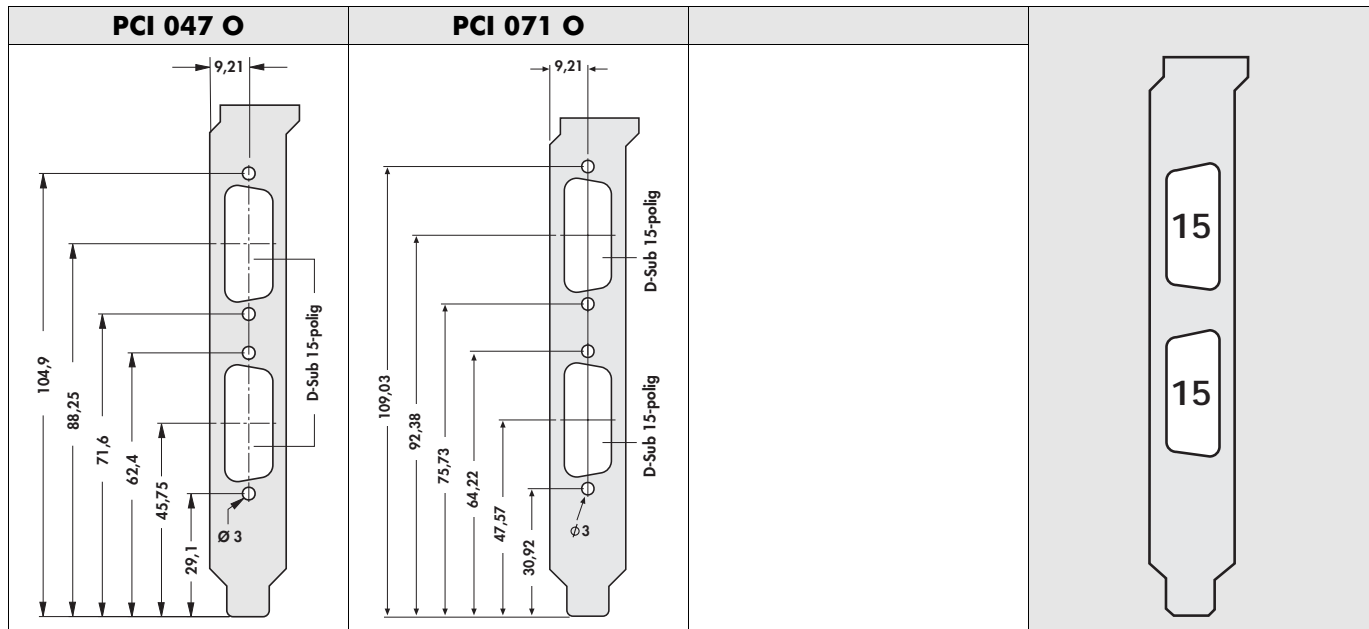
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please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

**Brackets for PC**

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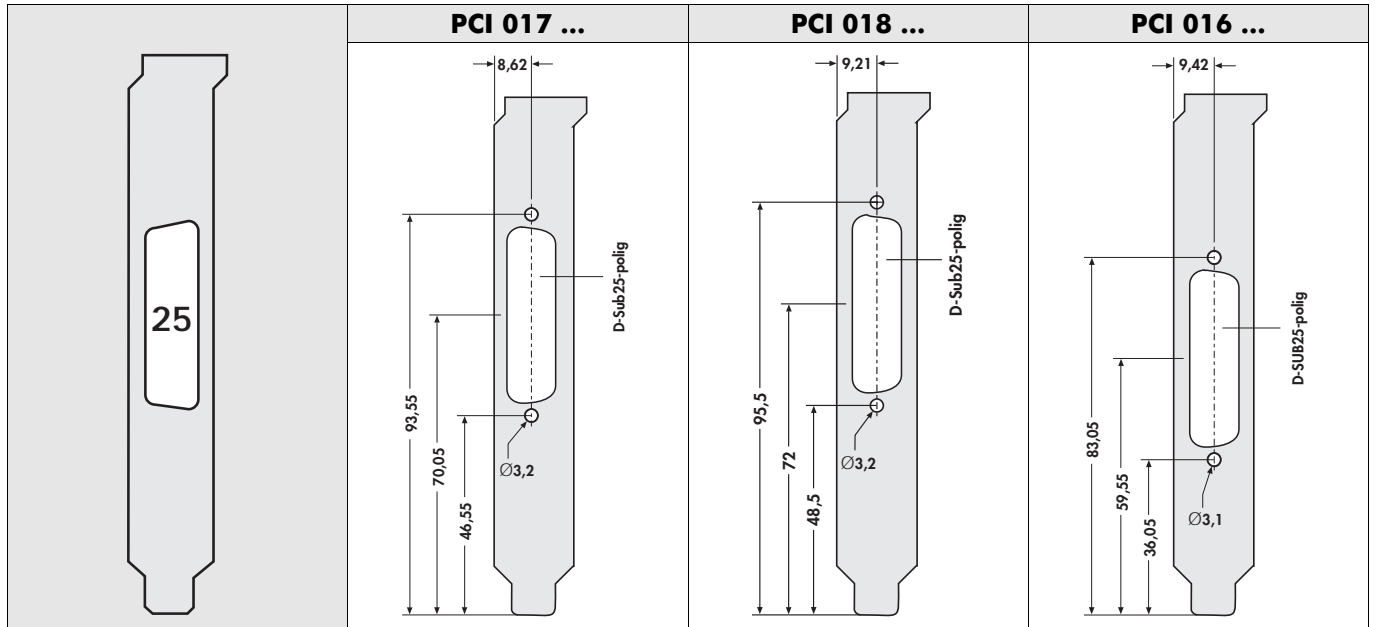
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PCI 072 O			

please indicate: ... fixing tab  
**L** = bracket with fixing tab  
**O** = bracket without fixing tab

A

**Brackets for PC**

B

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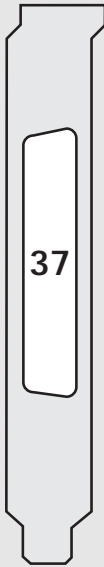
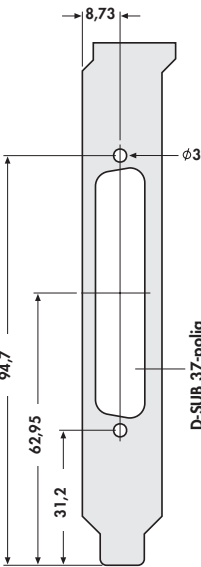
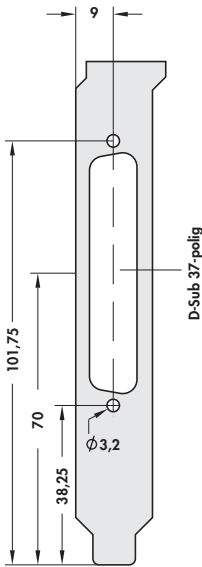
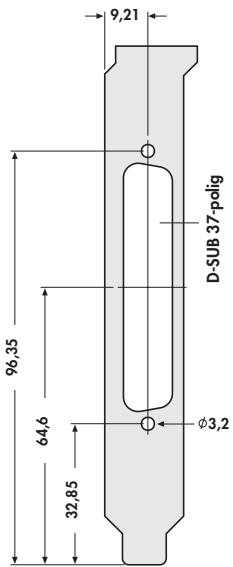
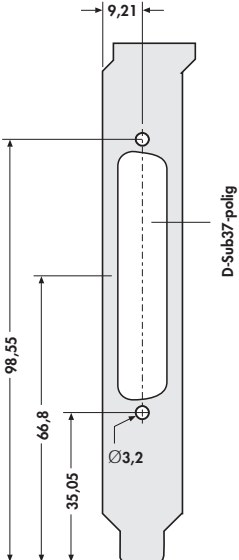
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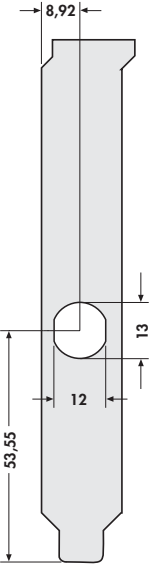

K

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	PCI 076 O	PCI 035 ...	PCI 077 ...
 <p style="text-align: center;"><b>37</b></p>			
PCI 020 ...			
			

PCI 021 O			
			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

Brackets for PC

B

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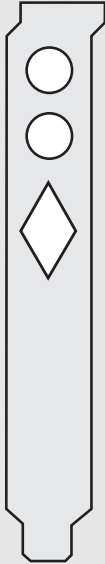
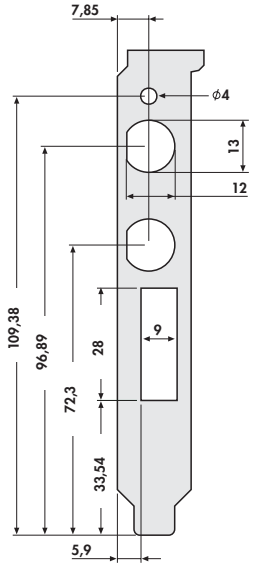
I

K

L

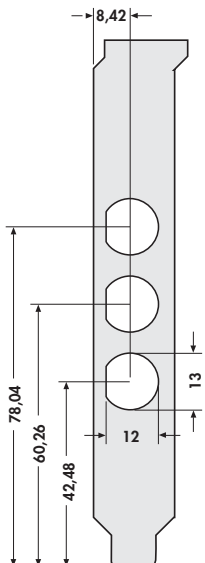
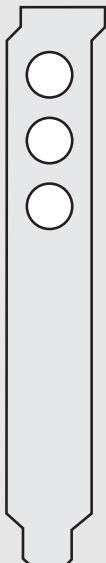
M

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	PCI 083 L		
			

**K 17**

If you do not find a suitable bracket, please use the PCI / KHPC design sheet at the end of section "K".

PCI 023 ...			
			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab



A

Brackets for PC

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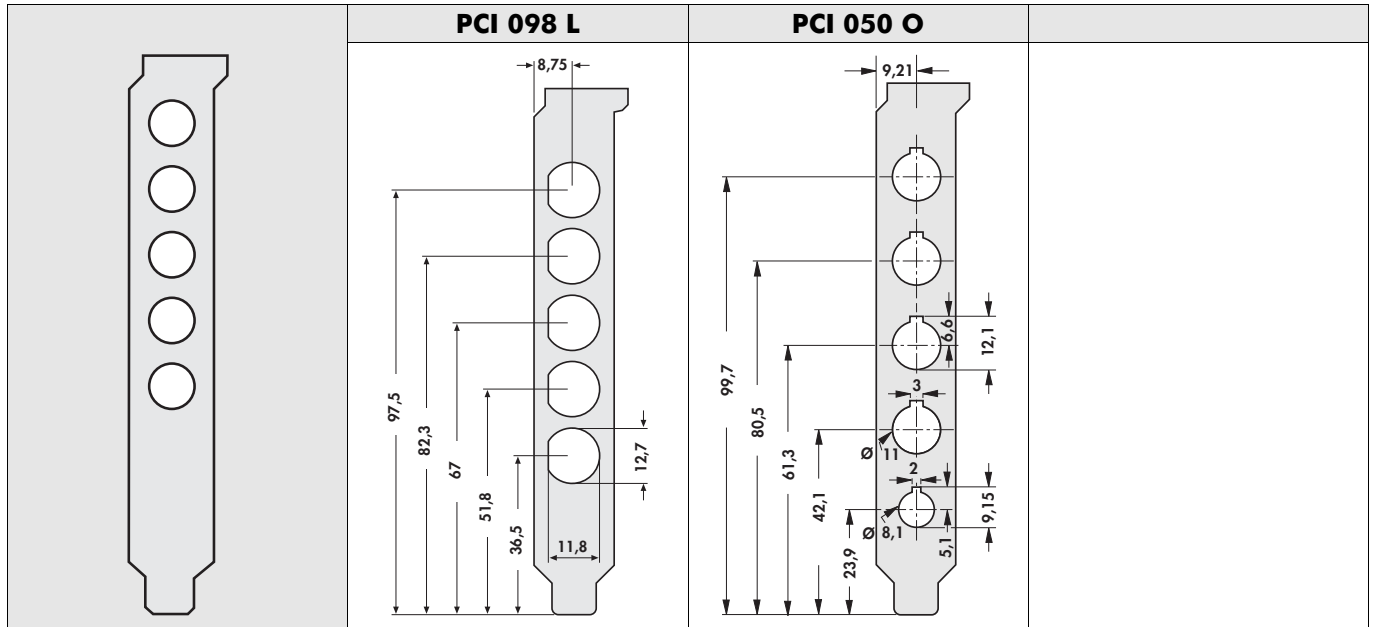
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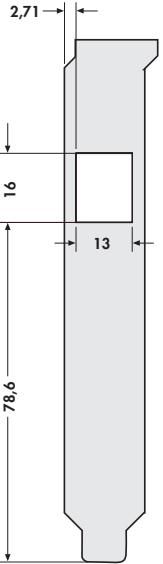
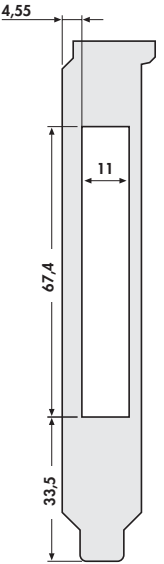
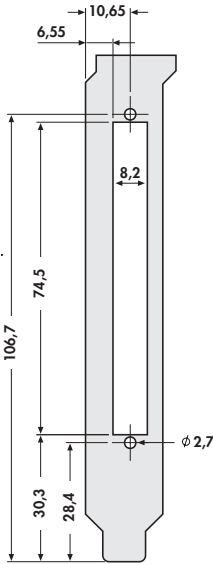

