

**CONNECT AND PROTECT**

Connectors, Front Panel  
Component Systems

  
nvent

**SCHROFF**

# FPCS front element system

## OVERVIEW

### MAIN KATALOG

- Cabinets . . . . . 1
- Wall mounted cases . . . . . 2
- Accessories for cabinets and wall mounted cases . . 3
- Climate control . . 4
- Electronics cases . . . . . 5
- Subracks/ 19" chassis . . . . . 6
- Front panels, plug-in units . . . . . 7
- Systems . . . . . 8
- Power supply units . . . . . 9
- Backplanes . . . . . 10
- Connectors, front panel component system . . . . . 11
- Appendix . . . . . 12

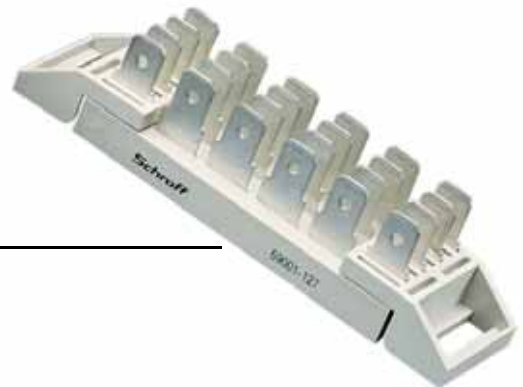


## Front element systems

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## Busbars

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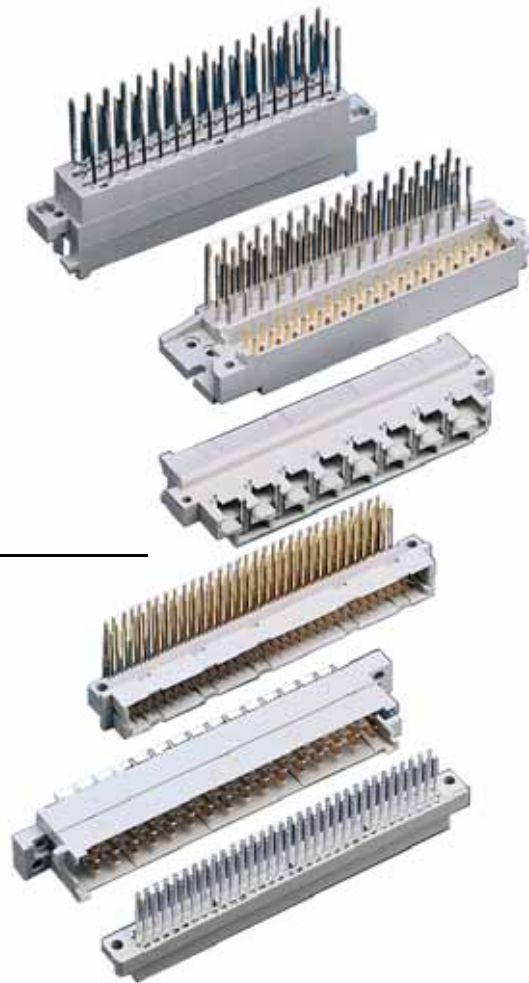
# FPCS front element system

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Connectors/  
busbars ..... 11.2

Front element  
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Electrical  
components  
see  
europacPRO  
subrack section 6.65



## Connectors

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## Electrical components

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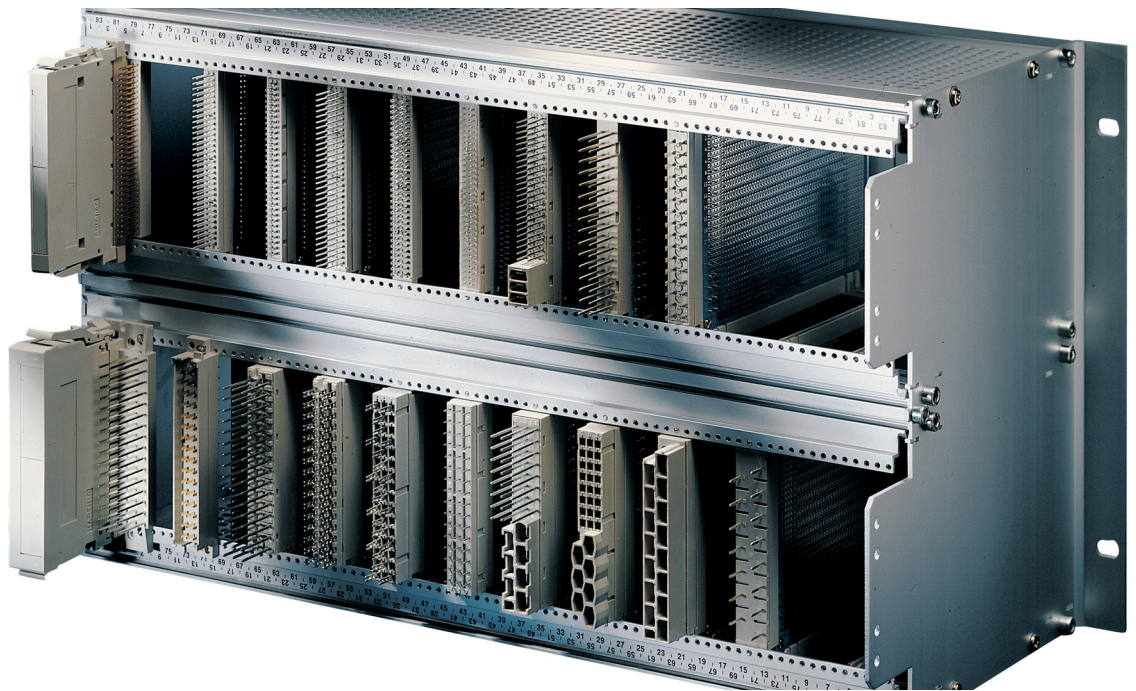


# Connectors, busbars

**OVERVIEW**

**MAIN KATALOG**

- Cabinets ..... 1
- Wall mounted cases ..... 2
- Accessories for cabinets and wall mounted cases .. 3
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- Connectors, front panel component system ..... 11
- Appendix ..... 12



05592002

## STANDARDS

- Connectors in accordance with:  
IEC 60603-2 / DIN 41612

### Requirements classes DIN 41612, Part 5 Requirements class 1

- 500 connector cycles
- 250 connector cycles, 21 day gas test with 10 ppm SO<sub>2</sub>, measurement of contact resistance
- 250 connector cycles, then visual inspection, no abrasion of contact surface down to the base metal, no impairment of function

### Requirements class 2

- 400 connector cycles
- 200 connector cycles, 4 day gas test with 10 ppm SO<sub>2</sub>, measurement of contact resistance
- 200 connector cycles, then visual inspection, no abrasion of contact surface down to the base metal, no impairment of function

### Requirements class 3

- 50 connector cycles, no gas test, then visual inspection, no impairment to function

### Requirements class VG 95 324, part 1

- 500 connector cycles, then 1 day gas test with 10 000 ppm SO<sub>2</sub> and 1 day gas test with 10 000 ppm H<sub>2</sub>S, then visual inspection, no abrasion of contact surface down to base metal, no impairment of function

## MODIFICATIONS

Extended delivery program

- Connectors to IEC 60603-2 with requirements classes 1, 3 and defence equipment standard  
Minimum quantity: 300 pieces
- Connectors with selective contacts  
Minimum quantity: 500 pieces
- Complementary types to standard IEC 60603-2 („half“ type)  
Minimum quantity: 300 pieces
- Not catalogued connectors to IEC 60603-2  
Minimum quantity: 300 pieces

Note:  
Prices and delivery times available on request

# Connectors, busbars

## GENERAL TECHNICAL DATA

### Contamination level 1

None or dry, non-conductive contamination. Contamination has no effect.

### Contamination level 2

Non-conductive contamination only. Occasional transient conductivity due to condensation may occur. Contamination levels 3 and 4 are not taken into account as they do not apply to the connectors listed in this catalogue. The minimum creepage distances represented in the table relate to the CTI values of insulation group III a/b.

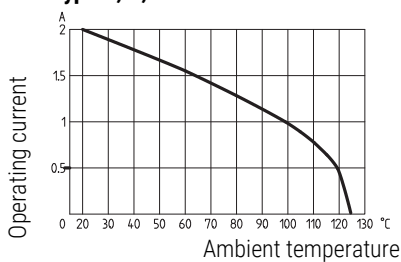
### Reference voltage, minimum creepage distance and contamination level

Minimum creepage distance in mm

- Contamination level 1	0.09	0.125	0.14	0.18	0.2	0.22	0.25	0.28	0.32	0.42	0.56	0.75	1.0	0.3	1.8	2.4	3.2
- Contamination level 2	0.42	0.50	0.53	1.2	1.25	1.30	1.40	1.50	1.60	2.00	2.50	3.20	4.0	5.0	6.3	8.0	10

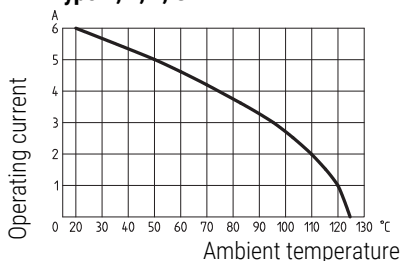
## DERATING DIAGRAMS

### Type B, C, R

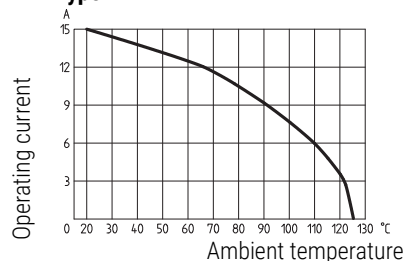


The current-carrying capacity of connectors is restricted by the thermal loading capacity of the materials, the contact elements - including connections - and insulation elements. The derating curve applies therefore for currents that may flow continuously (not intermittently) and simultaneously through each contact element of the connector without exceeding the maximum acceptable temperature. Measurement and control procedures in accordance with DIN 41 640, part 3.

