

# ME

## ME series electronics housings



Data sheet  
107719\_en\_01

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### 1 Description

ME series electronics housings consist of lower housing parts that can be combined with different upper housing parts. The housings are available in seven overall widths from 12.5 to 90 mm, with and without vents. The lower housing parts are available in three depths, allowing for total depths of 51.5 to 114.5 mm in combination with upper housing parts.

The upper housing parts are snapped onto the lower housing part. Different versions of upper housing parts are available for a range of connection technologies. Use screw or spring-cage PCB terminal blocks on up to two connection levels or plug-in terminal blocks on up to three connection levels.

The design ensures shock and contamination-proof accommodation of electronic components.

The housings are snapped onto an NS 35 DIN rail in accordance with EN 60715.

When combined with the DIN rail connector, you can change modules without interrupting the supply voltage.

Figure 1 ME housing design



**⚠ WARNING:** Only electrically qualified personnel may install and operate the housing. The qualified personnel must be able to recognize and prevent danger.

**i** A configurator for selecting the products is available at [phoenixcontact.com](https://phoenixcontact.com), web code: #0512. You can use it to configure your housing. You will then receive 3D data, order lists, and PCB layouts.

**i** Make sure you always use the latest documentation. It can be downloaded at [phoenixcontact.net/products](https://phoenixcontact.net/products).

**i** This document is valid for the products listed in the “Ordering data” section on [page 4](#) onwards.

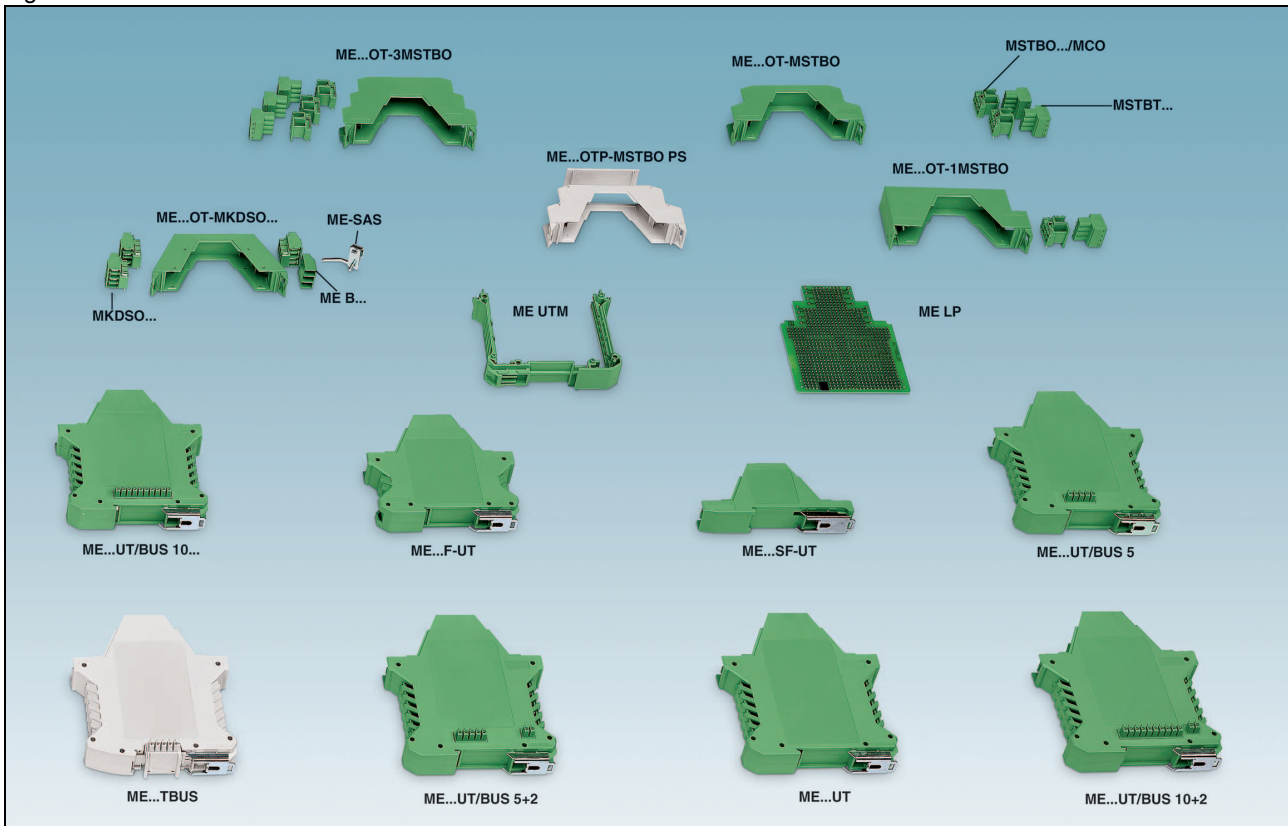
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## Table of contents