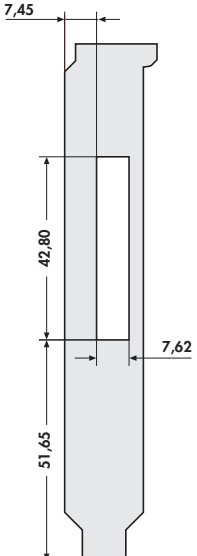
K

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PCI 027 L	PCI 105 L	PCI 104 O	
			
PCI 106 L			
			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

Brackets for PC

B

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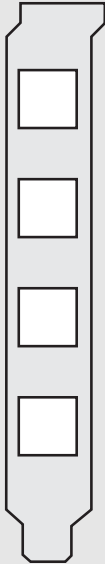
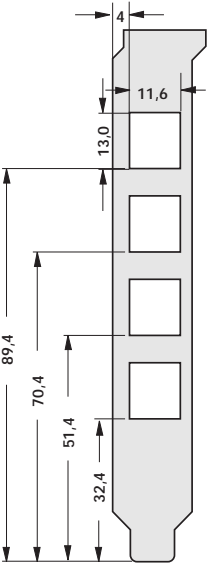
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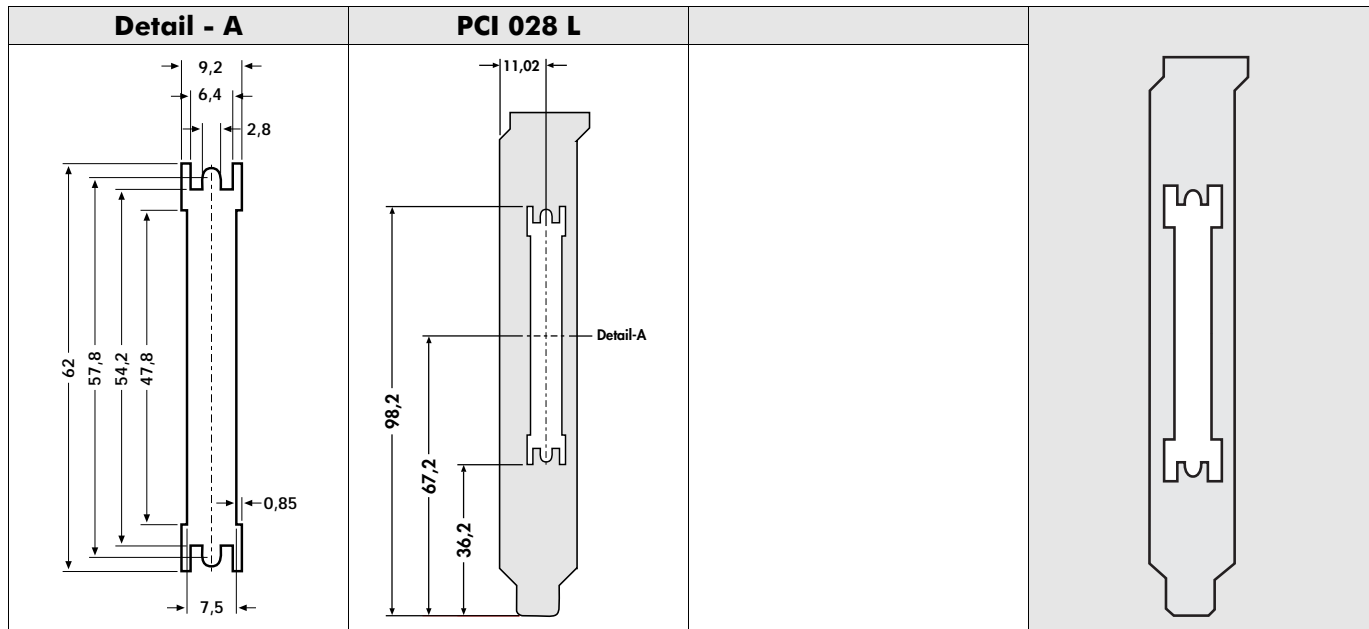
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	PCI 051 ...		
			

K 21

If you do not find a suitable bracket, please use the PCI / KHPC design sheet at the end of section "K".



please indicate: ... fixing tab  
**L** = bracket with fixing tab  
**O** = bracket without fixing tab

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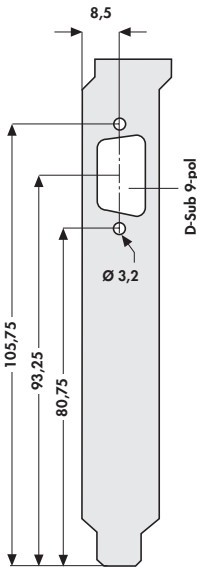
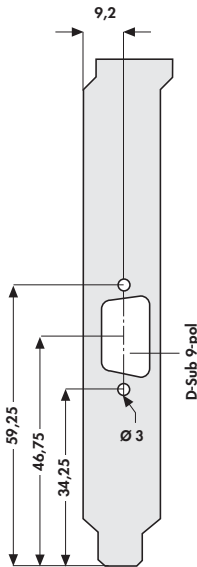
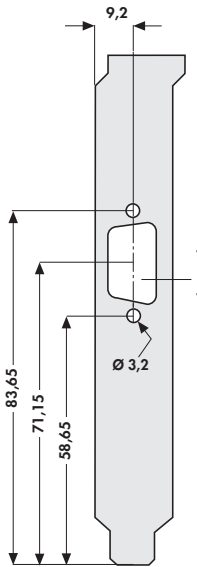
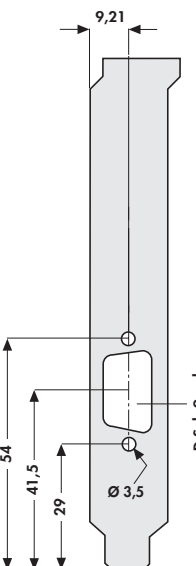
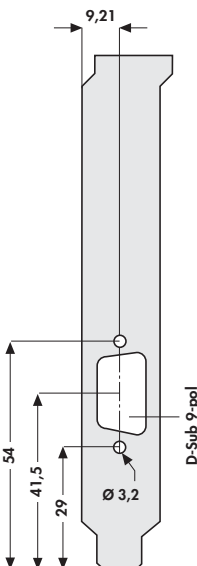
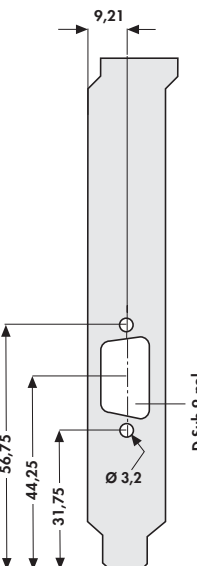
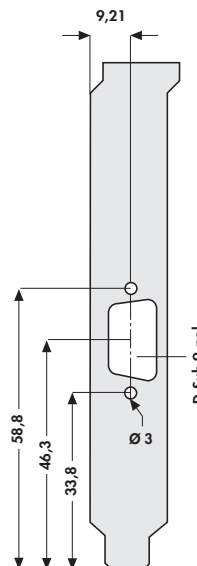
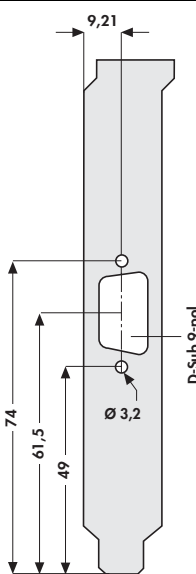
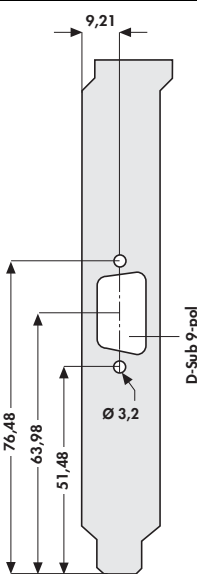
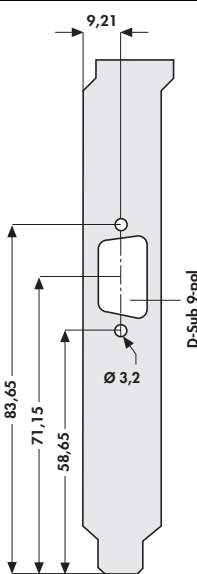
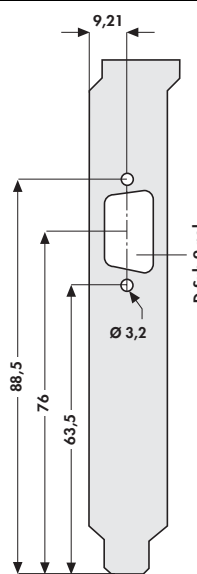
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	<p><b>KHPC 002 O</b></p> 	<p><b>KHPC 092 ...</b></p> 	<p><b>KHPC 003 ...</b></p> 
<p><b>KHPC 007 O</b></p> 	<p><b>KHPC 011 O</b></p> 	<p><b>KHPC 004 O</b></p> 	<p><b>KHPC 013 O</b></p> 
<p><b>KHPC 010 ...</b></p> 	<p><b>KHPC 093 L</b></p> 	<p><b>KHPC 094 O</b></p> 	<p><b>KHPC 096 O</b></p> 

KHPC 008 O	KHPC 014 O	KHPC 016 O	
KHPC 095 O	KHPC 017 ...	KHPC 102 O	

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

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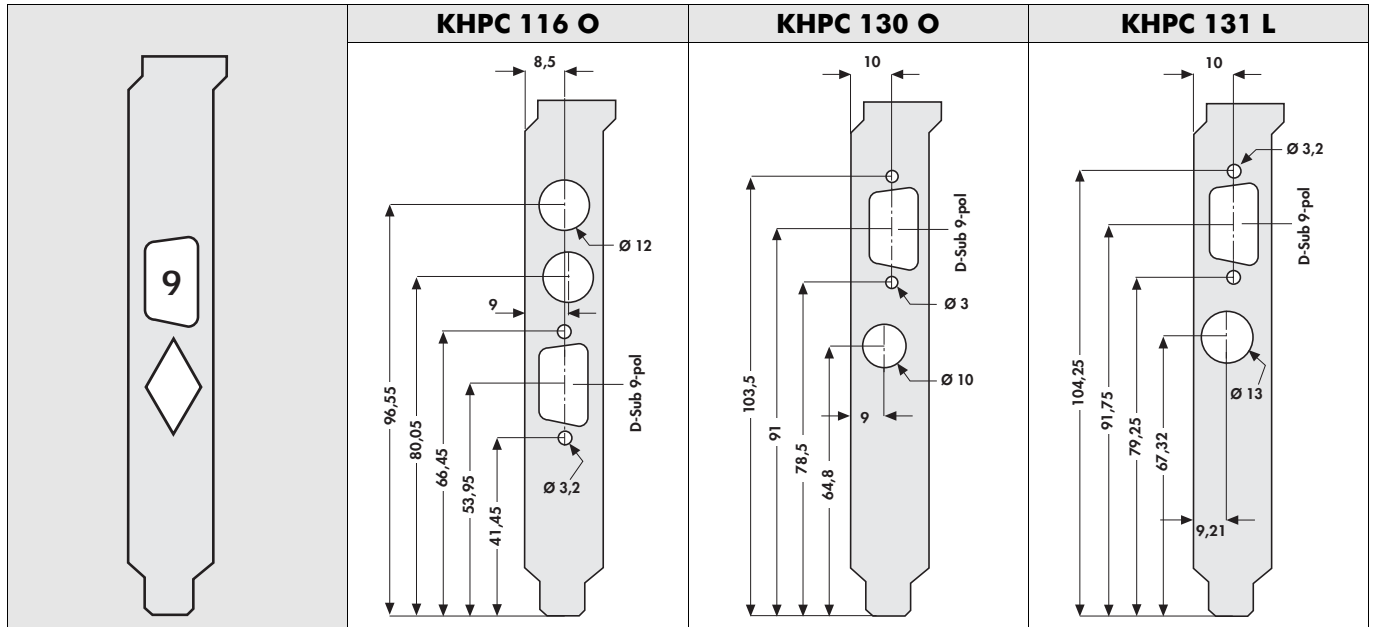
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<p><b>KHPC 144 O</b></p>	<p><b>KHPC 142 O</b></p>	<p><b>KHPC 053 O</b></p>	
<p><b>KHPC 138 O</b></p>	<p><b>KHPC 006 O</b></p>	<p><b>KHPC 141 O</b></p>	<p><b>KHPC 012 O</b></p>
<p><b>KHPC 072 O</b></p>	<p><b>KHPC 150 O</b></p>	<p><b>KHPC 009 O</b></p>	<p><b>KHPC 143 O</b></p>

please indicate: ... fixing tab  
**L** = bracket with fixing tab  
**O** = bracket without fixing tab