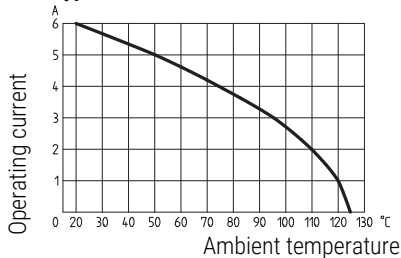
### Type D, E, F, G



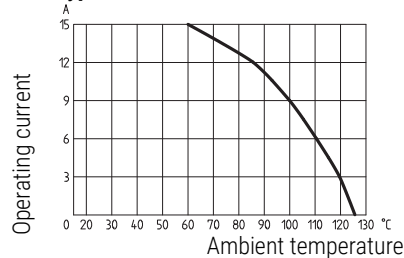
### Type H



### Type D, E, F, G



### Type H



sva42501 sva42502 sva42503 sva42504 sva42505

Overview ..... 11.3

### Connectors

Connector types 11.4

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### Busbars

4-pin for Faston connector 6.3 x 0.8 mm ..... 11.10



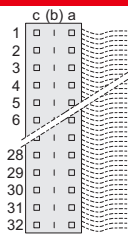
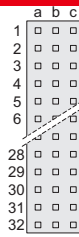

PCB busbars ..... 11.11

Busbars ..... 11.11

# Accessories – Connectors

## OVERVIEW OF TYPES, CONNECTORS EN 60603 (DIN 41612)

### ORDER INFORMATION

Description	Number of contacts	Row assignment	Type B	Type C	Type C for ribbon cables	Type R	Type D
Drawing: View of rear of plug							
			1 piece	1 piece	1 piece	1 piece	1 piece

### Male connector

Solder pins, length 3 mm, 0.6 mm x 0.6 mm; angled	32	a, c	–	<b>69001-826</b>	–	–	<b>69001-831</b>
	64	a, b	<b>69001-801</b>	–	–	–	–
	64	a, c	–	<b>69001-821</b>	–	–	–
	96	a, b, c	–	<b>69001-816</b>	–	–	–

### Female connector

Wire-wrap pins, length 13 mm, 0.6 mm x 0.6 mm, straight;	32	a, c	–	<b>69001-691</b>	–	–	–
	64	a, c	–	<b>69001-685</b>	–	–	–
	96	a, b, c	–	<b>69001-679</b>	–	–	–
Wire-wrap pins, length 20 mm, 1 mm x 1 mm, straight;	32	a, c	–	–	–	–	<b>69001-697</b>
Solder pins, length 2.5 mm, Ø 0.6 mm, straight	64	a, b	<b>69001-664</b>	–	–	–	–
	64	a, c	–	<b>69001-693</b>	–	–	–
	96	a, b, c	–	<b>69001-696</b>	–	–	–
Solder pins, length 3 mm, 0.6 mm x 0.6 mm, angled	64	a, c	–	–	–	<b>69001-976</b>	–
	96	a, b, c	–	–	–	<b>69001-728</b>	–
Solder pins, length 4 mm, Ø 0.6 mm, straight	64	a, c	–	<b>69001-678</b>	–	–	–
	96	a, b, c	–	<b>69001-677</b>	–	–	–
Solder eye, length 5.5 mm	32	a, c	–	–	–	–	<b>69001-698</b>
Snap-on/screw-on for 64-pin cable	64	a, c	–	–	<b>69005-596</b>	–	–
Spring contacts for crimping, 0.14 - 0.5 mm <sup>2</sup> , 50 pieces			–	–	–	–	<b>21100-293</b>
Spring contacts for crimping, 0.75 - 1.5 mm <sup>2</sup> , 50 pieces			–	–	–	–	<b>21100-294</b>
Torx panhead screw M2.5 x 7, PU 100 pieces, for direct mounting on z-rail			<b>24560-147</b>	<b>24560-147</b>	<b>24560-147</b>	<b>24560-147</b>	<b>24560-147</b>

Technical Data	Type B	Type C	Type C for ribbon cables	Type R	Type D
Connector pitch	2.54 mm	2.54 mm	2.54 mm	2.54 mm	5.08 mm
Current load max. at 20 °C	2 A	2 A	1 A	2 A	6 A
Test voltage U <sub>eff</sub> contact-contact	1 kV	1 kV	1 kV	1 kV	1.55 kV
Test voltage U <sub>eff</sub> contact-earth	1.55 kV	1.55 kV	–	1.55 kV	1.55 kV
Contact resistance	≤ 20 mΩ	≤ 20 mΩ	–	≤ 20 mΩ	≤ 20 mΩ
Coding on the connector	–	–	–	–	–
Separate coding	yes	yes	yes	yes	yes
Contact surface	solidly gold-plated	solidly gold-plated	solidly gold-plated	solidly gold-plated	solidly gold-plated
Air gap contact-contact	>1.2 mm	>1.2 mm	–	>1.2 mm	>1.6 mm
Creepage distances contact-contact	>1.2 mm	>1.2 mm	–	>1.2 mm	>3.0 mm
Insertion and withdrawal forces	32-pin < 30 N; 64-pin < 60 N; 96-pin < 90 N		64-pin < 60 N	64-pin < 60 N; 96-pin < 90 N	32-pin < 40 N

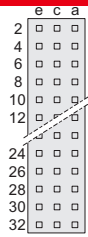
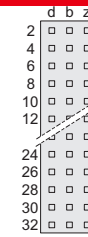
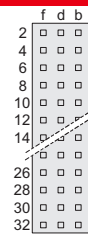
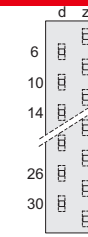

### NOTE

- Connectors are compliant with requirements class 2

# Accessories – Connectors

## OVERVIEW OF TYPES, CONNECTORS EN 60603 (DIN 41612)

### ORDER INFORMATION

Description	Number of contacts	Row assignment	Type E	Type F	Type G	Type H	Mixed type (M), type F and type H
Drawing: View of rear of plug							
			1 piece	1 piece	1 piece	1 piece	1 piece
<b>Male connector</b>							
Solder pins, length 2.9 mm, 0.6 mm x 0.6 mm; angled	32	z, b	-	<b>69001-851</b>	-	-	-
	32	z, d	-	<b>69001-853</b>	-	-	-
	48	a, c, e	<b>69001-879</b>	-	-	-	-
	48	z, b, d	-	<b>69001-846</b>	-	-	-
	64	z, b, d, f	-	-	<b>69001-856</b>	-	-
Solder pins, length 3 mm, 1.2 mm x 0.8 mm; angled; connector pins not protruding	15	z, d	-	-	-	<b>69001-865</b>	-
Solder pins, recessed, length 2.9 mm, 1.2 mm x 0.8 mm; angled	15	z, d	-	-	-	<b>69001-860</b>	-
FASTON connector 6.3 mm x 0.8 mm; straight	15	z, d	-	-	-	<b>69001-866</b>	-
Solder pins, length 2.9 mm, FØ 0.6 mm, H Ø 1.6 mm; angled	24+7-pin	z, b, d	-	-	-	-	<b>69001-905</b>

<b>Female connector</b>							
Wire-wrap pins, length 22 mm, 1 mm x 1 mm; straight	32	z, b	-	<b>69001-717</b>	-	-	-
	48	a, c, e	<b>69001-877</b>	-	-	-	-
	48	z, b, d	-	<b>69001-711</b>	-	-	-
	64	z, b, d, f	-	-	<b>69001-723</b>	-	-
F: Wire-wrap pins, length 22 mm, 1 mm x 1 mm; H: FASTON connector 6.3 mm x 0.8 mm; straight	24+7-pin	z, b, d	-	-	-	-	<b>69001-755</b>
Solder pins, length 4 mm, 0.8 mm x 0.8 mm; straight	15	z, d	-	-	-	<b>69001-981</b>	-
Solder pins, length 4.5 mm, 0.4 mm x 0.6 mm; straight	48	z, b, d	-	<b>69001-884</b>	-	-	-
Solder pins, length 10 mm, 0.8 mm x 0.8 mm; straight	15	z, d	-	-	-	<b>69001-980</b>	-
Wiring with FASTON connector 6.3 mm x 0.8 mm; straight	15	z, d	-	-	-	<b>69001-733</b>	-
Solder eyes, length 9.5 mm	32	z, b	-	<b>69001-718</b>	-	-	-
	32	z, d	-	<b>69001-722</b>	-	-	-
	48	z, b, d	-	<b>69001-712</b>	-	-	-
F: Solder eyes; H: FASTON connector 6.3 mm x 0.8 mm; straight	24+7-pin	z, b, d	-	-	-	-	-
Torx panhead screw M2.5 x 7, PU 100 pieces, for direct mounting on z-rail			<b>24560-147</b>	<b>24560-147</b>	<b>24560-147</b>	<b>24560-147</b>	<b>24560-147</b>