1	Description.....	1
2	Overview of ME products.....	3
3	Ordering data.....	4
4	Technical data .....	5
4.1	Calculating the power dissipation.....	6
5	Safety notes.....	6
6	Bus connectors.....	7
6.1	DIN rail connectors.....	7
6.2	Supplying signals to the DIN rail connector .....	7
6.3	Integrated cross connectors.....	7
7	Housing dimensions .....	8
7.1	Width.....	9
7.2	Inner dimensions.....	9
7.3	Increasing the housing width.....	9
7.4	Dimensions of upper housing parts .....	10
8	PCB dimensions .....	11
9	Selecting the connection technology .....	12
10	Connection technology – Technical data .....	14
10.1	PCB terminal blocks.....	14
10.2	Header .....	17
10.3	Connector.....	22
11	Mounting the housing .....	28
11.1	Mounting the DIN rail connector .....	28
11.2	Mounting on a DIN rail.....	28
11.3	Assembling the housing .....	29
12	Accessories and customization .....	30
12.1	Accessories.....	30
12.2	Housing customization .....	31

## 2 Overview of ME products

Figure 2 Overview



 The complete product list for ME modular component housings can be found at [phoenixcontact.com](http://phoenixcontact.com), web code: #0305.

### 3 Ordering data



A configurator for selecting the products is available at phoenixcontact.com, web code: #0512. You can use it to configure your housing. You will then receive 3D data, order lists, and PCB layouts.



In addition to the configurator, a visual product overview to facilitate product selection is also available at phoenixcontact.com, web code: #0305. The overview shows you the single parts that can be ordered for your housing.

#### Order key

The designation of ME series electronics housings consists of the following components:

#### Upper part

<b>ME</b>	<b>17,5</b>	<b>OT</b>	<b>-3</b>	<b>-MSTBO</b>	<b>KMGY</b>
	Width	<b>OT</b> = upper part	Number of levels	Connection technology	Color similar to RAL...
	12.5 mm	<b>OTU</b> = upper part, universal, for PCB terminal block connection	<b>-2</b> = 2 levels		Color similar to RAL...
	17.5 mm		<b>-3</b> = 3 levels		<b>GN</b> = RAL 6021
	22.5 mm				<b>KMGY</b> = RAL 7035
	35 mm	<b>OTP</b> = upper part, suitable for insertion plate and ejector for COMBI-CON connectors			
	45 mm				
	67.5 mm				
	90 mm				

#### Lower part

<b>ME</b>	<b>17,5</b>	<b>F-</b>	<b>UT</b>	<b>/FE</b>	<b>BUS</b>	<b>5+2</b>	<b>KMGY</b>
	Width	Design	<b>UT</b> = lower part	<b>/FE</b> = FE contact integrated in the bottom of the housing	Bus connector	Number of positions of cross connector	Color similar to RAL...
	12.5 mm	<b>No abbreviation</b> = standard (depth: 114.5 mm)	<b>UTG</b> = lower part without vents		<b>BUS</b> = integrated bus connector	<b>5</b> = 5 positions	<b>GN</b> = RAL 6021
	17.5 mm		<b>UTM</b> = middle part		<b>TBUS</b> = DIN rail connector	<b>10</b> = 10 positions	<b>KMGY</b> = RAL 7035
	22.5 mm	<b>F</b> = flat (depth: 106 mm)				<b>5+2</b> = 5 parallel and 2 serial contacts	
	35 mm	<b>SF</b> = super flat (depth: 92 mm)				<b>10+2</b> = 10 parallel and 2 serial contacts	
	45 mm						
	67.5 mm						
	90 mm						