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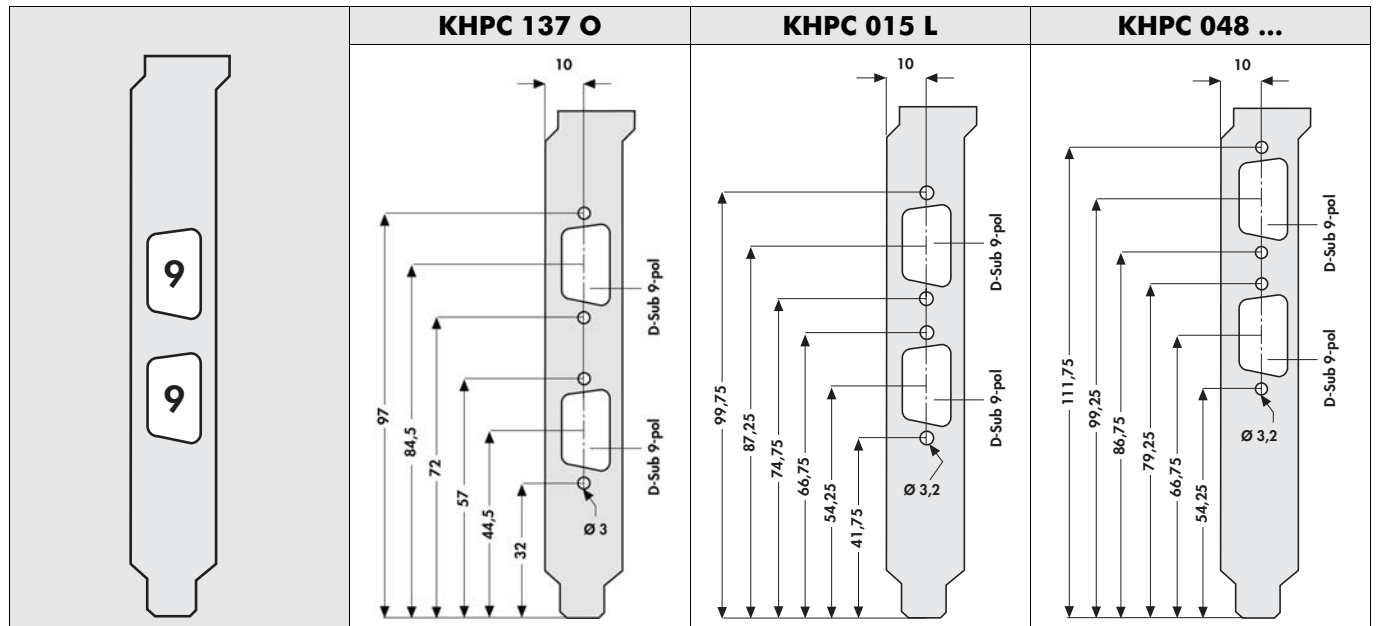
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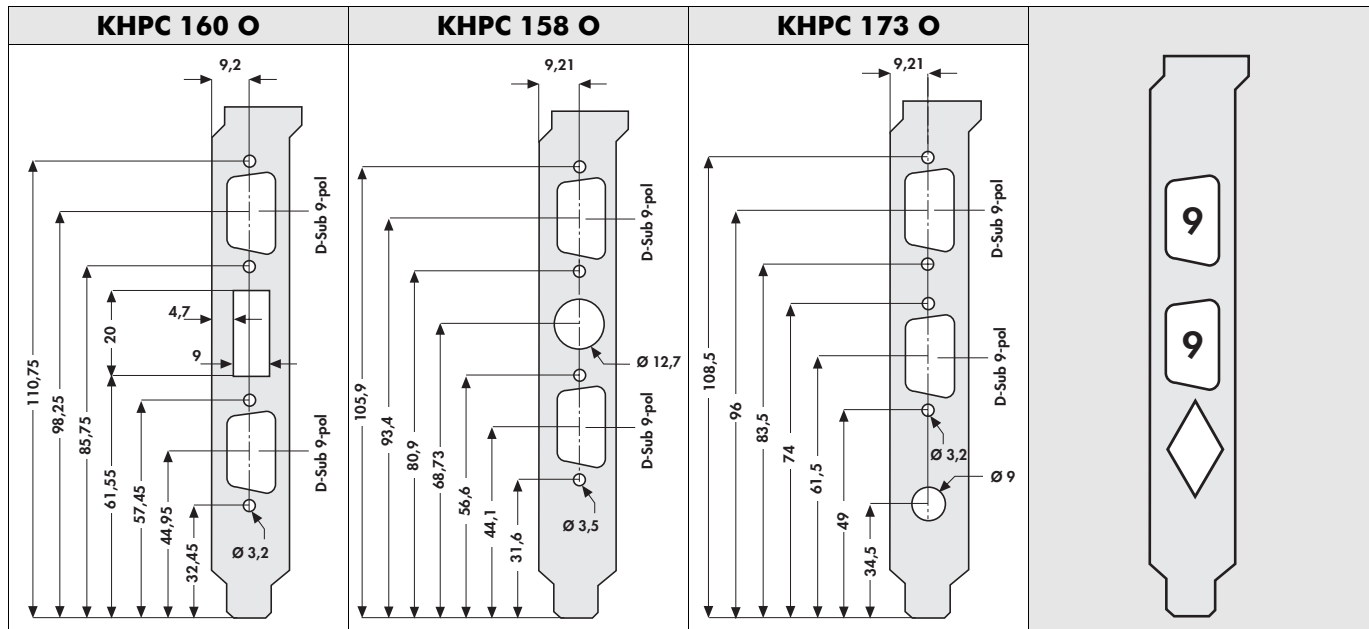
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please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

**Brackets for PC**

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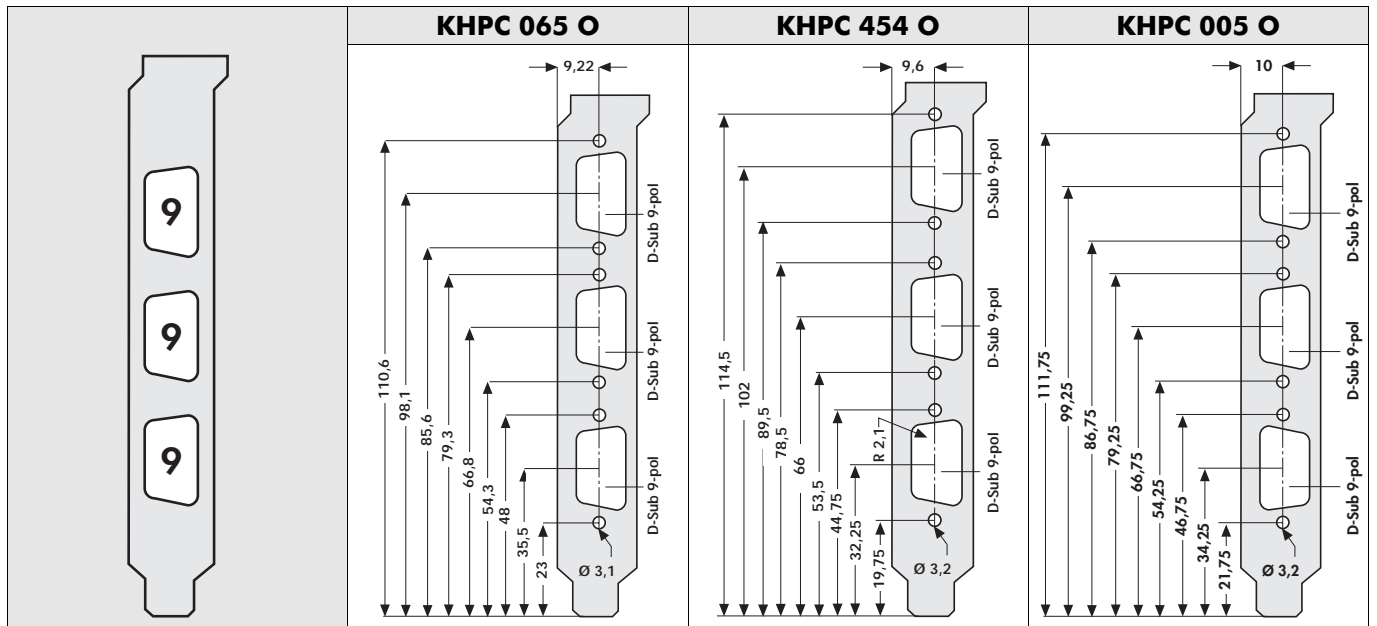
I

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KHPC 179 O	KHPC 177 ...	KHPC 178 O	
KHPC 076 O			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

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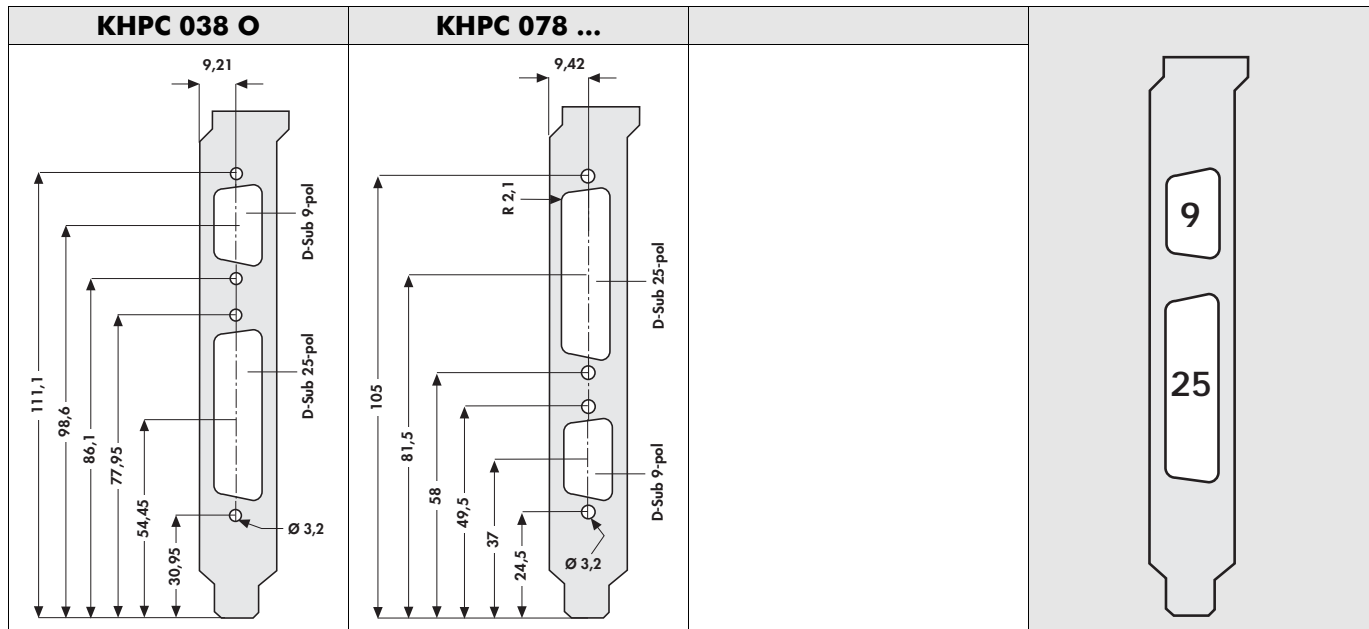
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	<b>KHPC 189 L</b> 	<b>KHPC 488 O</b> 	<b>KHPC 040 O</b> 
	<b>KHPC 041 O</b> 	<b>KHPC 185 O</b> 	<b>KHPC 061 O</b> 
<b>KHPC 188 O</b> 	<b>KHPC 039 O</b> 	<b>KHPC 037 L</b> 	<b>KHPC 191 O</b> 

**K 31**

If you do not find a suitable bracket,  
please use the PCI / KHPC design sheet  
at the end of section "K".



please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

**Brackets for PC**

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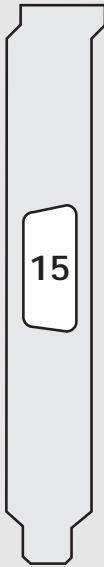
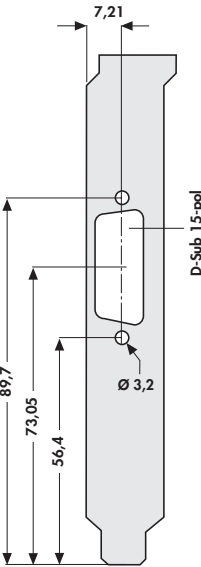
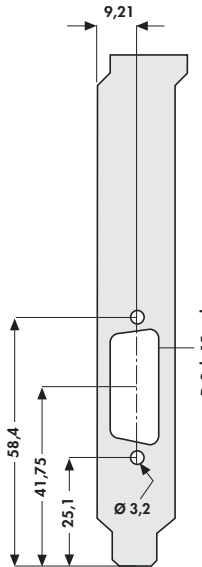
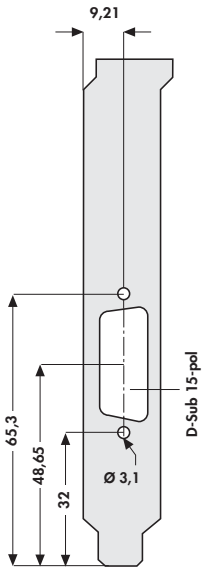
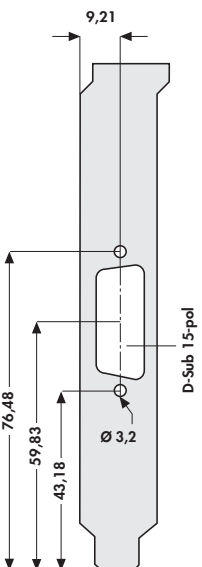
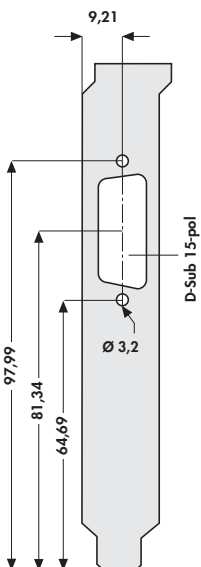
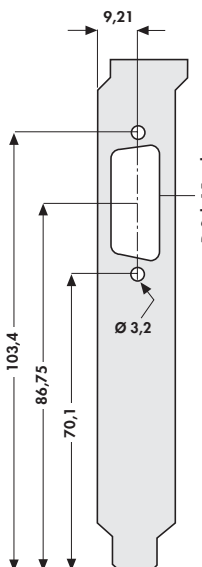
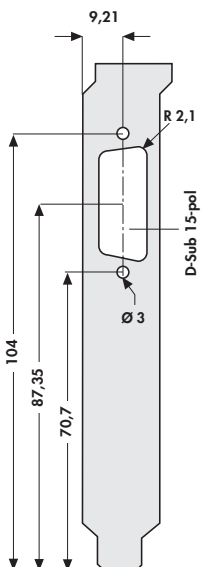
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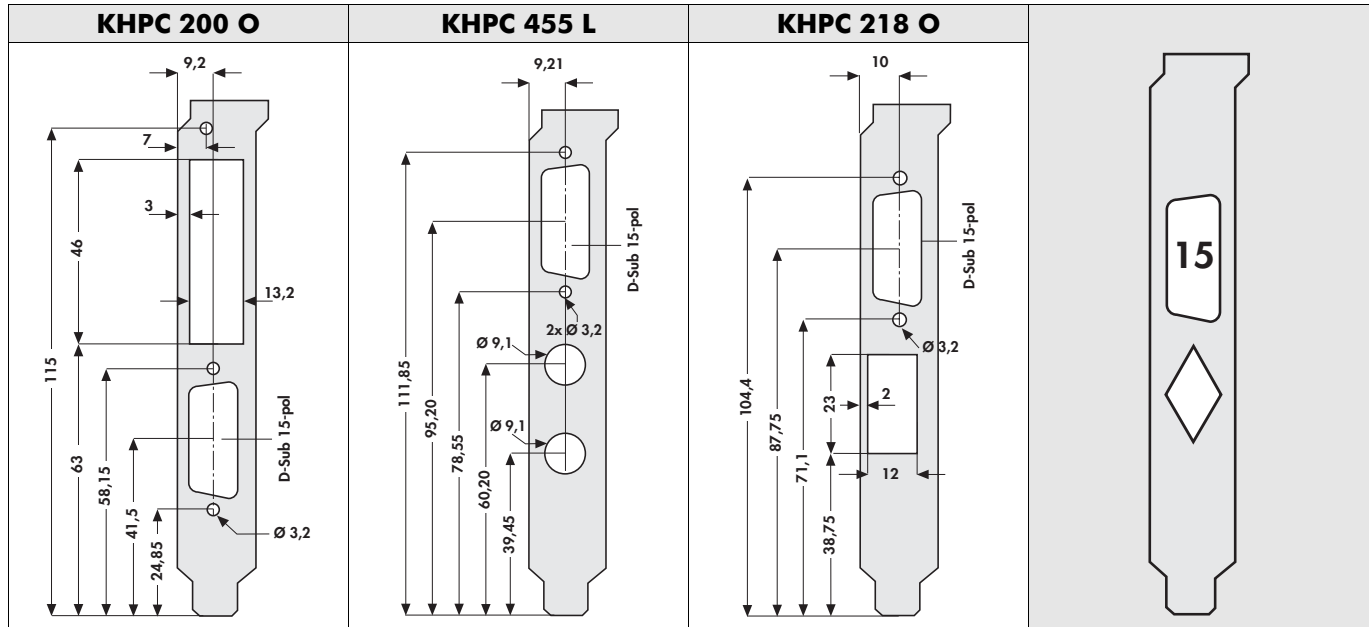
K