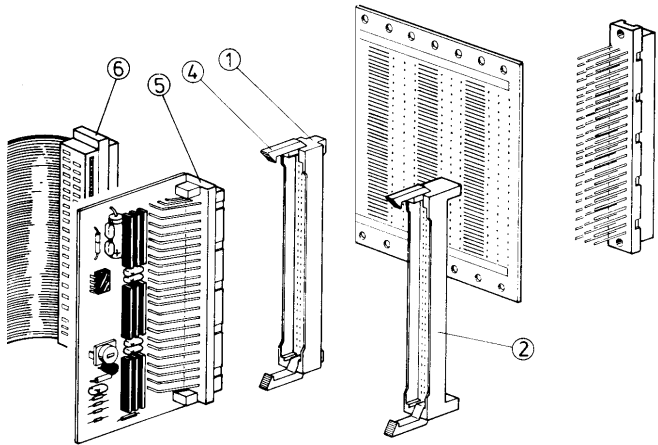
Technical Data	Type E	Type F	Type G	Type H	Mixed type (M), type F and type H	
Connector pitch	5.08 mm	5.08 mm	5.08 mm	10.16 mm	5.08 mm	10.16 mm
Current load max. at 20 °C	6 A	6 A	6 A	15 A	6 A	15 A
Test voltage U <sub>eff</sub> contact-contact	1.55 kV	1.55 kV	1.55 kV	3.10 kV	1.55 kV	3.10 kV
Test voltage U <sub>eff</sub> contact-earth	1.55 kV	2.50 kV	2.50 kV	3.10 kV	2.50 kV	3.10 kV
Contact resistance	≤ 20 mΩ	≤ 20 mΩ	≤ 20 mΩ	≤ 8 mΩ	≤ 20 mΩ	≤ 8 mΩ
Coding on the connector	-	-	-	yes	-	-
Separate coding	yes	yes	yes	yes	yes	yes
Contact surface	solidly gold-plated	solidly gold-plated	solidly gold-plated	hard silver-plated	solidly gold-plated	hard silver-plated
Air gap contact-contact	>1.6 mm	>1.6 mm	>1.6 mm	>4.5 mm	>1.6 mm	>4.5 mm
Creepage distances contact-contact	>3.0 mm	>3.0 mm	>3.0 mm	>8.0 mm	>3.0 mm	>8.0 mm
Insertion and withdrawal forces	48-pin < 75 N	32-pin < 50 N 48-pin < 75 N	64-pin < 100 N	15-pin < 90 N	24+7-pin < 85 N	

### NOTE

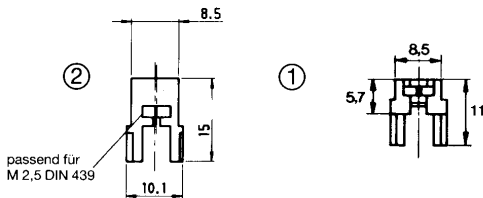
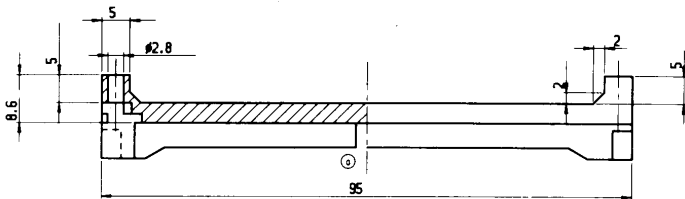
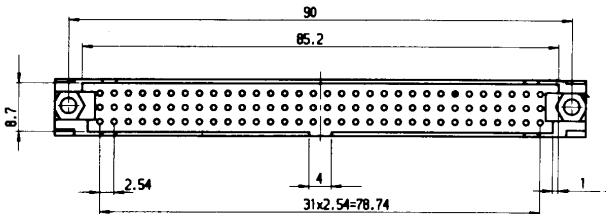
- Connectors are compliant with requirements class 2

# Accessories – Connectors

## BLANK CONNECTOR HOUSINGS/LOCKING LEVERS



A4\_2449



A3\_401

- For types C and R
- The connector housing is fixed to the board with screws; it is pushed over wire wrap posts (e.g. on the rear of backplanes) and thereby forms a male connector
- Locking levers can be used e.g. to lock terminator boards or I/O connectors in place



### ORDER INFORMATION

Item	Description	Qty/PU	Part no.
1	Housing with M 2.5 nuts, for posts 0.6 × 0.6 × 17 mm, backplane thickness 3.2 mm	1	<b>29090-001</b>
2	Housing with M 2.5 nuts, for posts 0.6 × 0.6 × 13 mm, backplane thickness 3.2 mm	1	<b>29090-002</b>
2	Housing with M 2.5 nuts, for posts 0.6 × 0.6 × 13 mm, backplane thickness 1.6 mm	1	<b>29001-019</b>
4	Locking lever for type R, grey	1	<b>69001-995</b>
4	Locking lever for type C, black	1	<b>69001-106</b>

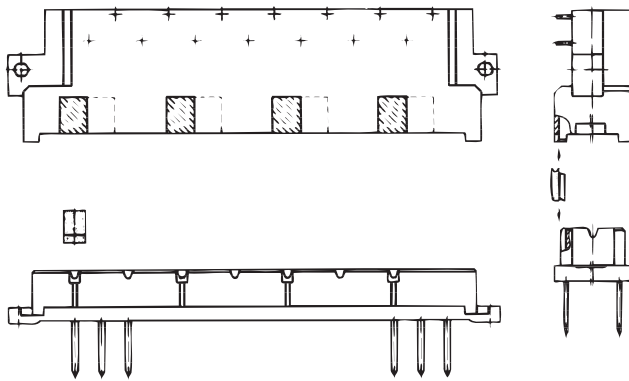
### NOTE

- 29090-001 is the replacement product for 69001-210 and 29001-015
- 29090-002 is the replacement product for 69001-814 and 29001-016
- 29001-019 is the replacement product for 69001-311



# Accessories – Connectors

## KEYING/CODING PEGS FOR CODABLE FEMALE CONNECTORS



- For female connector type H
- Without loss of space
- Max. 70 keying/coding possibilities
- The keying/coding pegs are plugged into the female connector; the corresponding keying/coding fields (situated opposite) of the male connectors are broken out

### ORDER INFORMATION

Description	Qty/PU	Part no.
Keying/coding pegs, PBTP, UL 94 V-0	40	<b>21101-252</b>

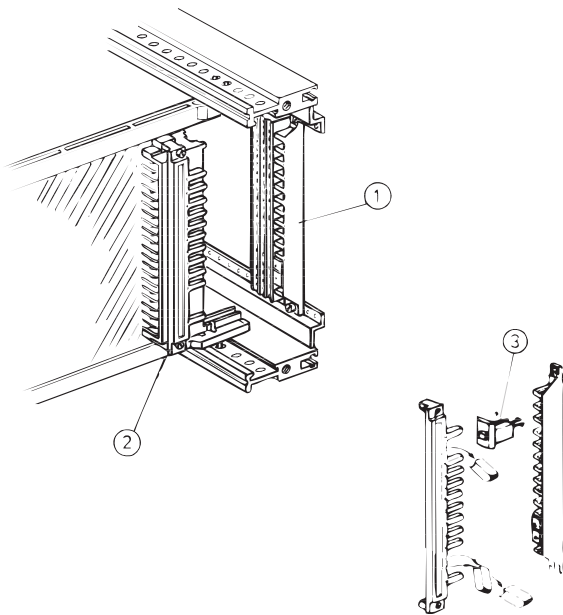
### Keying/coding

- Keying/coding prevents plug-in units becoming mixed up
- Keying/coding for type H
  - Fixing direct onto plug by means of keying/coding peg in the female connector
- Keying/coding for all types in accordance with EN 60603 (DIN 41612)
  - Fixing via additional mounting of keying/coding strips

Keying/coding pegs	For female connector
Part no.	Part no.
	<b>69001-733</b>
<b>21101-252</b>	<b>69001-980</b>
	<b>69001-981</b>

# Accessories – Connectors

## KEYING/CODING STRIPS


A4-2424

- For all types in accordance with EN 60603 (DIN 41612)
- Used with plug-in units to prevent mix-up
- Space for plugs with keying/coding strip:
  - 4 HP for types B, C, D, F, H
  - 5 HP for types E, G
- 66 keying/coding possibilities when two coding pins are used
- 924 keying/coding possibilities when six coding pins are used