## 4 Technical data

### Housing design

Insulation material	PA (polyamide)
Flammability rating UL 94	V0
Degree of protection in accordance with DIN EN 60259	IP20

### Power dissipation

Maximum dissipated power in direct apposition	5.2 W ... 10.4 W
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### Temperature range

Ambient temperature	
Storage/transport	-40°C ... +55°C (80% relative humidity)
Mounting	-5°C ... +100°C
Operation	-40°C ... +100°C (depending on power dissipation)

### Dimensions


Width	12.5 mm	35 mm	67.5 mm
	17.5 mm	45 mm	90 mm
	22.5 mm		
Depth	92 mm (super flat)		
	106 mm (flat)		
	114.5 mm (standard)		
Height	99 mm		

### PCBs

PCB surface, maximum usable	2000 mm <sup>2</sup> ... 6600 mm <sup>2</sup>
PCB connection	5 positions ... 40 positions with 3.5 mm pitch
	4 positions ... 32 positions with 5.0 mm pitch
	3 positions ... 24 positions with 7.25 mm and 7.5 mm pitch

### Bus connectors

5-pos. DIN rail connector:	ME 17,5 TBUS, ME 22,5 TBUS
Current carrying capacity	5 x 8 A, 100 V DC, depending on derating
5-pos. or 10-pos. integrated cross connectors	Part of ME ... BUS... housing
Current carrying capacity	8 A, 125 V DC (per position), depending on derating

 For the technical data for the connection technology, please refer to [“Selecting the connection technology” on page 12.](#)

#### 4.1 Calculating the power dissipation

Power dissipation values should be used as a guide only. They are largely dependent on the following factors:

- The PCB arrangement in the housing
- The position of components (as a source of heat)
- The number of assembled PCBs in the housing
- The mounting position of the housing

The maximum permissible power dissipation decreases as the ambient temperature increases. The listed reduction factor ( $K_t$ ) must therefore be taken into account when calculating the permissible power dissipation.

	+20°C	+30°C	+40°C	+50°C	+60°C
$K_t$	1	0.91	0.81	0.7	0.57

Formula for calculating the power dissipation depending on the ambient temperature

$$P_{v,t_u} = P_t \times K_t$$

$P_v$  = power dissipation

$t_u$  = ambient temperature

$t = 20^\circ\text{C}$

$K_t$  = reduction factor

Example: power dissipation at +50°C

$$P_{50^\circ\text{C}} = P_{20^\circ\text{C}} \times K_t$$

$$P_{50^\circ\text{C}} = 10.8 \text{ W} \times 0.7 = 7.56 \text{ W}$$

## 5 Safety notes

Only electrically qualified personnel may install and operate the housing. The qualified personnel must be able to recognize and prevent danger.

Do not connect or disconnect the connectors under load.

Do not connect or disconnect the DIN rail connector under load.

Only put products into use that are free of faults. Check the products regularly for damage. Immediately take defective products out of service. Replace damaged products. Repairs are not possible.

## 6 Bus connectors

Bus connectors are passive plug-in components that connect several housing modules fitted with electronics.

The main priority is quick and reliable contacting of the modules. This enables communication to be established between the modules.

### 6.1 DIN rail connectors

Figure 3 ME...TBUS DIN rail connector



The ME...TBUS DIN rail connector is integrated into the DIN rail. The bus connector has 5 positions for energy supply and data transmission. It connects several electronics modules, which are mounted on the DIN rail. When you remove a device from the topology, the contact chain (in the case of parallel contacts) is not interrupted.

DIN rail connectors are available with five parallel contacts or four parallel contacts and one serial contact.

Several DIN rail connectors are required for housings wider than 35 mm. These can be freely combined.

The DIN rail connector can be snapped onto an NS 35/7,5 or NS 35/15 DIN rail.

It has five gold-plated contacts for transmitting up to 8 A and 100 V per position.