L

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	<p><b>KHPC 195 L</b></p> 	<p><b>KHPC 023 L</b></p> 	<p><b>KHPC 019 O</b></p> 
<p><b>KHPC 074 O</b></p> 	<p><b>KHPC 073 ...</b></p> 	<p><b>KHPC 024 O</b></p> 	<p><b>KHPC 198 O</b></p> 



please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab



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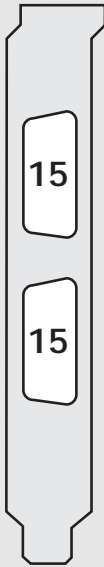
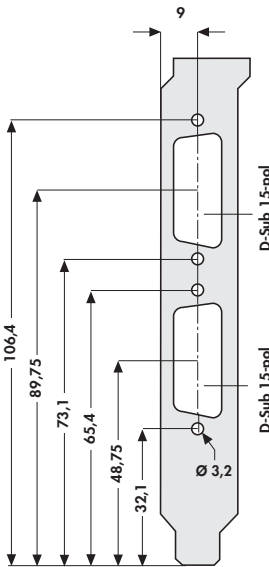
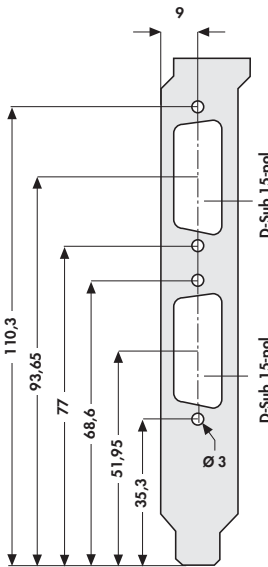
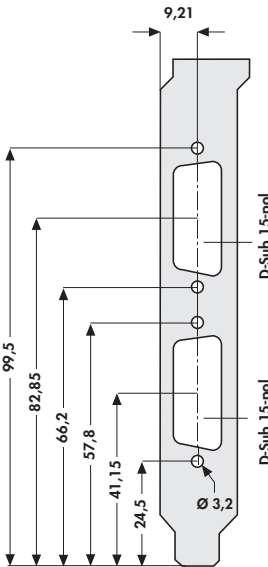
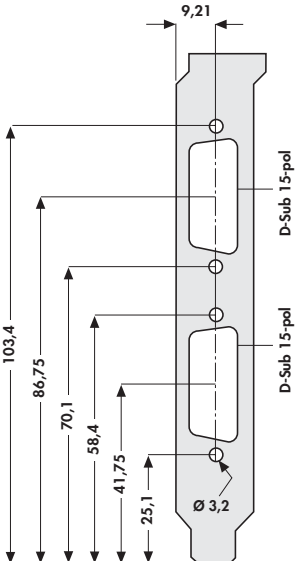
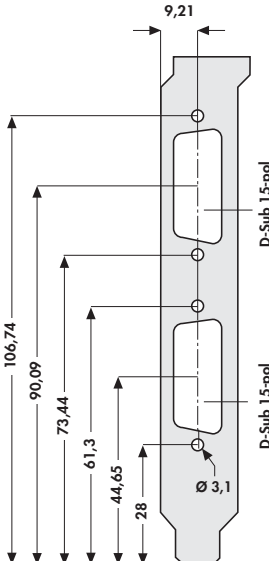
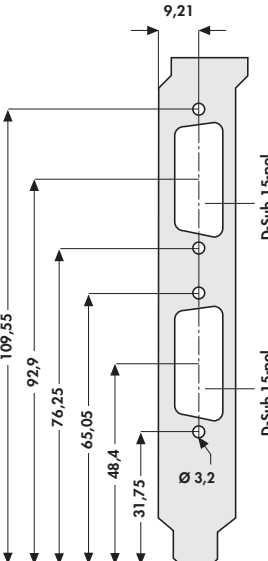
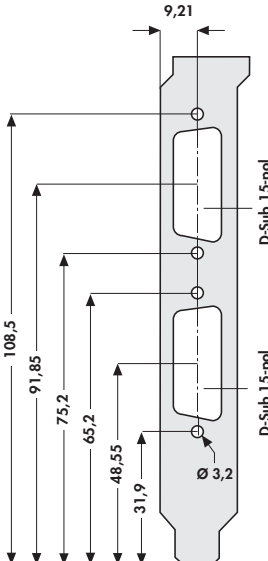
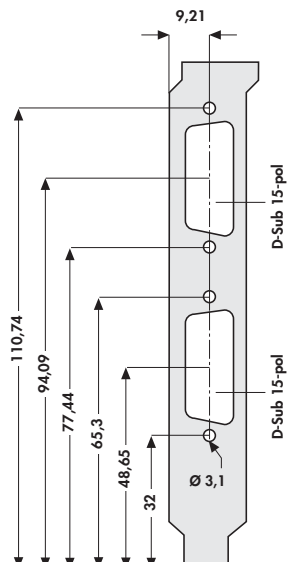
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	<p><b>KHPC 230 O</b></p> 	<p><b>KHPC 231 O</b></p> 	<p><b>KHPC 223 O</b></p> 
<p><b>KHPC 022 L</b></p> 	<p><b>KHPC 225 O</b></p> 	<p><b>KHPC 069 O</b></p> 	<p><b>KHPC 229 O</b></p> 
<p><b>KHPC 018 O</b></p> 			

KHPC 241 O	KHPC 042 O	KHPC 242 O	
KHPC 075 O			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

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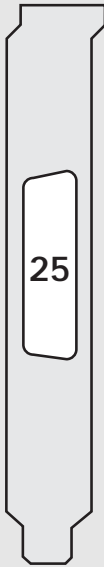
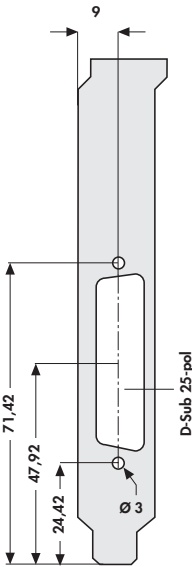
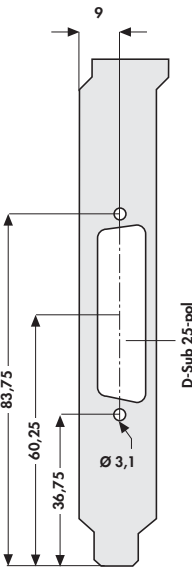
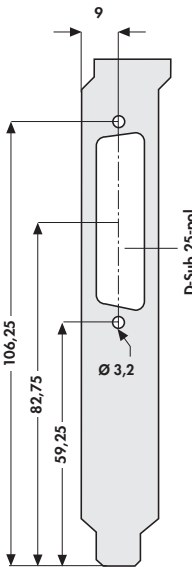
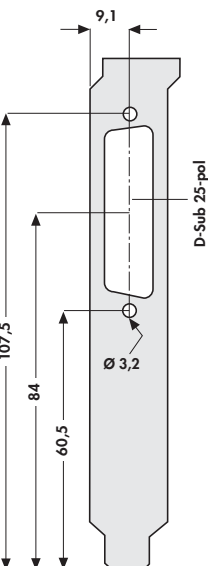
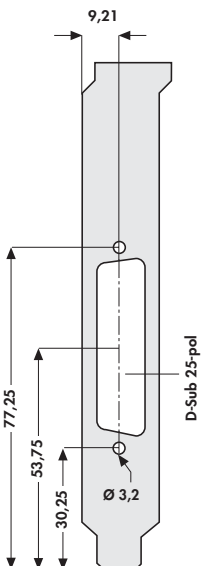
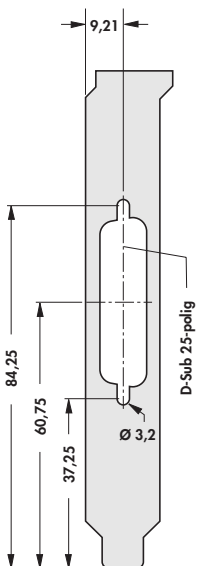
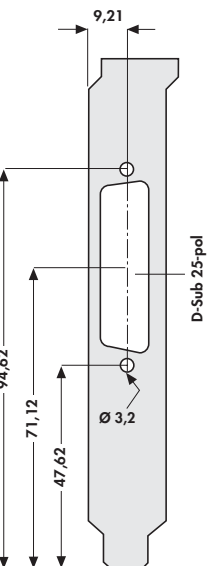
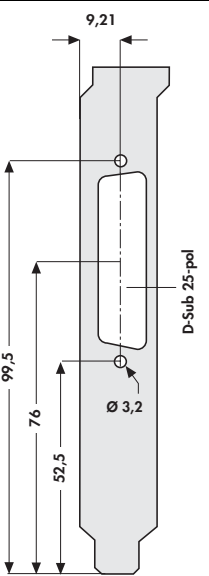
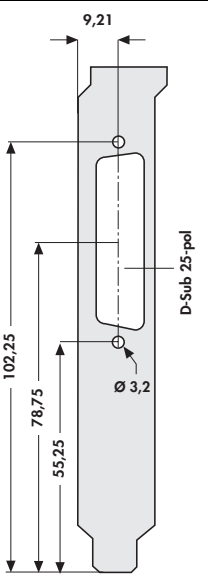
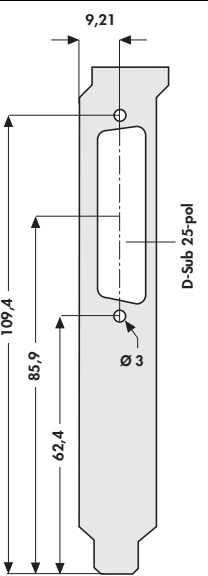
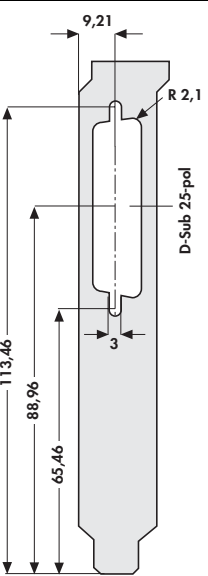
I