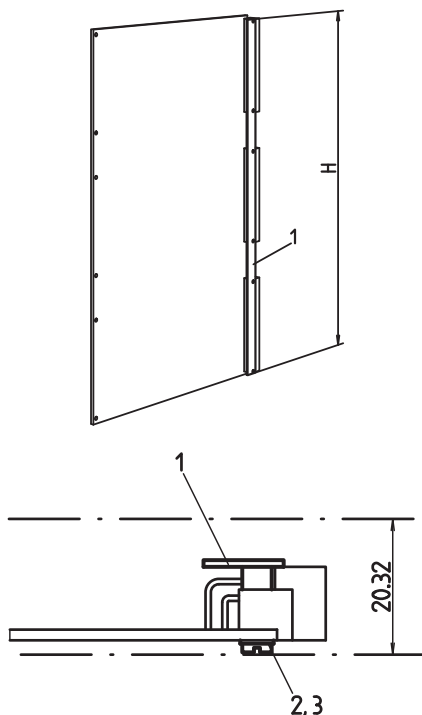
### ORDER INFORMATION

Item	Description	Qty/PU	Part no.
1, 2, 3	Contact strip PBTP, UL 94 V-0, 10 pieces, female strip, PBTP, UL 94 V-0, 10 pieces, keying/coding pins, PBTP, UL 94 V-0, 20 pieces	1	<b>20800-042</b>
1, 2, 3	Spacer element for types E, G	20	<b>20800-036</b>
3	Keying/coding pin	100	<b>20800-078</b>
Assembly kit Screw M2.5 × 18, PU 100 pieces			<b>21100-404</b>

### NOTE

- For connectors types E and G spacers are always required

## PCB STRENGTHENING (9 U)


LKA42609
LKA42593

- Protects large PCBs from bending
- Creates an additional crossbar (in accordance with IEEE recommendations, P 896, Nubus, Multibus<sup>®</sup> II etc.) that links all connectors
- Fixing points match connectors in accordance with EN 60603 (DIN 41612), types B, R, C and D

### DELIVERY COMPRISES (kit)

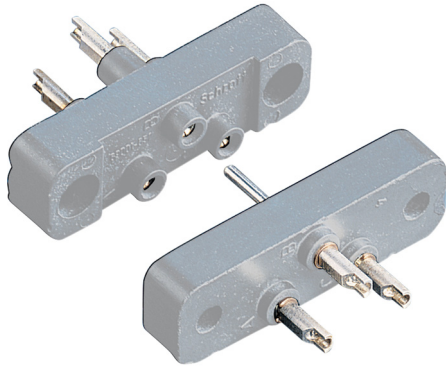
Item	Qty	Description
1	1	PCB strengthening, Al extrusion, anodised, cut edges plain; separator, stainless steel, riveted on
2	6	Cheesehead screw M 2,5 × 12, St, nickel-plated
3	6	Washer 2.6, St, nickel-plated

### ORDER INFORMATION

Description	Height H mm	Part no.
For 9 U PCBs	361.6	<b>20809-441</b>

# Accessories – Connectors

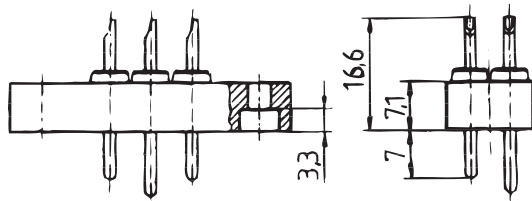
## CONNECTORS, 3-PIN



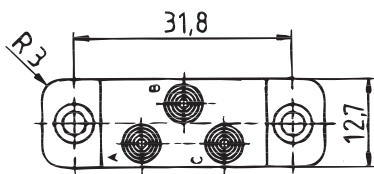
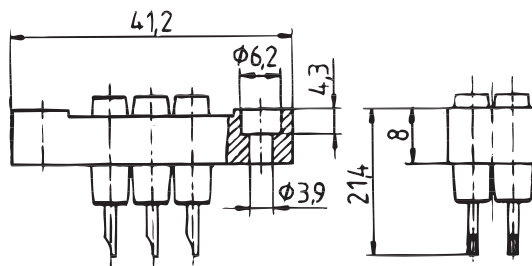
- Used for mains/line voltage supplies
- Male connector with advanced earth protection contact (B)

### ORDER INFORMATION

Item	Description	Qty/PU	Part no.
1	Male connector	1	<b>69001-651</b>
2	Female connector strip	1	<b>69001-652</b>
3	Mounting plate for fixing in subrack, socket terminal strip mounts on z-rail (with threaded holes to EN 60603, DIN 41612)	1	<b>30812-002</b>



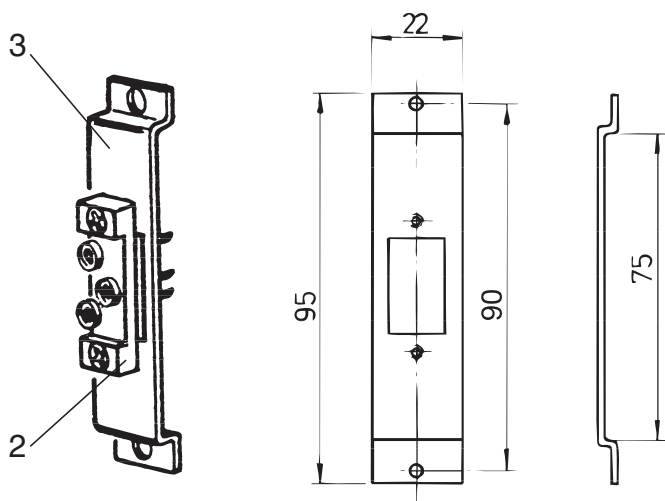
Dimensional drawing of multi-pin connector



Dimensional drawing of socket terminal strip

### TECHNICAL DATA

Nominal current per contact	10 A
Air gap	≥ 4.4 mm
Creepage distance	≥ 7.6 mm
Test voltage	3 kV (eff)
Contact resistance	approx. 10 mΩ
Connection	Solder eye connection up to 1 mm
Ambient temperature	23 °C ... 130 °C
Contact pins, sockets	galvanically silver-plated
Housing material	Keripol R gray (type 802 as per DIN 16911)
Flammability	UL 94-HB



3: Mounting plate  
2: Socket terminal strip

Dimension drawing of mounting plate

# Accessories – Horizontal busbars

## BUSBAR, 4-POLE, FOR FASTON CONNECTORS, 6.3 X 0.8 MM



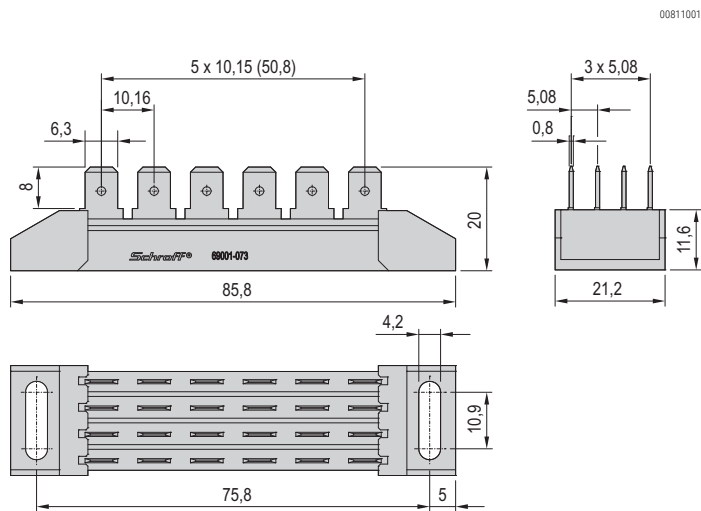
- 24 connection points (4-poles, 6 connectors each)
- To supply mains voltage to 19" subracks
- Fixing in HP grid increments (spacing 15 HP), external dimension < 17 HP

### DELIVERY COMPRISES

Item	Qty	Description
1	1	Busbar, 4-pole (for 6 Faston connectors 6.3 x 0.8 mm)

### ORDER INFORMATION

Description	Part no.
Busbar, 4-pole, for Faston connectors, 6.3 x 0.8 mm	<b>69001-073</b>



00811001

### TECHNICAL DATA

Operating voltage	250 V <sub>AC</sub>
Test voltage: Bar – Bar	3.5 kV <sub>eff</sub>
Test voltage: Pin – Earth	5.0 kV <sub>eff</sub>
Operating current at 20 °C per pin (= 6 connections)	$\sum I \leq 35$ A
Temperature range	-40 °C ... +100 °C
Material: Faston, busbars	CuZn, surface tin-plated
Material: insulating body	PC/ABS, UL 94-V0
Connector type	for Fastons 6.3 x 0.8 mm, 4-pin, 6 Fastons per pin
Connection pitch	5.08 x 10.16 mm

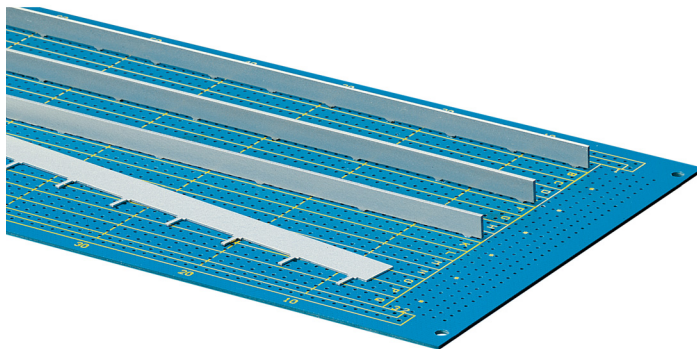
### NOTE

- Other lengths, 2-pole and 3-pole versions, brass contacts available on request

00811050

# Accessories – Horizontal busbars

## PCB BUSBARS

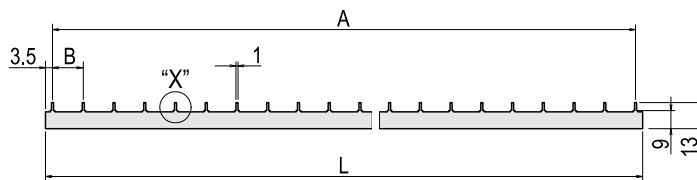


- Power distribution on printed circuit boards and backplanes
- Fault elimination
- Increases the stiffness of PCBs

### ORDER INFORMATION

Width B HP	Length L mm	Dimension A mm	Part no.
3	220.3	14 × 15.24 = 213.36	<b>30925-001</b>
3	342.3	22 × 15.24 = 335.28	<b>30925-002</b>
4	210.2	10 × 20.32 = 203.2	<b>30925-003</b>
4	332.1	16 × 20.32 = 325.12	<b>30925-004</b>
5	210.2	8 × 25.4 = 203.2	<b>30925-005</b>
5	337.2	13 × 25.4 = 330.2	<b>30925-006</b>

Delivery is exclusively in Standard Pack Quantity (SPQ): Please order at least 10 pieces or a multiple. Pricing is per individual item.