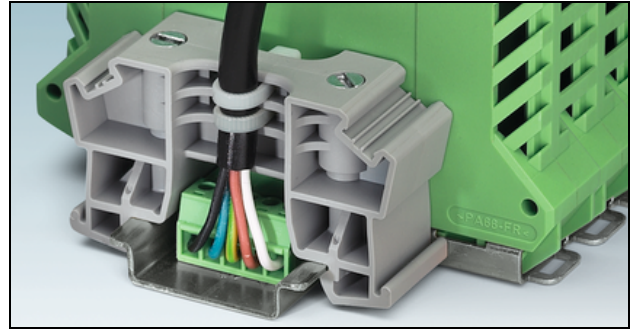
When combined with the DIN rail connector, you can change modules without interrupting the supply voltage.

Do not connect or disconnect the DIN rail connector under load.

### 6.2 Supplying signals to the DIN rail connector

The E/ME TBUS NS35 GY end bracket (2713780) is available for supplying signals to the DIN rail connector.

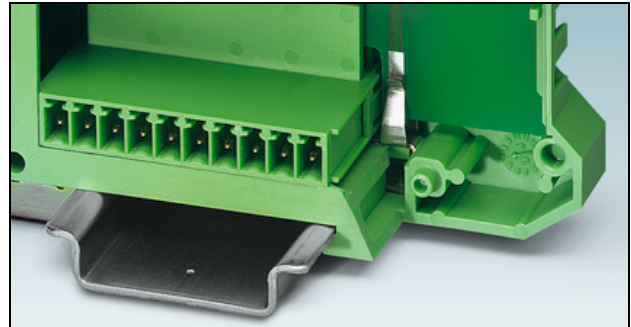
Figure 4 Signal supply with strain relief



The signals are supplied via MINI COMBICON connectors (MC 1,5...AU or IMC 1,5...AU). Strain relief can be integrated in the end bracket.

### 6.3 Integrated cross connectors

Figure 5 Integrated cross connectors



The integrated cross connector is part of the bottom of the housing. The conductive path contact points on the PCB make direct contact with the gold-plated contact forks of the cross connector when the module electronics are inserted.

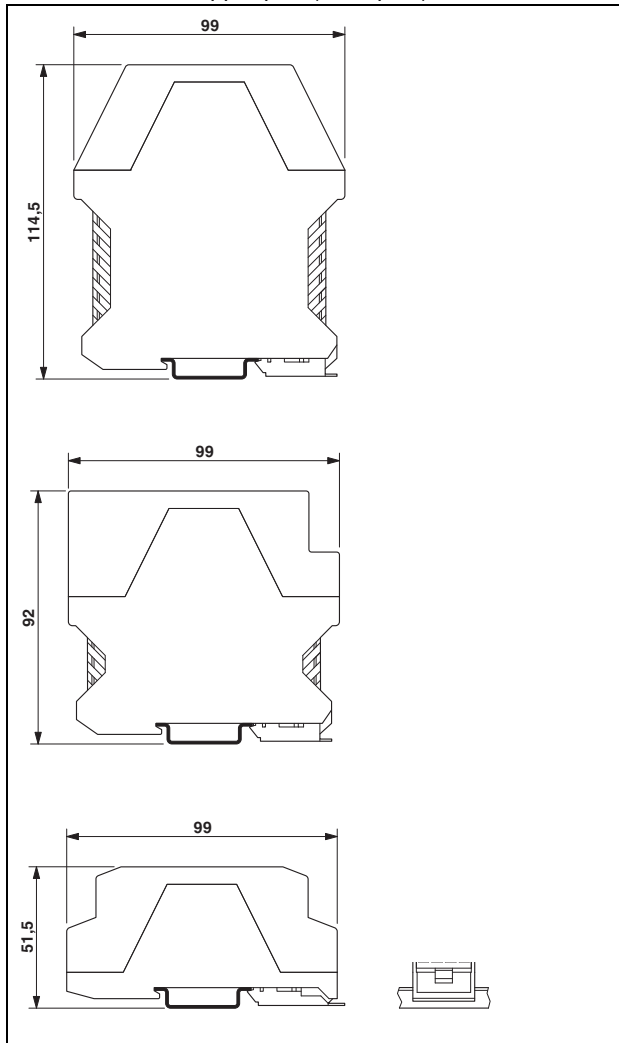
Integrated cross connectors are available with five or ten parallel contacts. Variants are also available where you can additionally connect two serial contacts.