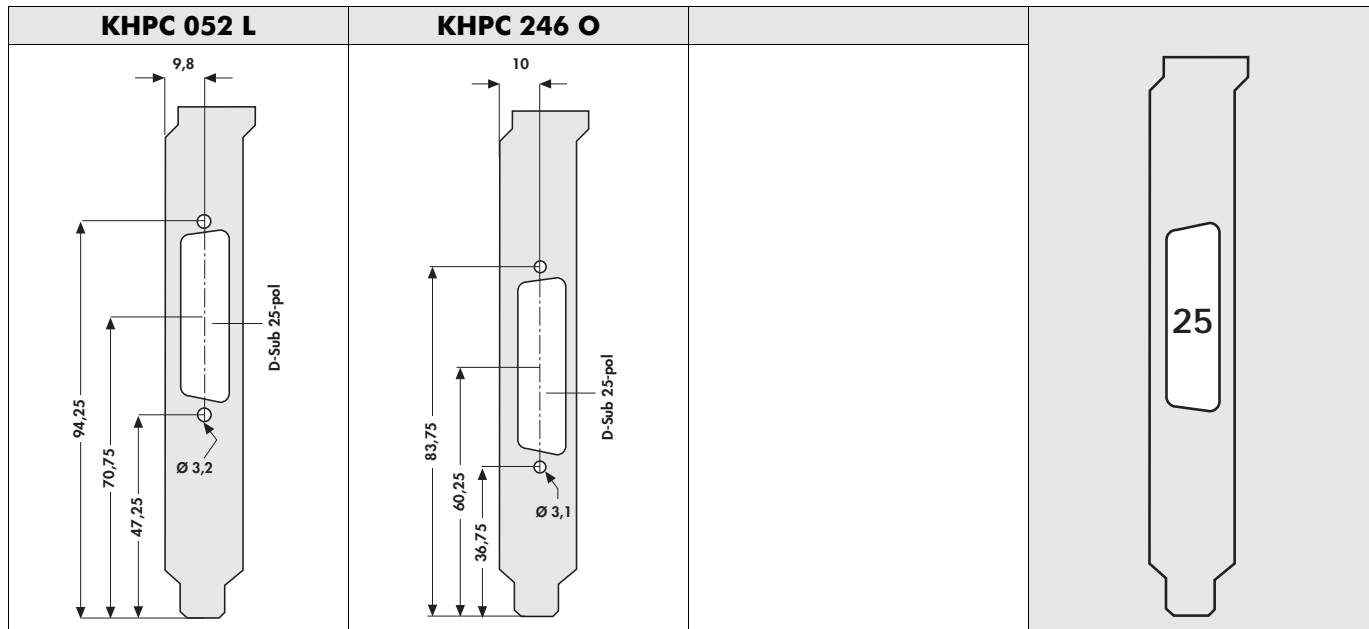
K

L

M

N

	<p><b>KHPC 243 O</b></p> 	<p><b>KHPC 070 O</b></p> 	<p><b>KHPC 027 O</b></p> 
<p><b>KHPC 054 O</b></p> 	<p><b>KHPC 028 O</b></p> 	<p><b>KHPC 491 O</b></p> 	<p><b>KHPC 026 ...</b></p> 
<p><b>KHPC 252 O</b></p> 	<p><b>KHPC 255 O</b></p> 	<p><b>KHPC 257 O</b></p> 	<p><b>KHPC 258 L</b></p> 



please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

**Brackets for PC**

B

C

D

E

F

G

H

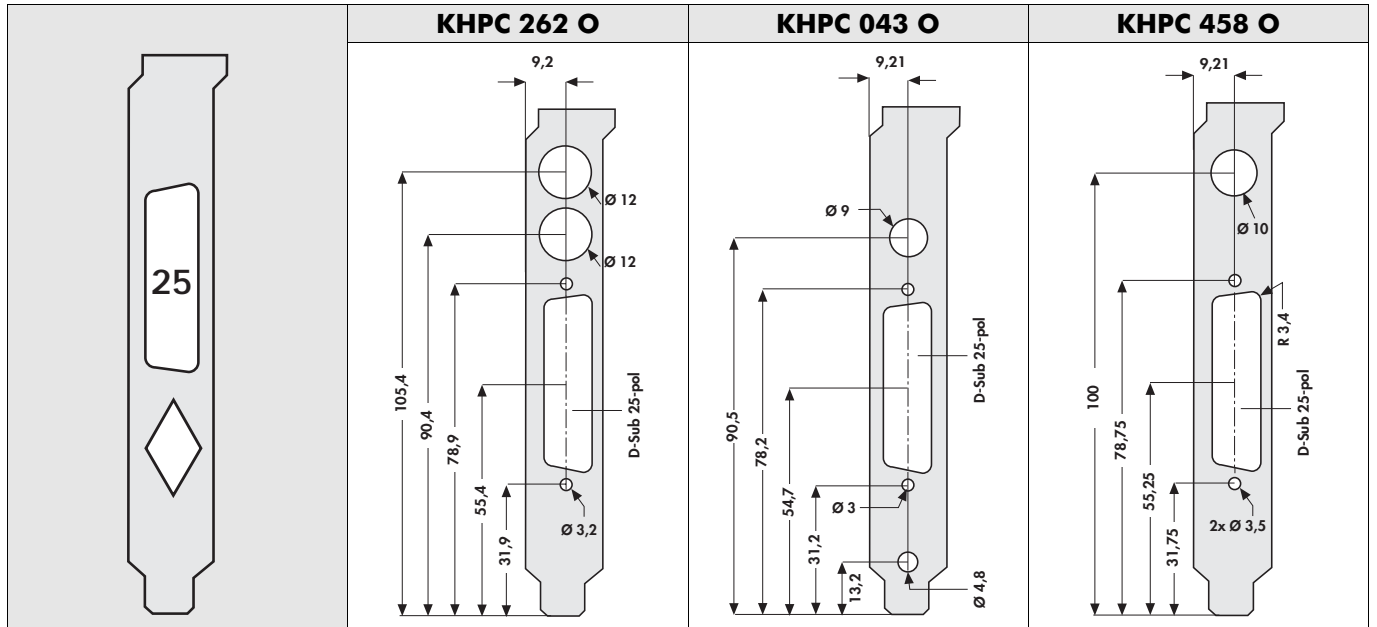
I

K

L

M

N


**K 39**

If you do not find a suitable bracket,  
please use the PCI / KHPC design sheet  
at the end of section "K".

<p><b>KHPC 058 O</b></p>	<p><b>KHPC 035 O</b></p>	<p><b>KHPC 277 O</b></p>	
<p><b>KHPC 267 ...</b></p>	<p><b>KHPC 033 O</b></p>	<p><b>KHPC 269 O</b></p>	<p><b>KHPC 270 O</b></p>
<p><b>KHPC 271 O</b></p>	<p><b>KHPC 274 O</b></p>	<p><b>KHPC 278 O</b></p>	<p><b>KHPC 034 O</b></p>

please indicate: ... fixing tab  
**L** = bracket with fixing tab  
**O** = bracket without fixing tab

A

B

C

D

E

F

G

H

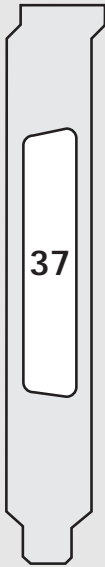
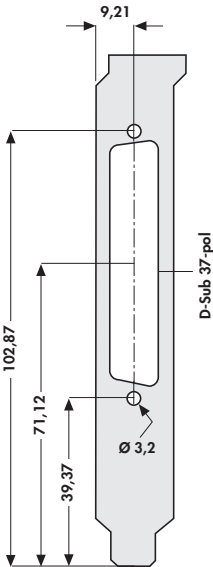
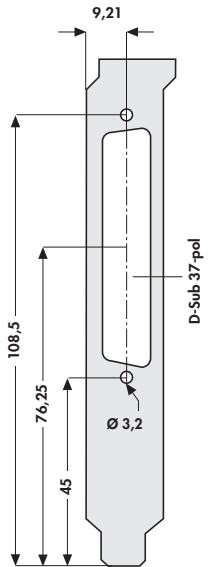
I

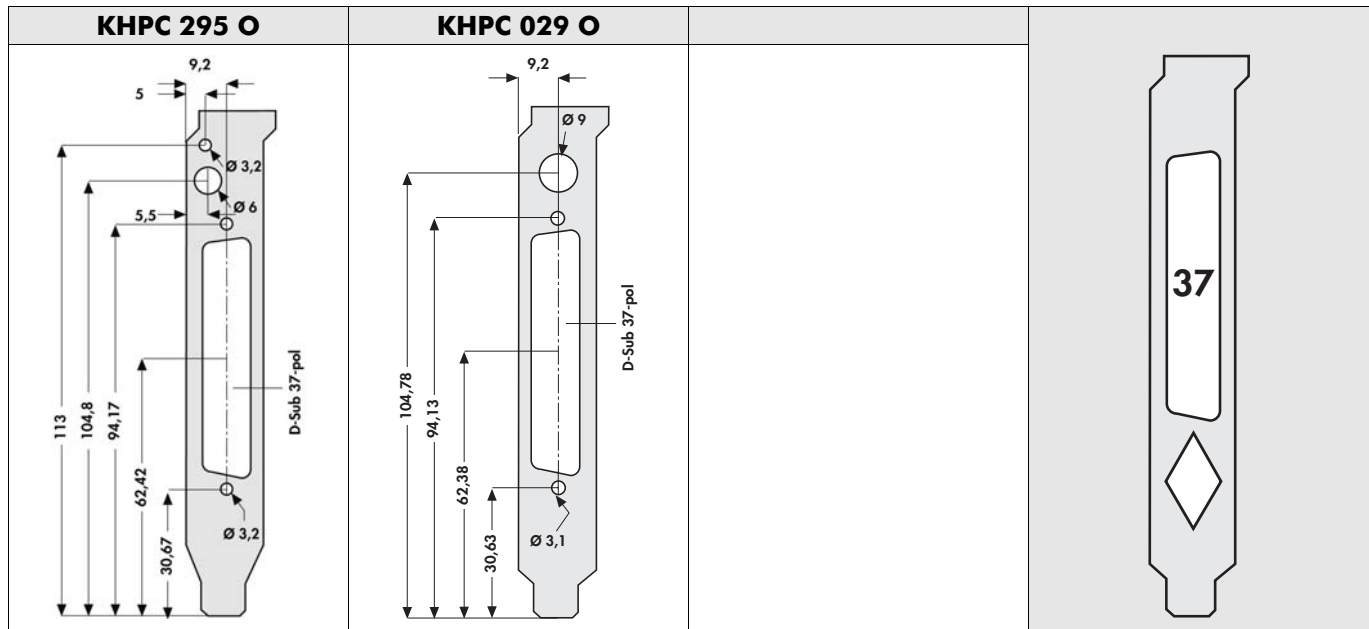
K

L

M

N

	<p><b>KHPC 031 ...</b></p>	<p><b>KHPC 032 O</b></p>	
			



please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab



A

**Brackets for PC**

B

C

D

E

F

G

H

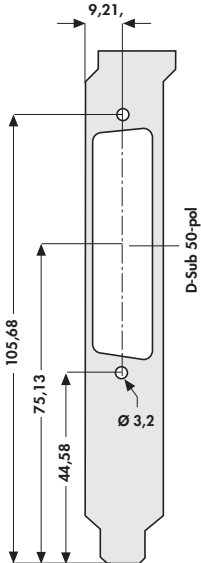
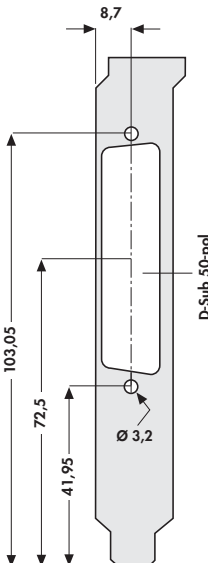
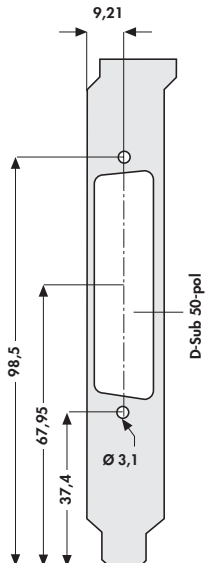
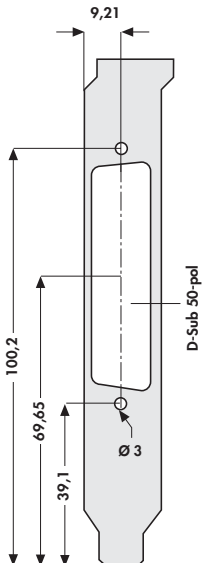
I

K

L

M

N

	KHPC 036 ...	KHPC 051 O	KHPC 083 O
 <p><b>KHPC 308 L</b></p> <p>Technical drawing of KHPC 308 L showing dimensions: 105,68 (total length), 75,13 (length to top hole), 44,58 (length to bottom hole), 9,21 (width of top hole), and Ø 3,2 (hole diameter). The drawing is labeled "D-Sub 50-pol".</p>	 <p>Technical drawing of KHPC 036 ... showing dimensions: 103,05 (total length), 72,5 (length to top hole), 41,95 (length to bottom hole), 8,7 (width of top hole), and Ø 3,2 (hole diameter). The drawing is labeled "D-Sub 50-pol".</p>	 <p>Technical drawing of KHPC 051 O showing dimensions: 98,5 (total length), 67,95 (length to top hole), 37,4 (length to bottom hole), 9,21 (width of top hole), and Ø 3,1 (hole diameter). The drawing is labeled "D-Sub 50-pol".</p>	 <p>Technical drawing of KHPC 083 O showing dimensions: 100,2 (total length), 69,65 (length to top hole), 39,1 (length to bottom hole), 9,21 (width of top hole), and Ø 3 (hole diameter). The drawing is labeled "D-Sub 50-pol".</p>

KHPC 530 O			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

Brackets for PC

B

C

D

E

F

G

H


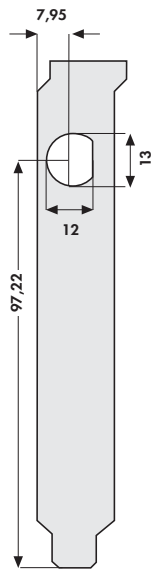
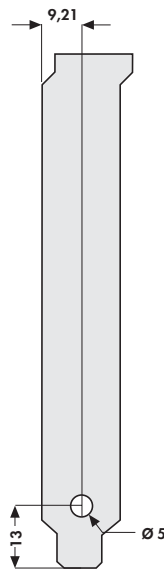
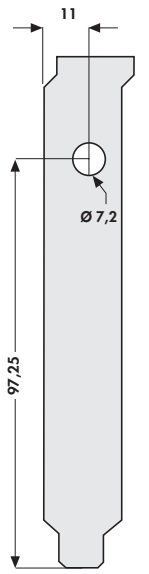
I