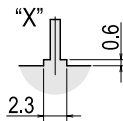
00892008

### TECHNICAL DATA

Conductor material	E-Cu, tin-plated
Pin dimensions	0.8 × 1.0 mm
Max. operating current	30 A
DC resistance	2.5 mΩ/m

### NOTE

- Special designs available on request



A41743

## SOLDER STRIP CONDUCTOR



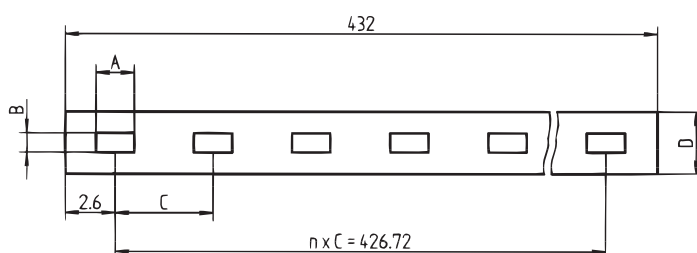
- Efficient linking of connections in the same grid and with the same potential
- Also suitable for EN 60603 (DIN 41612) connectors with wire-wrap pin

### ORDER INFORMATION

Connection type	A mm	B mm	C mm	D mm	n	Qty/PU	Part no.
Wire-wrap pins 0.6 × 0.6 mm	1.14	0.9	2.54	2.3	168	1	<b>60800-064</b>
Wire-wrap pins 1.0 × 1.0 mm	1.65	1.4	5.08	3.2	84	1	<b>60800-080</b>

### TECHNICAL DATA

Conductor material	E-Cu F30, tin-plated
Max. operating current wire-wrap pins 0.6 × 0.6 mm	≤ 4 A
Max. operating current wire-wrap pins 1.0 × 1.0 mm	≤ 4 A



00892016

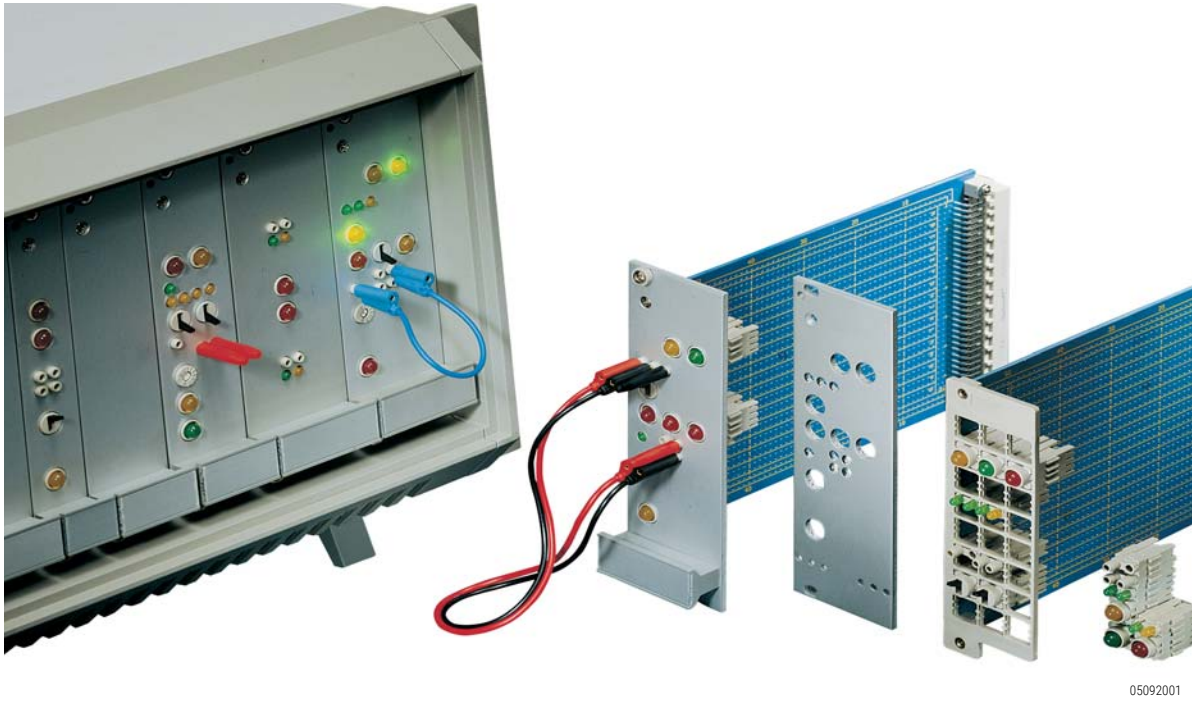
AZA42390

# Front panel component system

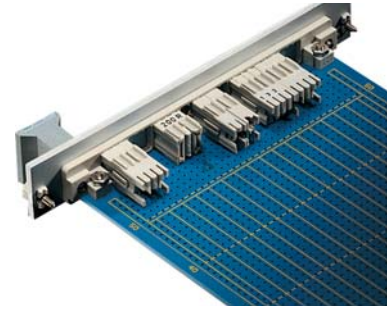
## OVERVIEW

### MAIN KATALOG

- Cabinets . . . . . 1
- Wall mounted cases . . . . . 2
- Accessories for cabinets and wall mounted cases . . 3
- Climate control . . 4
- Electronics cases . . . . . 5
- Subracks/ 19" chassis . . . . . 6
- Front panels, plug-in units . . . . . 7
- Systems . . . . . 8
- Power supply units . . . . . 9
- Backplanes . . . . . 10
- Connectors, front panel component system . . . . . 11
- Appendix . . . . . 12



Components are pre-mounted in plastic bodies that can be arranged in rows; horizontal grid (3 planes) and vertical grid (8 or 16 planes)



Front element system in use

### STANDARDS

- IEC 60297-3-101
- IEC 60603 (DIN 41494 part 8)

# Front panel component system

## OVERVIEW

### OPERATING AND DISPLAY ELEMENTS FOR FRONT PANELS

- Pre-assembled front element components
- Mounting frames with integrated PCB brackets
- Assembled front elements can be soldered in one step
- Subsequent front panel mounting

Overview ..... 11.12

Front panel component system

Single LEDs ..... 11.14

Double LEDs ..... 11.16

Technical data LEDs ..... 11.17

Test sockets ..... 11.18

Make-break socket. 11.19

Technical data for test and make-break sockets and fuse holders ..... 11.20

Potentiometers .... 11.21

Design aids ..... 11.22



LEDs (light-emitting diodes)