Some housing variants with integrated cross connector (ME...UT/FE...BUS) also have an FE contact integrated in the bottom of the housing. The FE contact connects the inserted PCB directly to the grounded DIN rail.

## 7 Housing dimensions

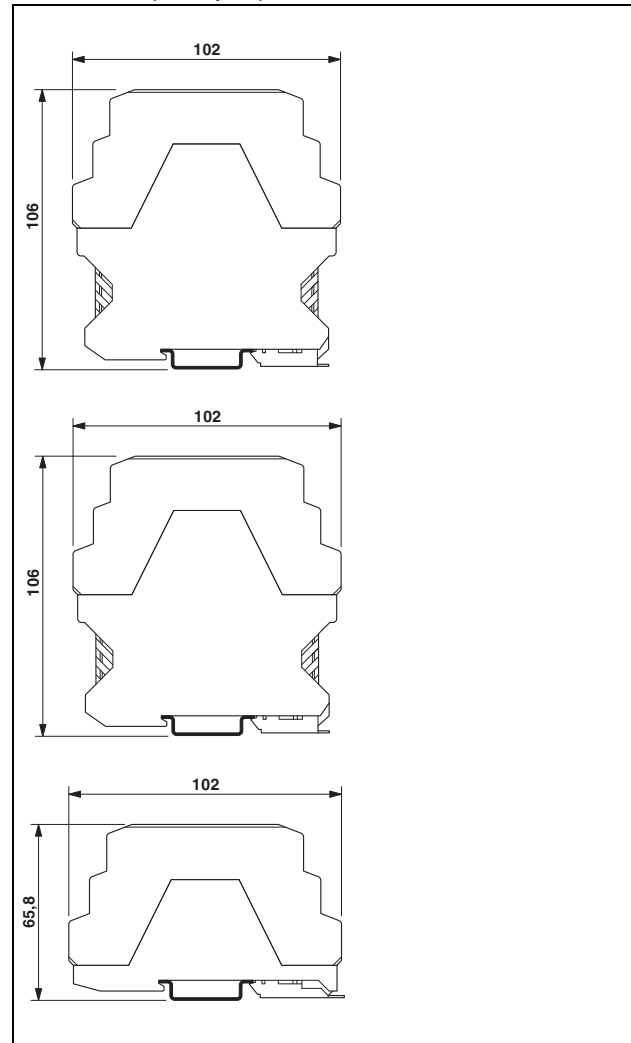
### Depth and height with single-level or double-level upper part

Figure 6 Height and depth with single-level and double-level upper part (examples)



### Depth and height with triple-level upper part

Figure 7 Height and depth with triple-level upper part (examples)

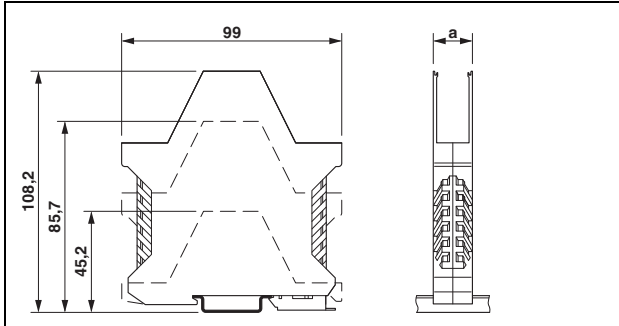


The dimensions are available in the download area for the relevant product.

### 7.1 Width

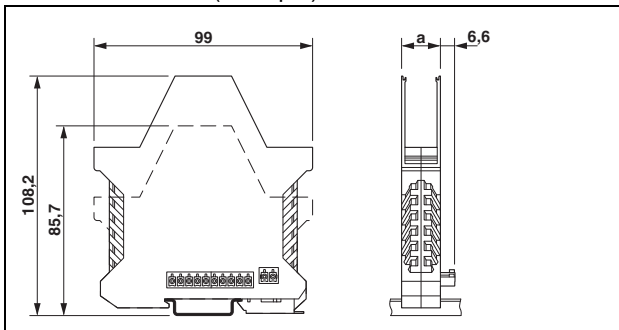
Lower housing part without integrated cross connector

Figure 8 Lower housing part without integrated cross connector (example)