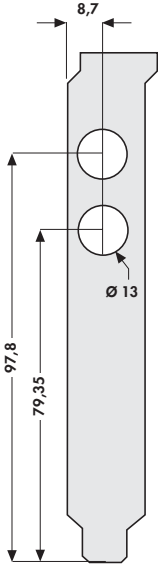
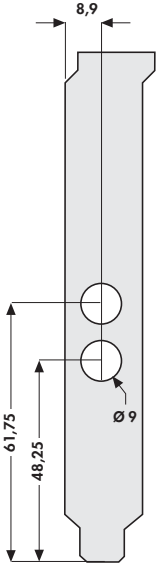

K

L

M

N

	KHPC 312 O	KHPC 310 L	KHPC 313 L
			

KHPC 325 O	KHPC 320 L		
			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

**Brackets for PC**

B

C

D

E

F

G

H

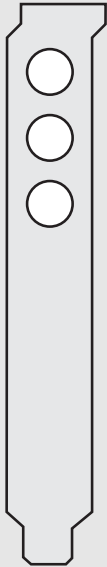
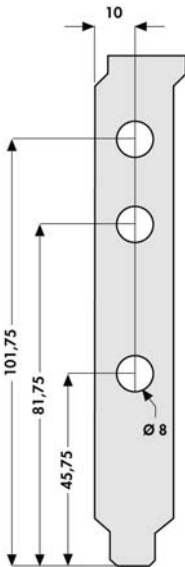
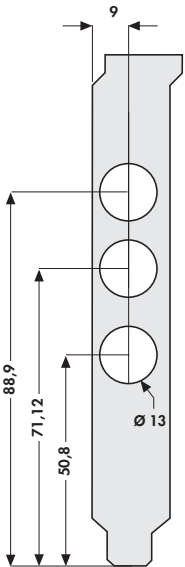
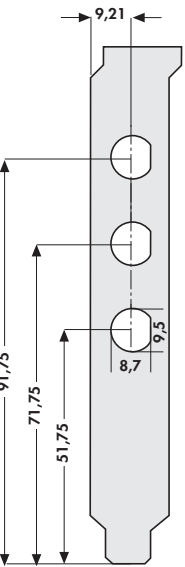
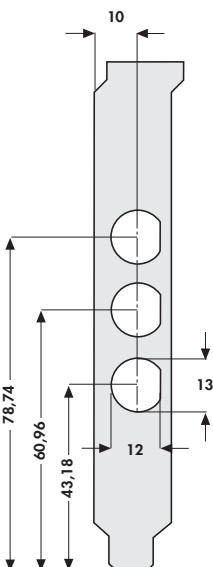
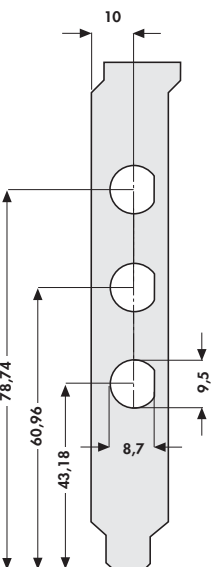
I

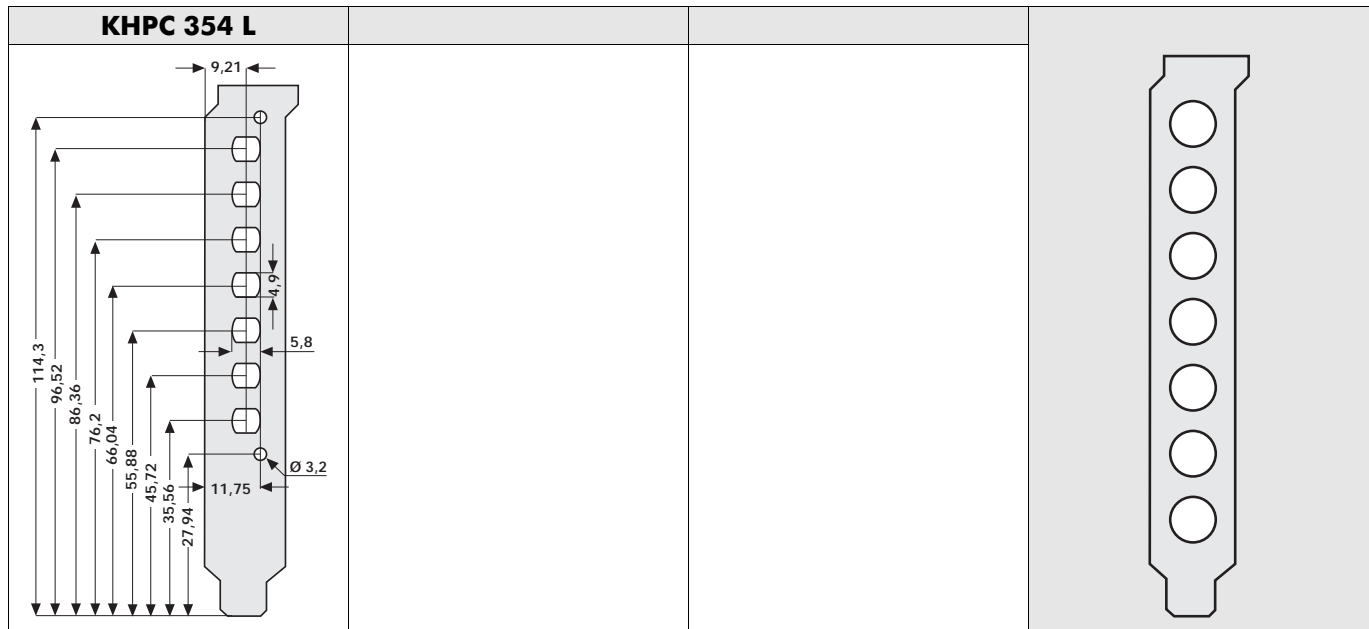
K

L

M

N

	<p style="text-align: center;"><b>KHPC 333 L</b></p> 	<p style="text-align: center;"><b>KHPC 335 L</b></p> 	<p style="text-align: center;"><b>KHPC 463 O</b></p> 
<p style="text-align: center;"><b>KHPC 044 L</b></p> 	<p style="text-align: center;"><b>KHPC 332 L</b></p> 		



please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

B

C

D

E

F

G

H


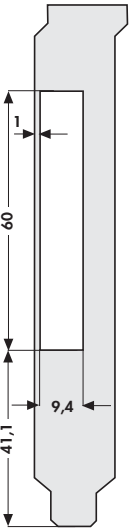
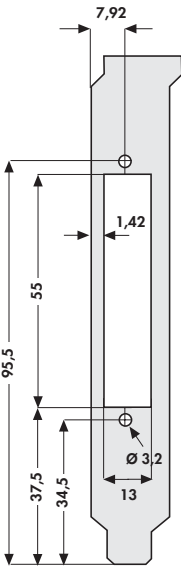
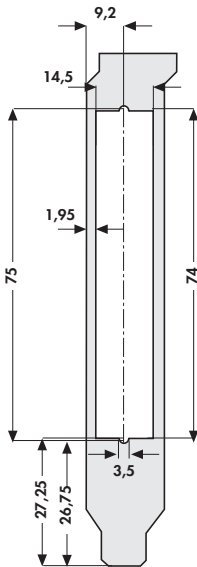
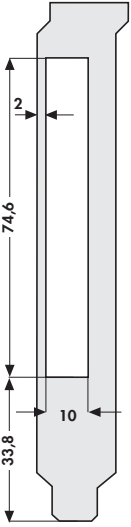
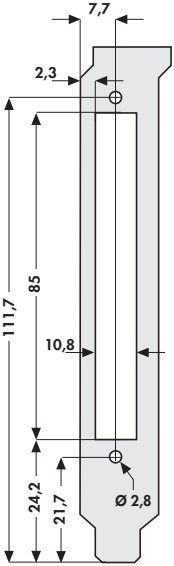
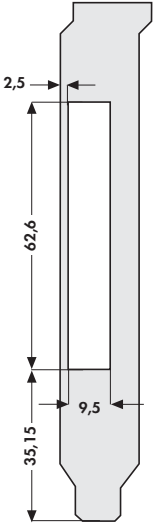
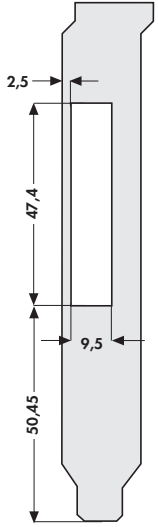
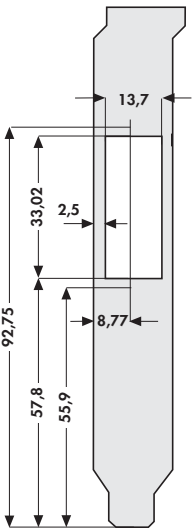
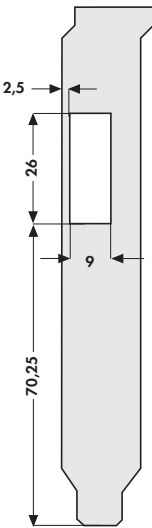
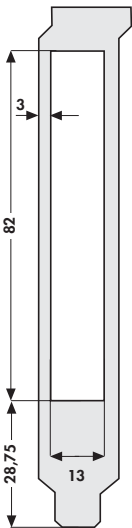
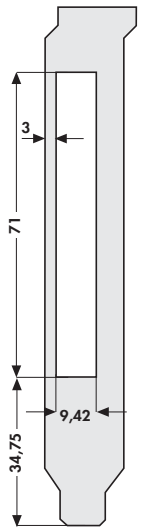
I

K

L

M

N

	<b>KHPC 055 L</b>	<b>KHPC 377 L</b>	<b>KHPC 389 O</b>
			
<b>KHPC 390 L</b>	<b>KHPC 394 ...</b>	<b>KHPC 380 L</b>	<b>KHPC 371 L</b>
			
<b>KHPC 367 L</b>	<b>KHPC 365 L</b>	<b>KHPC 085 L</b>	<b>KHPC 384 L</b>
			

**K 49**

If you do not find a suitable bracket,  
please use the PCI / KHPC design sheet  
at the end of section "K".

KHPC 062 L	KHPC 059 L	KHPC 398 ...	
KHPC 399 L	KHPC 391 O	KHPC 086 O	KHPC 366 O

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab



A

Brackets for PC

B

C

D

E

F

G

H

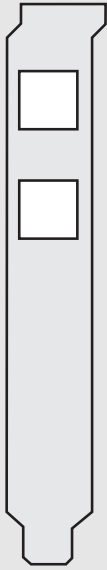
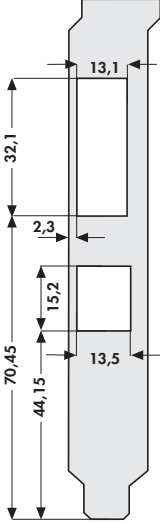
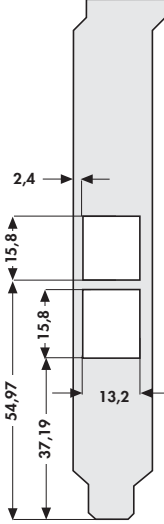
I

K

L

M

N

	KHPC 404 L	KHPC 407 L	
			

KHPC 439 O			
			

please indicate: ... fixing tab  
 L = bracket with fixing tab  
 O = bracket without fixing tab

A

B

C

D

E

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G

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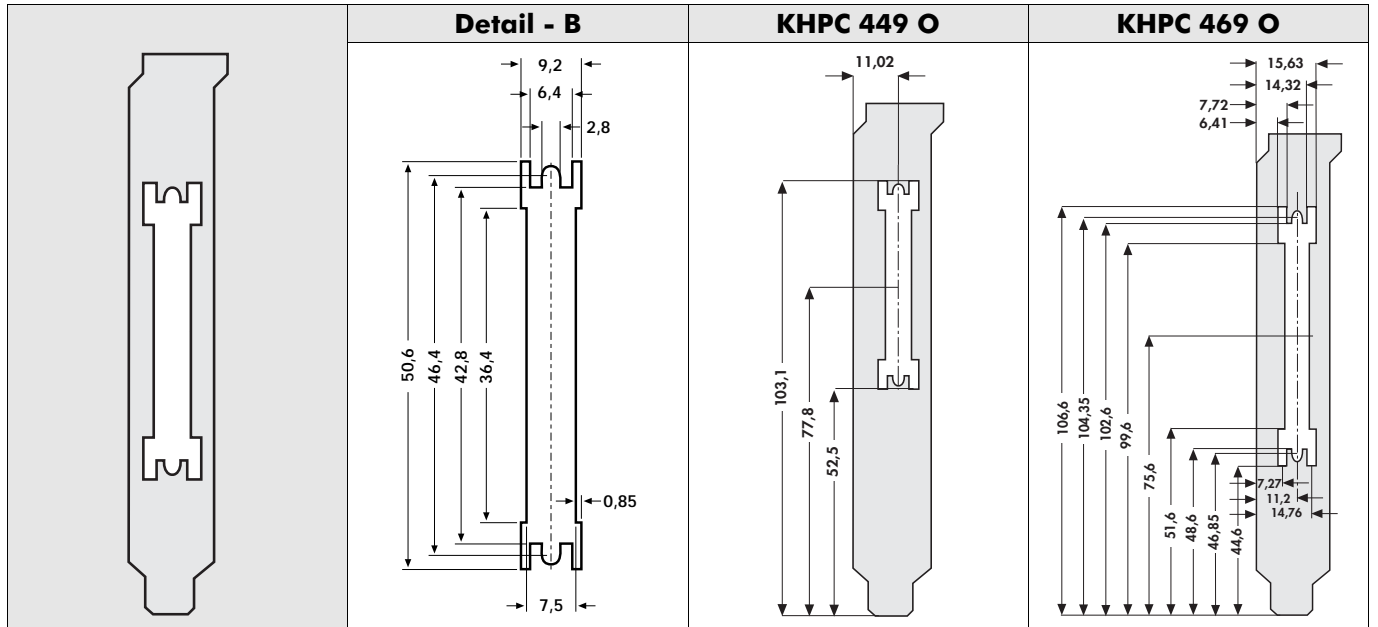
I