05092009



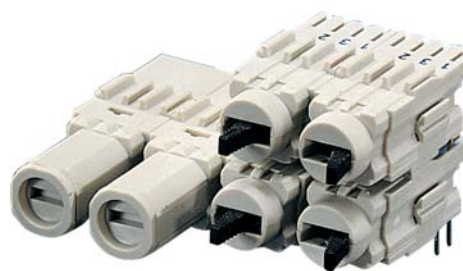
Test and make-break sockets

05092005



Potentiometers

05092007

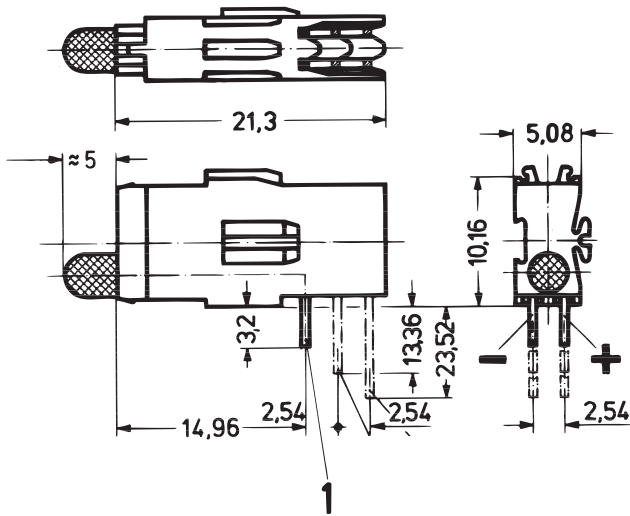


Fuse holders

05092006

# Front panel component system

## SINGLE LED, LONG TYPE, Ø 3.2 MM



1 = mounting planes

A3-195

- Long type for mounting planes 1

### ORDER INFORMATION

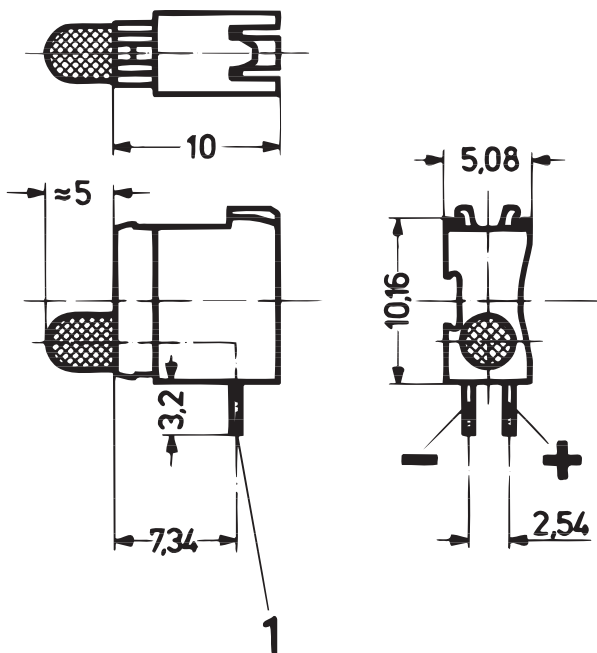
Description	Colour	1 Part no.
Low current LED	red	69004-240
Low current LED	yellow	69004-242
Low current LED	green	69004-241
Standard LED	red	<b>69004-059</b>
Standard LED	yellow	69004-065
Standard LED	green	69004-062

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

- Dimensions of connecting pins: 0.5 × 0.5 mm (mounting plane 1)
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.17

## SINGLE LED, SHORT TYPE, Ø 3.2 MM



1 = mounting plane

A3-214

- Short type for mounting plane 1

### ORDER INFORMATION

Colour	Low current LED Part no.	Standard LED Part no.
red	<b>69004-264</b>	<b>69004-121</b>
yellow	<b>69004-266</b>	<b>69004-123</b>
green	<b>69004-265</b>	<b>69004-122</b>

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

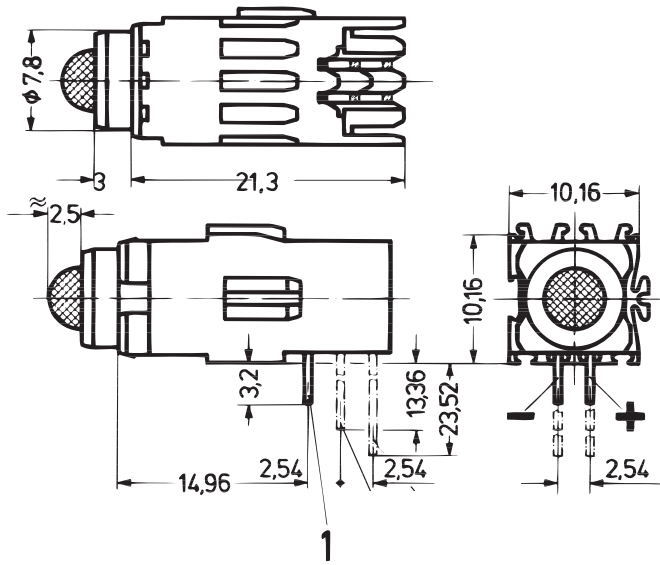
### NOTE

- Dimensions of connecting pins: 0.5 × 0.5 mm
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.17



# Front panel component system

## SINGLE LED, LONG TYPE, Ø 5 MM



1 = mounting plane

A1-194

- Long type for mounting plane 1

### ORDER INFORMATION

Description	Colour	1 Part no.
Low current LED	red	<b>69004-250</b>
Low current LED	yellow	69004-249
Low current LED	green	<b>69004-253</b>
Standard LED	red	69004-050
Standard LED	yellow	69004-056
Standard LED	green	69004-053

Delivery is exclusively in Standard Pack Quantity (SPQ):

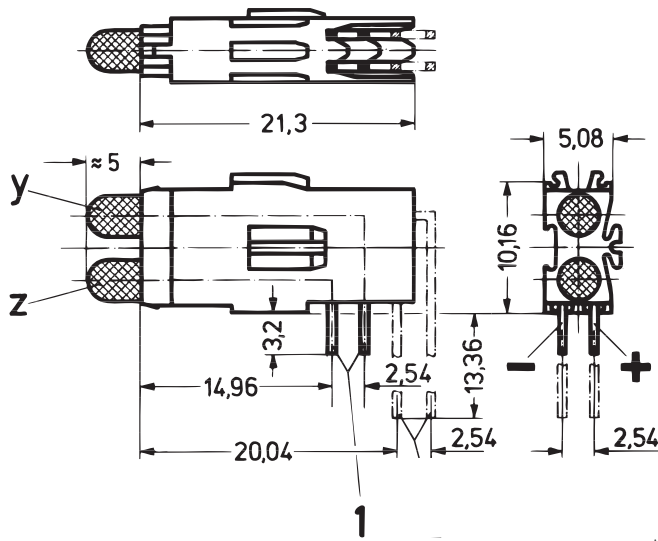
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

- Dimensions of connecting pins: 0.5 x 0.5 mm (mounting plane 1)
- Required front panel drill hole:  $\phi 8$  mm
- Technical data see page 11.17

# Front panel component system

## DOUBLE LED, LONG TYPE, Ø 3.2 MM



1 = mounting plane

A3-196

- Long type for mounting plane 1

### ORDER INFORMATION

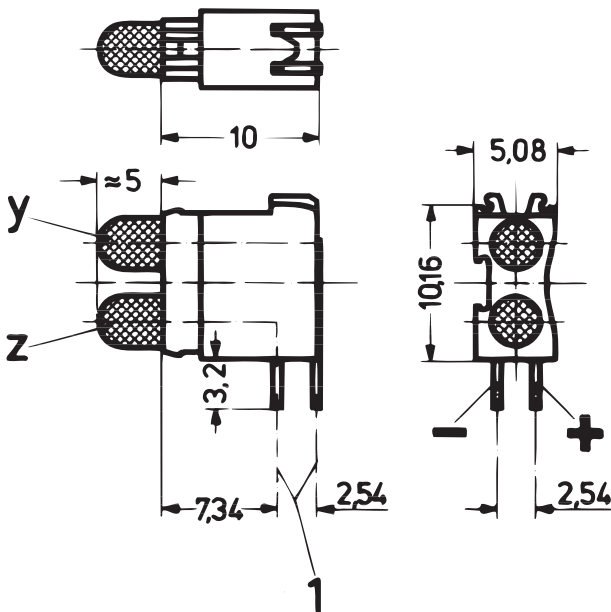
Description	Colour	1 Part no.
Standard LED	red/red (Y/Z)	69004-068
Standard LED	green/green (Y/Z)	69004-071
Standard LED	yellow/yellow (Y/Z)	69004-074
Standard LED	red/green (Y/Z)	69004-077

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

- Dimensions of connecting pins: 0.63 × 0.63 mm
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.17

## DOUBLE LED, SHORT TYPE, Ø 3.2 MM



1 = mounting plane

A3-217

- Short type for mounting plane 1

### ORDER INFORMATION

Colour	Low current LED Part no.	Standard LED Part no.
red/red (Y/Z)	69004-286	<b>69004-124</b>
yellow/yellow (Y/Z)	69004-288	<b>69004-126</b>
green/green (Y/Z)	<b>69004-287</b>	<b>69004-125</b>
red/green (Y/Z)	<b>69004-289</b>	<b>69004-127</b>
red/yellow (Y/Z)	69004-290	69004-128
yellow/green (Y/Z)	<b>69004-291</b>	69004-129

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

- Dimensions of connecting pins: 0.5 × 0.5 mm
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.17