Lower housing part with integrated cross connector

Figure 9 Lower housing part with integrated cross connector (example)



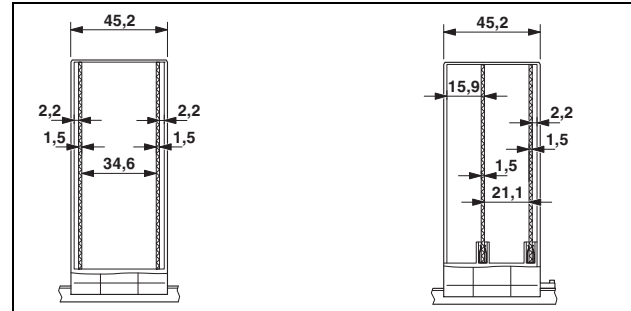
Seven overall widths:

a
12.5 mm
17.5 mm
22.5 mm
35 mm
45 mm
67.5 mm
90 mm

**i** The dimensions are available in the download area for the relevant product.

### 7.2 Inner dimensions

Figure 10 Example illustration, 45 mm overall width



**i** The dimensions are available in the download area for the relevant product.

### 7.3 Increasing the housing width

You can increase housing widths with 17.5 mm or 22.5 mm pitch as required by aligning intermediate elements.

- With vents (UTM) or without vents (UTMG) in gray or green (GN)  
 ME 35 UTM, 2908265  
 ME 45 UTM GN, 2853404  
 ME 35 UTMG, 2908275  
 ME 45 UTMG GN, 2853417

When intermediate elements are used, the ME MF 17,5 base latch (290828) is required to ensure secure latching on the DIN rail.

## 7.4 Dimensions of upper housing parts

### Connectors with header

Figure 11 ME 45 OT-1MSTBO... (single-level)

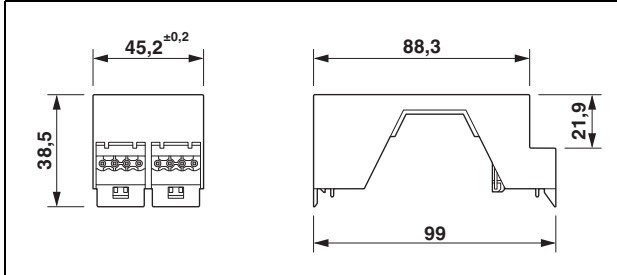


Figure 12 ME 45 OT-MSTBO... (double-level)

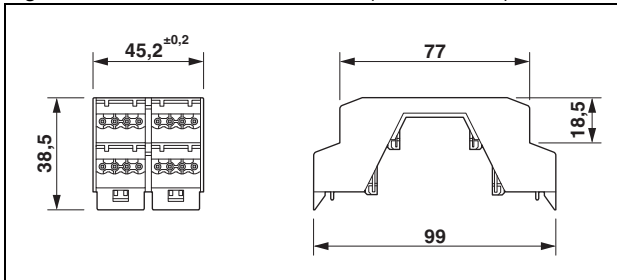
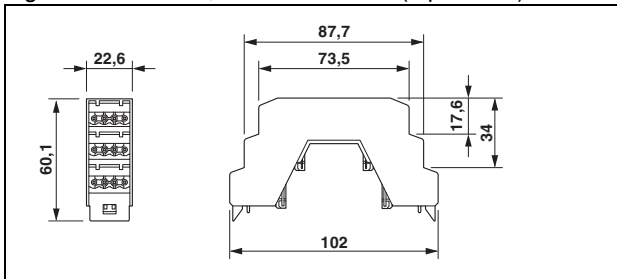


Figure 13 ME 22,5 OT-3MSTBO... (triple-level)



### PCB terminal blocks

Figure 14 ME 45 OT-MKDSO... (screw connection)