K

L


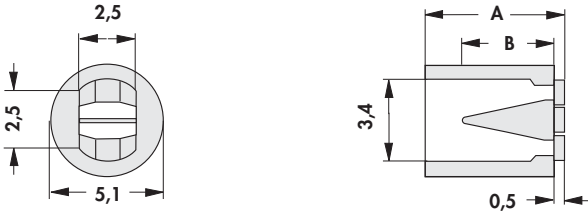

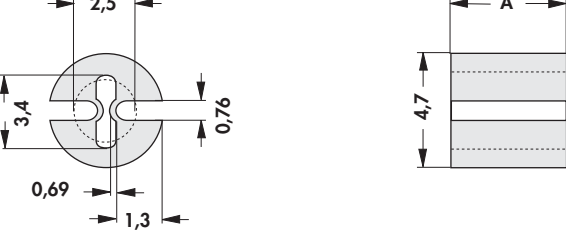
M

N


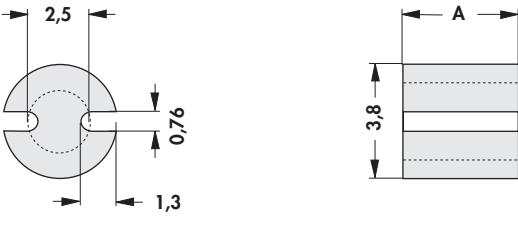


## Spacers and mounting strips for LED

universal mount for LED Ø 3 mm and 5 mm, self retaining

					
art. no.	dim. [mm]		art. no.	dim. [mm]	
	A	B		A	B
<b>MAH 31</b>	3.10	1.50	<b>MAH 71</b>	7.10	4.70
<b>MAH 41</b>	4.10	1.50	<b>MAH 81</b>	8.10	4.70
<b>MAH 51</b>	5.10	1.50	<b>MAH 89</b>	8.90	4.70
<b>MAH 61</b>	6.10	1.50	<b>MAH 99</b>	9.90	7.90
					
art. no.	dim. [mm]		art. no.	dim. [mm]	
	A			A	
<b>MAH 401</b>	1.00		<b>MAH 406</b>	6.00	
<b>MAH 402</b>	2.00		<b>MAH 407</b>	7.00	
<b>MAH 403</b>	3.00		<b>MAH 408</b>	8.00	
<b>MAH 404</b>	4.00		<b>MAH 409</b>	9.00	
<b>MAH 405</b>	5.00		<b>MAH 410</b>	10.00	

for LED Ø 3 mm, thin mount

					
art. no.	dim. [mm]		art. no.	dim. [mm]	
	A			A	
<b>MAH 301</b>	1.00		<b>MAH 306</b>	6.00	
<b>MAH 302</b>	2.00		<b>MAH 307</b>	7.00	
<b>MAH 303</b>	3.00		<b>MAH 308</b>	8.00	
<b>MAH 304</b>	4.00		<b>MAH 309</b>	9.00	
<b>MAH 305</b>	5.00		<b>MAH 310</b>	10.00	

**material:** PVC blend, black

**temperature range:** -40 °C ... +85 °C

**flammability:** UL 94 V-0

Spacers & mounting strips  
LED-hold.for front panel assembly  
Technical data of the LEDs  
Light pipes for SMDs

→ L 2 - 3  
→ L 4  
→ L 12  
→ L 9 - 11

LED-holders for PCB assembly  
Sockets for LED

→ L 5 - 8  
→ F 11 - 12

**L 2**

A

B

C

D

E

F

G

H

I

K

L

M

N

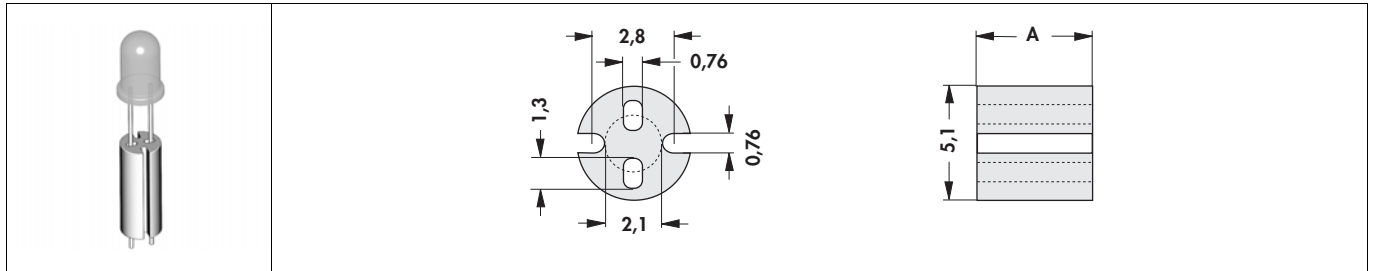
A

**Spacers and mounting strips for LED**

for LED Ø 5 mm, self retaining

B

C



D

art. no.	dim. [mm] A	art. no.	dim. [mm] A
<b>MAH 501</b>	1.00	<b>MAH 506</b>	6.00
<b>MAH 502</b>	2.00	<b>MAH 508</b>	8.00
<b>MAH 503</b>	3.00	<b>MAH 509</b>	9.00
<b>MAH 504</b>	4.00	<b>MAH 510</b>	10.00
<b>MAH 505</b>	5.00		

E

**material:** PVC blend, black

**temperature range:** -40 °C ... +85 °C

**flammability:** UL 94 V-0

F

G

H

I

K

L

M

N

**L 3**

Spacers & mounting strips  
 LED-holders for PCB assembly  
 Technical data of the LEDs  
 Light pipes for SMDs


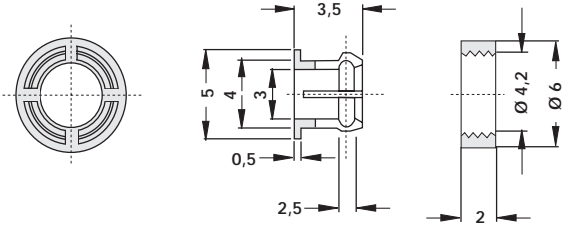
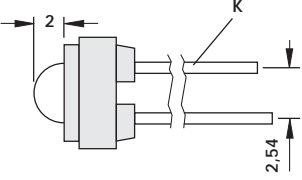
→ L 2 - 3  
 → L 5 - 8  
 → L 12  
 → L 9 - 11

Light pipes for SMDs  
 Sockets for LED  
 LED-hold.for front panel assembly

→ L 9 - 11  
 → F 11 - 12  
 → L 4

## LED-holders for front panel assembly


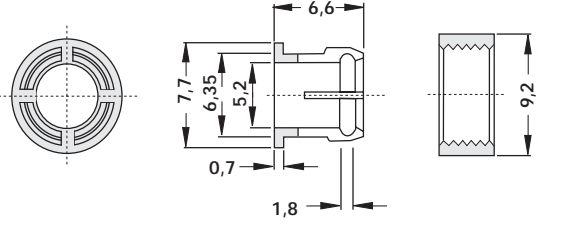
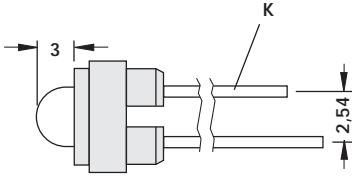
suitable for 3 mm diodes with a collar height of 0.6 mm

		
<b>art. no.</b>	type	
<b>DH 3 V</b>	for LED Ø 3 mm	

**K = cathode**

**material:** glass fibre reinforced polyamide


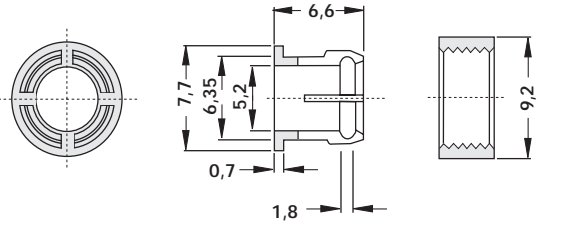
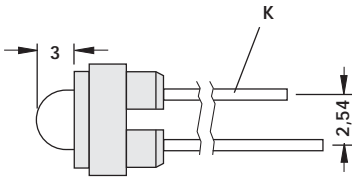
suitable for 5 mm diodes with a collar height of 0.6 mm/1 mm

		
<b>art. no.</b>	type	
<b>DH 5 VC</b>	for LED Ø 5 mm	

**K = cathode**

**material:** glass fibre reinforced polyamide

suitable for 5 mm diodes with a collar height of 0.6 mm/1 mm

		
<b>art. no.</b>	type	
<b>DH 5 SRC</b>	for LED Ø 5 mm	

**material:** glass fibre reinforced polyamide

A

**LED-holders for PCB assembly**

B

C

D

E

F

G

H

I


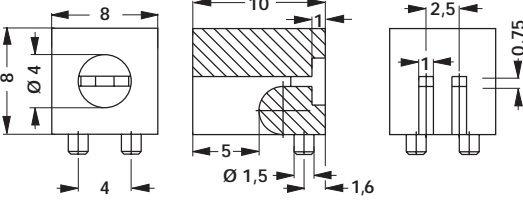
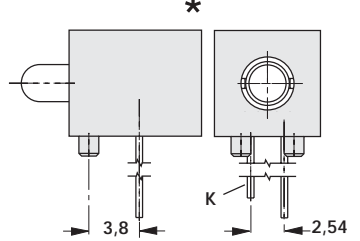
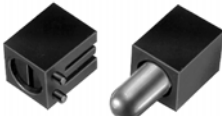
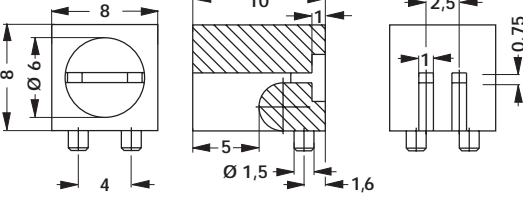
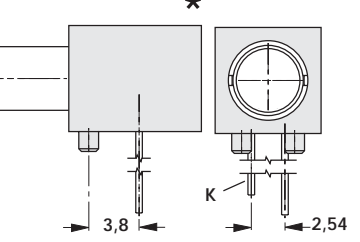

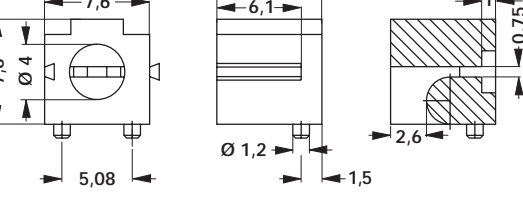
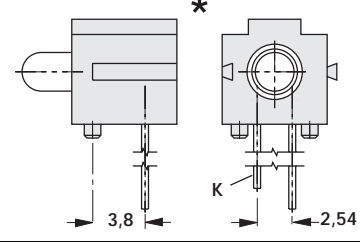
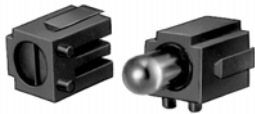
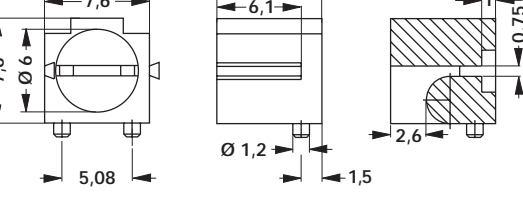
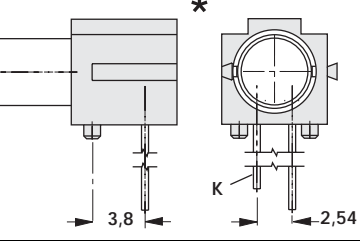
K

L

M

N

**LED-holder for LED Ø 3 mm and 5 mm**

		
<b>art. no.</b> <b>DH 3 W</b>	type for LED Ø 3 mm	
		
<b>art. no.</b> <b>DH 5 W</b>	type for LED Ø 5 mm	
		
<b>art. no.</b> <b>DH 3 R</b>	type for LED Ø 3 mm	
		
<b>art. no.</b> <b>DH 5 R</b>	type for LED Ø 5 mm	

\* = presentation with diode

K = cathode

material: glass fibre reinforced polyamide

**L 5**

LED-hold.for front panel assembly  
Spacers & mounting strips  
LED-holders for PCB assembly  
Sockets for LED

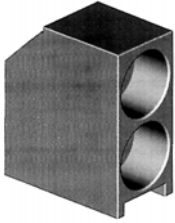
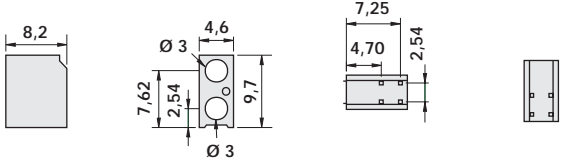
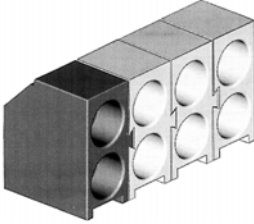
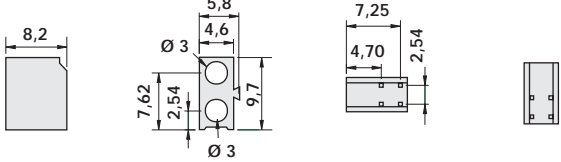
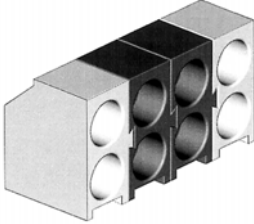
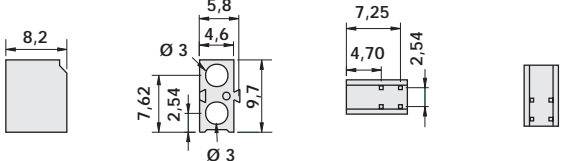
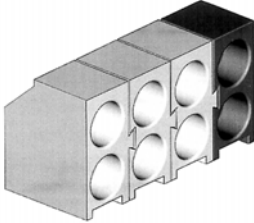
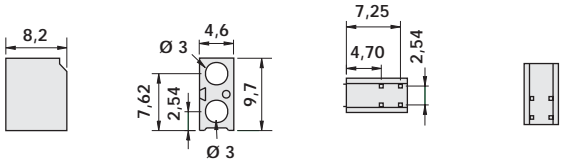
→ L 4  
→ L 2 - 3  
→ L 5 - 8  
→ F 11 - 12