# Front panel component system

## DIMENSIONS LEDs

A = standard LED  
B = low current LED

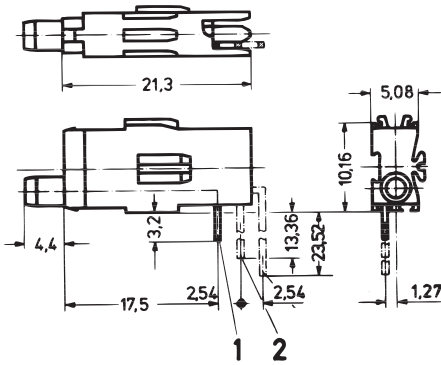
Absolute maximum data $T_a = 25\text{ }^\circ\text{C}$	A red, $\varnothing$ 3.2 mm		B red, $\varnothing$ 5 mm		A yellow, $\varnothing$ 3.2 mm		B yellow, $\varnothing$ 5 mm		A green, $\varnothing$ 3.2 mm		B green, $\varnothing$ 5 mm	
Reverse voltage V	5	3	5	3	5	3	5	3	5	3	5	3
On-state current mA	25	30	25	30	25	30	25	30	25	30	25	30
Power dissipation mW	100	75	100	75	100	75	100	75	100	75	100	75
Forward current mA ( $t < 10\text{ }\mu\text{s}$ )	100	75	100	75	100	75	100	75	100	75	100	75
Forward voltage V – type (10 mA/2 mA)	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.2
– max. (10 mA/2 mA)	3	3	3	3	3	3	3	3	3	3	3	3
Luminous intensity mcd – at 2 mA	–	1.5	–	3.1	–	1.4	–	3.2	–	2	–	3.3
– at 10 mA <sup>1)</sup>	1.8	13.4	2.2	25.1	2.7	13.4	3.4	28.6	3.2	24.6	3.9	25.7
– at 20 mA <sup>1)</sup>	3.6	26.8	4.4	48.2	5.4	28.7	6.8	60.8	6.4	54.9	7.8	54.6
Wavelength nm (10 mA/2 mA)	635	650	635	650	585	585	585	585	565	563	565	563
Thermal resistance $^\circ\text{C}/\text{W}$	400	470	350	390	400	470	350	390	400	470	350	390
Angle of reflected beam	$\pm 50^\circ$											
Storage temperature	–55 ... +100 $^\circ\text{C}$											
Operating temperature	–55 ... +100 $^\circ\text{C}$ (low-current LED)/–40 ... +85 $^\circ\text{C}$ (Standard-LED)											
Solder temperature	260 $^\circ\text{C}/\text{max. 5 sec}$ (processing advice for wave soldering: protect plastic body against solder wave)											
Insulating body	PBT (Crastin)											
Flammability of insulation body	UL 94 V-0											

1) The low current LEDs can be used from 2 to 20 mA (without reduction of lifespan), which means that a significantly higher luminosity can be achieved.

# Front panel component system

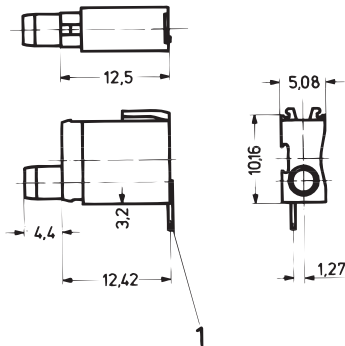
## TEST SOCKET, Ø 2 MM

Long type



1, 2 = mounting plane

Short type



1 = mounting plane

- Long type for mounting plane 1, 2
- Short type for mounting plane 1

### ORDER INFORMATION

For application in	1	2
	Part no.	Part no.
Long type	<b>69004-086</b>	69004-087
Short type	<b>69004-130</b>	-

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

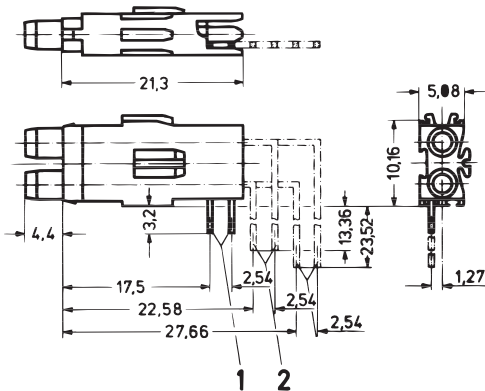
- Dimensions of connecting pins: 0.3 × 0.6 mm
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.20

A3-199b

KA943

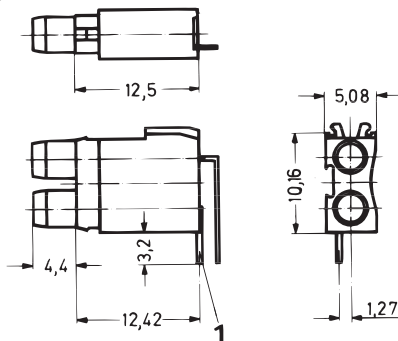
## DOUBLE TEST SOCKET, Ø 2 MM

Long type



1, 2 = mounting plane

Short type



1 = mounting plane

- Long type for mounting plane 1, 2
- Short type for mounting plane 1

### ORDER INFORMATION

For application in	1	2
	Part no.	Part no.
Long type	<b>69004-089</b>	69004-090
Short type	<b>69004-131</b>	-

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

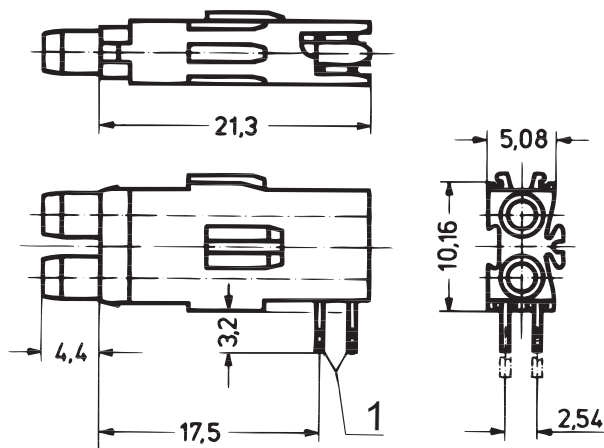
- Dimensions of connecting pins: 0.3 × 0.6 mm
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.20

05009050

05009051

# Front panel component system

## DOUBLE MAKE-BREAK SOCKET, Ø 2 MM



1 = mounting plane

A3-200

- Long type for mounting plane 1
- Gold-plated contacts
- Can also be used as test socket

### ORDER INFORMATION

For application in	Part no.
Long type	<b>69004-095</b>

Delivery is exclusively in Standard Pack Quantity (SPQ):

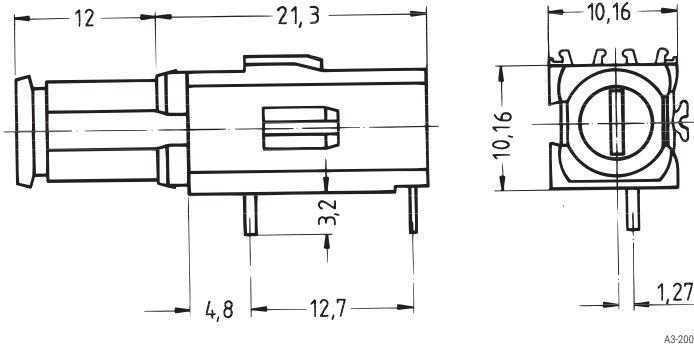
Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

- Dimensions of connecting pins: 0.3 × 0.6 mm
- Required front panel drill hole: Ø 4 mm
- Technical data see page 11.20

# Front panel component system

## FUSE HOLDER



- Long type for mounting plane 1
- For glass fuse inserts 5 x 20 mm to DIN 41 571, 250 V<sub>AC</sub>, 6.3 A
- Contacts silver-plated

### ORDER INFORMATION

Description	Part no.
Long type	<b>69004-098</b>

Delivery is exclusively in Standard Pack Quantity (SPQ): Please order at least 10 pieces or a multiple. Pricing is per individual item.

### NOTE

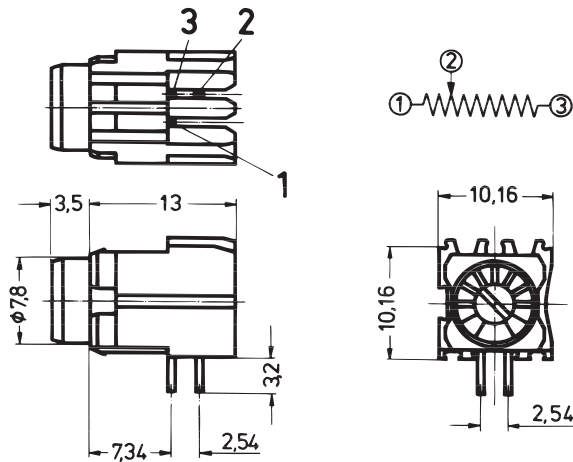
- Dimensions of connecting pins: 0.7 x 0.6 mm
- Required front panel drill hole: Ø 9 mm

	Test socket/make-break socket	Double test socket/ double make-break socket	Fuse holder
Operating voltage	≤ 60 V <sub>DC/AC</sub>	≤ 30 V <sub>AC</sub>	≤ 250 V <sub>AC</sub>
Operating current	≤ 1 A	≤ 1 A	≤ 6.3 A
Test voltage	1 kV/50 Hz	1 kV/50 Hz	–
Temperature range	–25 ... +70 °C	–25 ... +70 °C	–25 ... +70 °C
Solder temperature	260 °C/max. 5 sec (processing advice for wave soldering: protect plastic body against solder wave)		
Contact material	Copper alloy	Copper alloy	Copper alloy
Contact surface	Selectively gold-plated	Selectively gold-plated	Silver-plated
Insulating body	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Climatic use category	HSF <sup>1)</sup> to DIN 40 040	HSF <sup>1)</sup> to DIN 40 040	HSF <sup>1)</sup> to DIN 40 040
Flammability	UL 94 V-0	UL 94 V-0	UL 94 V-0

<sup>1)</sup> H = –25 °C; S = +70 °C; F = 75 % air humidity, no condensation

# Front panel component system

## CERMET POTENTIOMETERS



Pins 1 and 2 low-ohmic when left-hinged;  
pins 2 and 3 low-ohmic when right-hinged

- Short type for mounting plane 1

### ORDER INFORMATION

Resistance	Part no.
100 kΩ	69004-155

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item.