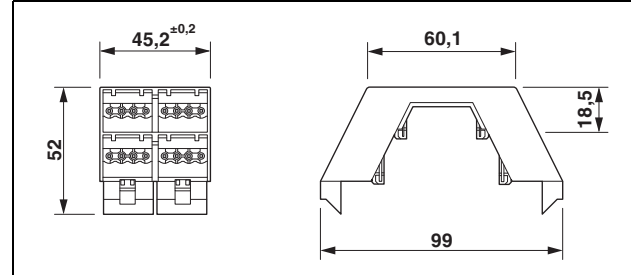
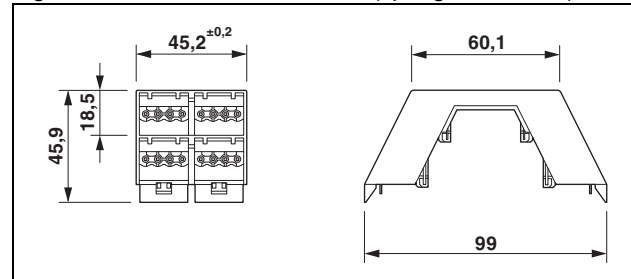


Figure 15 ME 45 OT-FDKSO... (spring connection)

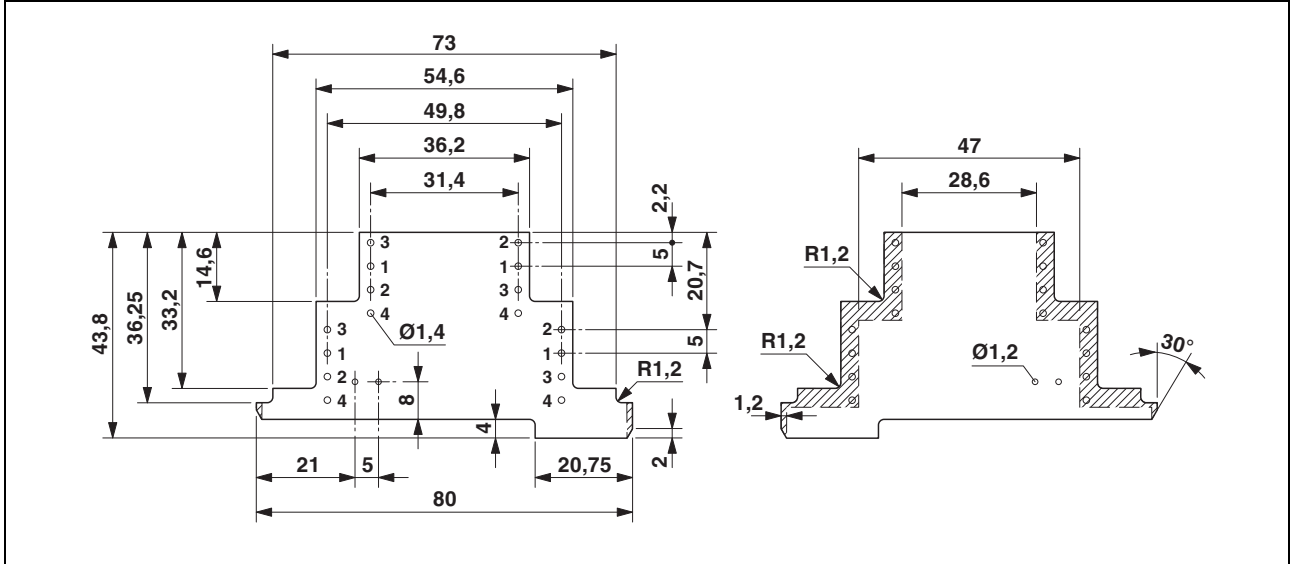


The dimensions are available in the download area for the relevant product.

## 8 PCB dimensions

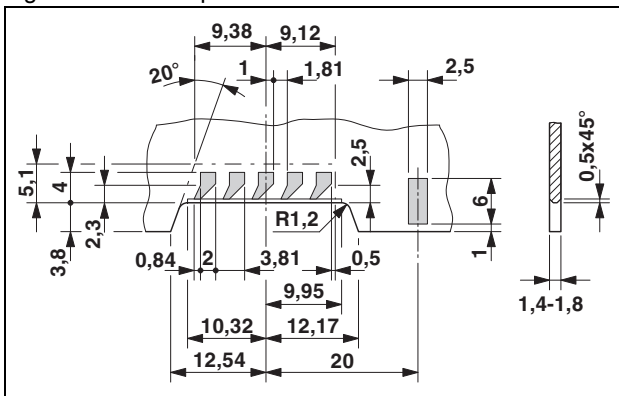
**i** You can configure your housing in the configurator at phoenixcontact.com, web code: #0512. You will receive 3D data, order lists, and PCB layouts.