Light pipes for SMDs  
Technical data of the LEDs

→ L 9 - 11  
→ L 12

LED-holder for LED Ø 3 mm

multiple LED-holders: single holder/can be strung, left/can be strung, middle/can be strung, right

	
<p>art. no. <b>DDH 3 E</b></p>	<p>type for LED Ø 3 mm</p>
	
<p>art. no. <b>DDH 3 L</b></p>	<p>type for LED Ø 3 mm</p>
	
<p>art. no. <b>DDH 3 M</b></p>	<p>type for LED Ø 3 mm</p>
	
<p>art. no. <b>DDH 3 R</b></p>	<p>type for LED Ø 3 mm</p>

material: nylon, black

temperature range: -20 °C ... +85 °C

flammability: UL 94 V-0



A

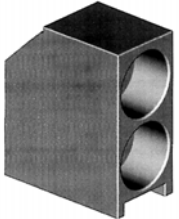
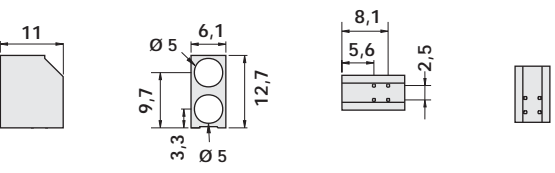
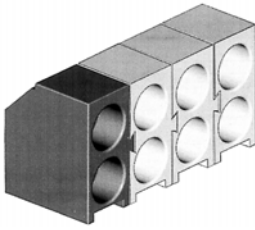
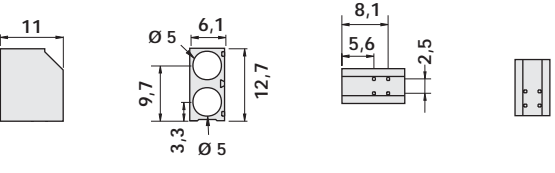
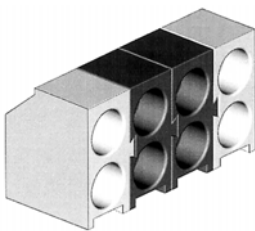
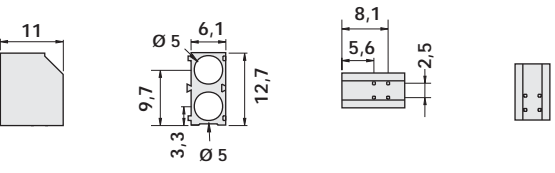
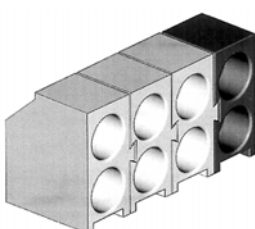
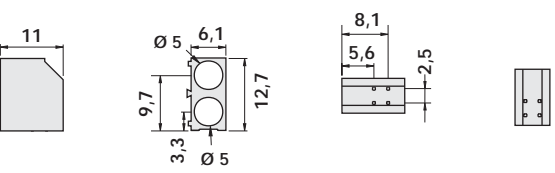
**LED-holders for PCB assembly**

B

**LED-holder for LED Ø 5 mm**

multiple LED-holders: single holder/can be strung, left/can be strung, middle/can be strung, right

C

	
<b>art. no.</b> <b>DDH 5 E</b>	type for LED Ø 5 mm
	
<b>art. no.</b> <b>DDH 5 L</b>	type for LED Ø 5 mm
	
<b>art. no.</b> <b>DDH 5 M</b>	type for LED Ø 5 mm
	
<b>art. no.</b> <b>DDH 5 R</b>	type for LED Ø 5 mm

**material:** nylon, black

**temperature range:** -20 °C ... +85 °C

**flammability:** UL 94 V-0

L

M

N

**L 7**

 Screw fastening  
 D-Sub cut-out cover  
 Spacers & mounting strips  
 Technical data of the LEDs

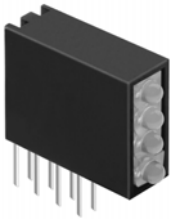
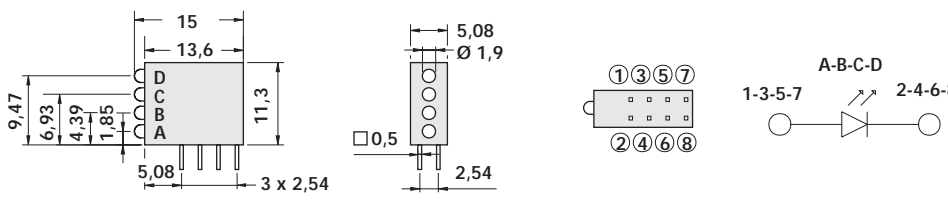
 → I 28  
 → I 27  
 → L 2 - 3  
 → L 12

 Sockets for LED  
 LED-holders for PCB assembly  
 LED-hold.for front panel assembly  
 Light pipes for SMDs

 → F 11 - 12  
 → L 5 - 8  
 → L 4  
 → L 9 - 11

Fourfold-LED-holders

standard case, diffuse lens, standard colours, space-saving version, round lens, rectangular lens

		
art. no.	type	emission colour
DLH 21 ASEH	with LED Ø 2 mm, fourfold	red
DLH 21 AYEH	with LED Ø 2 mm, fourfold	yellow
DLH 21 AGEH	with LED Ø 2 mm, fourfold	green

material: nylon, black

temperature range: -20 °C ... +85 °C

flammability: UL 94 V-0

A

**Light pipes for SMDs**

suitable for common SMD types, 3 mm light pipes, horizontal, ESD-protection from panel to PCB

B

C

D

E

F

G

H


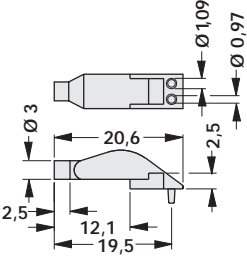


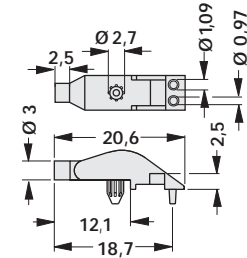
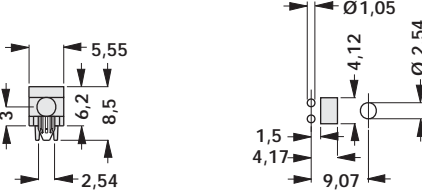
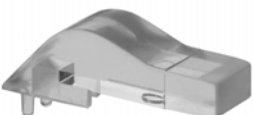
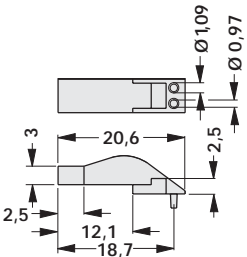
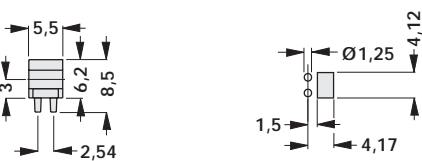
I

K

L

M

N

		
<b>art. no.</b> <b>LL 30 HRS</b>	way of fixation by alignment pins	diameter of lens Ø 3 mm
		
<b>art. no.</b> <b>LL 30 HRP</b>	way of fixation by press-in pins	diameter of lens Ø 3 mm
		
<b>art. no.</b> <b>LL 35 HVS</b>	way of fixation by alignment pins	diameter of lens rectangle 5.5x3 mm

**material:** polycarbonat, clear colour

**temperature range:** -30 °C ... +100 °C

**flammability:** UL 94 V-0

**L 9**

 Spacers & mounting strips  
 Sockets for LED  
 LED-holders for PCB assembly  
 Technical data of the LEDs


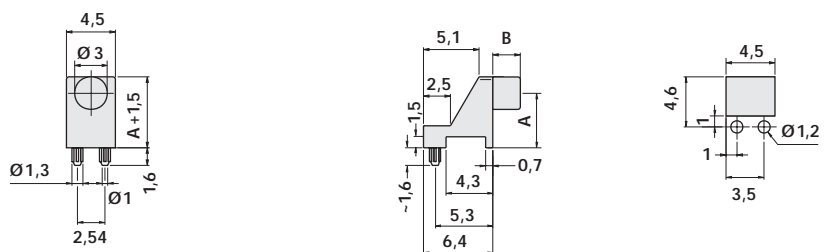
 → L 2 - 3  
 → F 11 - 12  
 → L 5 - 8  
 → L 12

 Screw fastening  
 D-Sub cut-out cover  
 LED-hold.for front panel assembly  
 Light pipes for SMDs


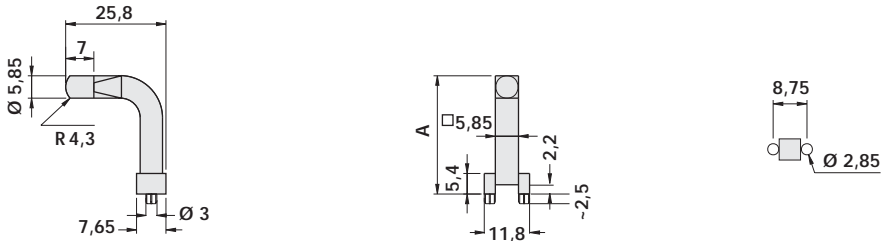
 → I 28  
 → I 27  
 → L 4  
 → L 9 - 11

Light pipes for SMDs

suitable for common SMD types, 3 mm light pipes, horizontal, ESD-protection from panel to PCB

			
	art. no.	way of fixation	dim. [mm]
LL 30 WRFP 038	by press-in pins	A	B
LL 30 WRFP 050	by press-in pins	3.80	2.50
LL 30 WRFP 076	by press-in pins	5.00	2.50
LL 30 WRFP 102	by press-in pins	7.60	2.50
		10.20	2.50

panel light pipe, 6 mm lens, suitable for common SMD LEDs, white lens, large angle of radiation

			
	art. no.	way of fixation	dim. [mm]
LL 60 WRB 254	by press-in pins	A	25.40

material: polycarbonat, clear colour

temperature range: -30 °C ... +100 °C

flammability: UL 94 V-0

Spacers & mounting strips  
Screw fastening  
D-Sub cut-out cover  
Technical data of the LEDs

→ L 2 - 3  
→ I 28  
→ I 27  
→ L 12

Sockets for LED  
Light pipes for SMDs  
LED-hold.for front panel assembly  
LED-holders for PCB assembly

→ F 11 - 12  
→ L 9 - 11  
→ L 4  
→ L 5 - 8

L 10

A

B

C

D

E

F

G

H

I

K

L


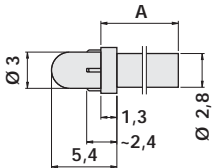



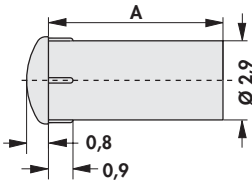
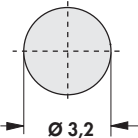
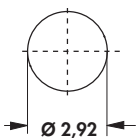
M

N

A

**Light pipes for SMDs**

panel light pipe 3 mm, ESD protection from panel to PCB


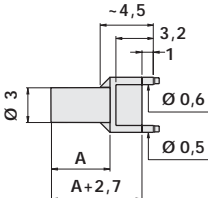
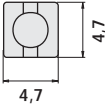
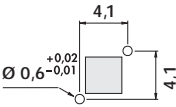
			
<b>art. no.</b>	dim. [mm] A	<b>art. no.</b>	dim. [mm] A
<b>LL 30 PRB 032</b>	3.20	<b>LL 30 PRB 089</b>	8.90
<b>LL 30 PRB 064</b>	6.40		
			
<b>art. no.</b>	dim. [mm] A	<b>art. no.</b>	dim. [mm] A
<b>LL 30 PRL 032</b>	3.20	<b>LL 30 PRL 127</b>	12.70
<b>LL 30 PRL 064</b>	6.40	<b>LL 30 PRL 159</b>	15.90
<b>LL 30 PRL 089</b>	8.90		

**material:** polycarbonat, clear colour

**temperature range:** -30 °C ... +100 °C

**flammability:** UL 94 V-0

suitable for common SMD LEDs, vertical, rigid light pipe Ø 3 mm, ESD protection from panel to PCB

			
<b>art. no.</b>	way of fixation	dim. [mm] A	
<b>LL 30 VRFS 024</b>	by alignment pins	2.40	
<b>LL 30 VRFS 050</b>	by alignment pins	5.00	
<b>LL 30 VRFS 075</b>	by alignment pins	7.50	

**material:** polycarbonat, clear colour

**temperature range:** -30 °C ... +100 °C

**flammability:** UL 94 V-0

N

**L 11**
**Screw fastening**  
**Spacers & mounting strips**  
**Sockets for LED**  
**D-Sub cut-out cover**

 → I 28  
 → L 2 - 3  
 → F 11 - 12  
 → I 27

**LED-holders for PCB assembly**  
**Light pipes for SMDs**  
**Technical data of the LEDs**  
**LED-hold.for front panel assembly**

 → L 5 - 8  
 → L 9 - 11  
 → L 12  
 → L 4