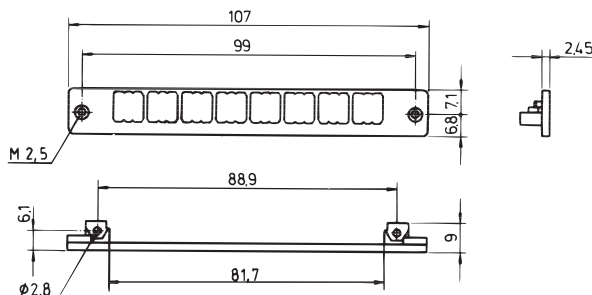
### TECHNICAL DATA

Operating voltage	≤ 200 V <sub>DC/AC</sub>
Operating current	≤ 100 mA
Load capacity	0.5 Watt at T <sub>a</sub> = 70 °C
Test voltage	500 V/50 Hz
Resistance tolerance	± 10 %
Electrical rotation angle	230° ± 5°
Insulation resistance change	100 MΩ
Contact resistance change	3 Ω or 3 %, use largest value
Torque at initial turning	0.021 Nm
Storage temperature	-55 ... +125 °C
Operating temperature	-25 ... +70 °C
Service life (full rotation)	200 cycles
Service life at 0.5 Watt load	1000 h at T <sub>a</sub> = 70 °C
Solder temperature	260 °C/max. 5 sec (processing advice for wave soldering; protect plastic body against solder wave)
Insulating body	PBT (Crastin)
Flammability	UL 94 V-0
Resistance of gasket to cleaning	85 °C max. 1 min.
Temperature coefficient	± 100 ppm/K

### NOTE

- Dimensions of connecting pins: 0.45 × 0.45 mm
- Required front panel drill hole: Ø 8 mm
- When left-hinged: pins 1 and 2 low-ohmic
- When right-hinged: pins 2 and 3 low-ohmic

## MOUNTING FRAMES WITH PCB BRACKET FOR MOUNTING PLANES



Mounting frame for mounting plane 1

- With 2 threaded female connectors M 2.5
- Material PBT
- Flammability UL 94 V-0

### ORDER INFORMATION

Description	Part no.
Mounting frame for mounting plane 1	<b>69004-043</b>

Delivery is exclusively in Standard Pack Quantity (SPQ):  
Please order at least 10 pieces or a multiple. Pricing is per individual item

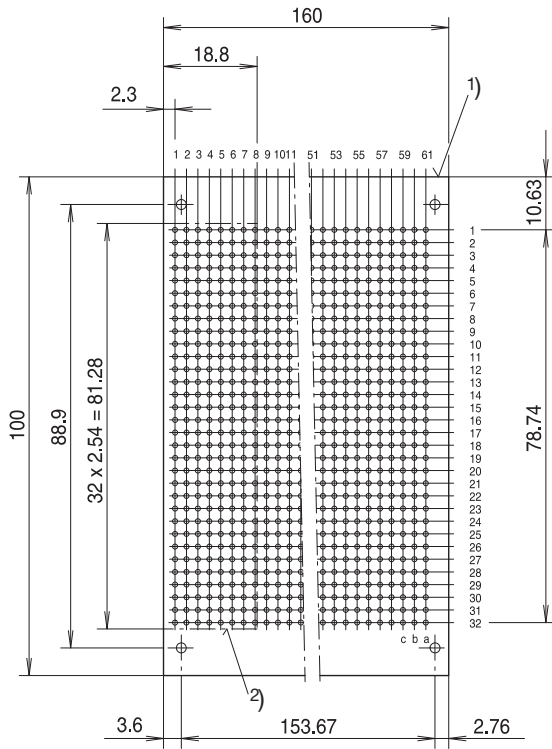
### NOTE

- Mounting frame cannot be used in conjunction with the aluminium profile handle for front panels

# Front panel component system

**DESIGN AIDS**

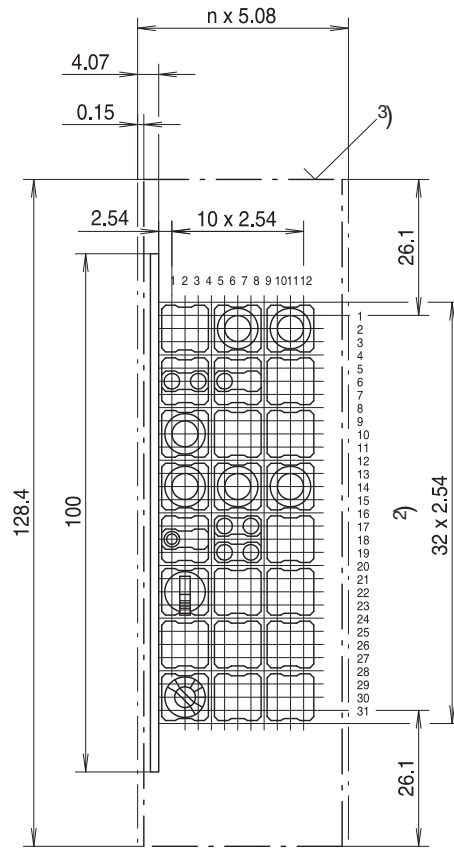
Component side of PCB



- 1) PCB
- 2) Component mounting limit

FEA45510

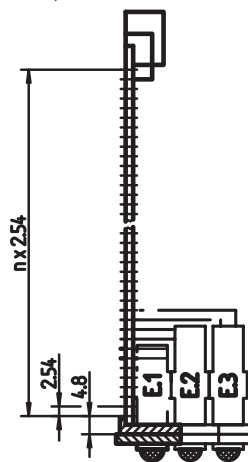
Front of front panel



- 3) Front panel

FEA45511

Placement example



- E1 = first mounting plane
- E2 = second mounting plane
- E3 = third mounting plane

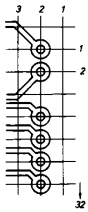
ELA40278



# Front panel component system

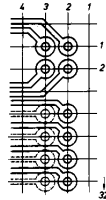
## DESIGN AIDS

PCB tracks  
View solder side  
Short type  
LED,  
Ø 3.2 mm



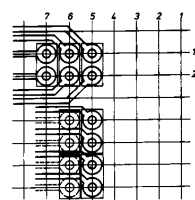
A4\_277a

Double LED,  
Ø 3.2 mm



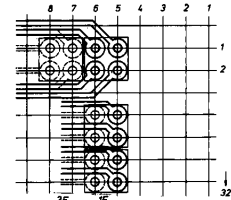
A4\_277b

View solder side  
Long type  
LED,  
Ø 3.2 mm



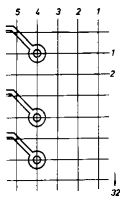
A3\_205a

Double LED,  
Ø 3.2 mm



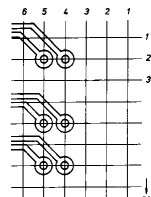
A3\_205b

Test socket,  
Ø 2 mm



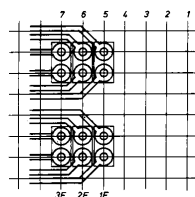
A3\_215a

Double test socket,  
Ø 2 mm



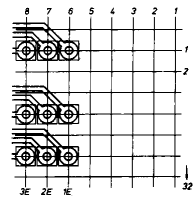
A3\_215b

LED,  
Ø 5 mm



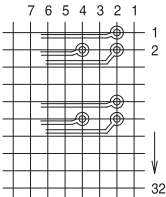
A4\_272

Test socket,  
Ø 2 mm



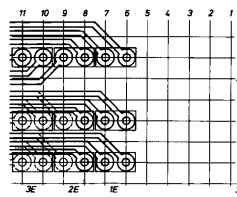
A3\_205c

Potentiometer



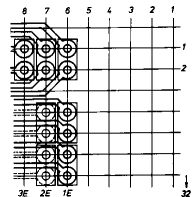
FEA45990

Double test socket,  
Ø 2 mm



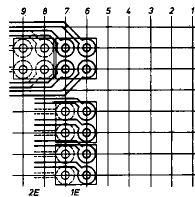
A4\_273

Make/break socket,  
Ø 2 mm



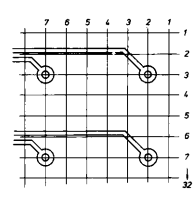
A2\_114a

Double make-break socket,  
Ø 2 mm



A2\_114b

Fuse holder



A2\_114d

Dimensions of connecting pins	Recommended hole Ø	Solder eyes Ø
0.5 × 0.5 mm	1.0 mm ± 0.05	2.1 mm ± 0.1
0.63 × 0.63 mm	1.1 mm ± 0.05	2.2 mm ± 0.2
0.3 × 0.6 mm	0.9 mm ± 0.05	2.0 mm ± 0.2
0.7 × 0.6 mm	1.1 mm ± 0.05	2.1 mm ± 0.2
0.4 × 0.6 mm	0.9 mm ± 0.05	2.0 mm ± 0.2
0.45 × 0.45 mm	0.7 mm ± 0.05	1.8 mm ± 0.2

PCB tracks width min. 0.6 mm  
Grid 2.54 mm

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