Figure 16 Example illustration of ME ... OT-MSTBO (double-level upper part)



### DIN rail connector

Figure 17 Example illustration of DIN rail connector



## 9 Selecting the connection technology

Upper housing part	Header with connector					
	3.5 mm pitch		Suitable connectors			
	Left	Right				
	Header, wave soldering, see <a href="#">page 17</a>		Screw connection, see <a href="#">page 22</a>		Push-in connection, see <a href="#">page 25</a>	Push-in connection, see <a href="#">page 25</a>
ME 22,5 OT-1MSTBO	1x	MCO 1,5/ 5-G1L-3,5	MCO 1,5/ 5-G1R-3,5	MC 1,5/ 5-ST-3,5	FMC 1,5/ 5-ST-3,5	FK-MCP 1,5/ 5-ST-3,5
ME 45 OT-1MSTBO	2x					
ME 67,5 OT-1MSTBO	3x					
ME 90 OT-1MSTBO	4x					
ME 12,5 OT-MSTBO	4x	MCO 1,5/ 3-G1L-3,5	MCO 1,5/ 3-G1R-3,5	MC 1,5/ 3-ST-3,5	–	–
ME 17,5 OT-MSTBO	4x	MCO 1,5/ 4-G1L-3,5	MCO 1,5/ 4-G1R-3,5	MC 1,5/ 4-ST-3,5	FMC 1,5/ 4-ST-3,5	FK-MCP 1,5/ 4-ST-3,5
ME 22,5 OT-MSTBO	4x	MCO 1,5/ 5-G1L-3,5	MCO 1,5/ 5-G1R-3,5	MC 1,5/ 5-ST-3,5	FMC 1,5/ 5-ST-3,5	FK-MCP 1,5/ 5-ST-3,5
ME 35 OT-MSTBO	8x	MCO 1,5/ 4-G1L-3,5	MCO 1,5/ 4-G1R-3,5	MC 1,5/ 4-ST-3,5	FMC 1,5/ 4-ST-3,5	FK-MCP 1,5/ 4-ST-3,5
ME 45 OT-MSTBO	8x	MCO 1,5/ 5-G1L-3,5	MCO 1,5/ 5-G1R-3,5	MC 1,5/ 5-ST-3,5	FMC 1,5/ 5-ST-3,5	FK-MCP 1,5/ 5-ST-3,5
ME 22,5 OT-3MSTBO	6x	MCO 1,5/ 5-G1L-3,5	MCO 1,5/ 5-G1R-3,5	MC 1,5/ 5-ST-3,5	FMC 1,5/ 5-ST-3,5	FK-MCP 1,5/ 5-ST-3,5

Upper housing part	Header with connector				
	5 mm pitch		Suitable connectors		
	Left	Right			
	Header Wave soldering: MSTBO 2,5/ ...-G1 (see <a href="#">page 18</a> ) or MSTBO 2,5/ ...-G1P (see <a href="#">page 19</a> ) Reflow soldering (THR): MSTBO 2,5/ ... G1L THR (see <a href="#">page 20</a> )		Screw connection, see <a href="#">page 25</a>		Push-in connection, see <a href="#">page 25</a>
ME 22,5 OT-1MSTBO	1x	MSTBO 2,5/ 4-G1...L ...	MSTBO 2,5/ 4-G1...R ...	MSTBT 2,5 HC/ 4-STP	PSPT 2,5/ 4-ST
ME 45 OT-1MSTBO	2x				
ME 67,5 OT-1MSTBO	3x				
ME 90 OT-1MSTBO	4x				
ME 12,5 OT-MSTBO	4x	MSTBO 2,5/ 2-G1...L ...	MSTBO 2,5/ 2-G1...R ...	MSTBT 2,5 HC/ 2-STP	PSPT 2,5/ 2-ST
ME 17,5 OT-MSTBO	4x	MSTBO 2,5/ 3 G1...L ...	MSTBO 2,5/ 3 G1...R ...	MSTBT 2,5 HC/ 3-STP	PSPT 2,5/ 3-ST
ME 22,5 OT-MSTBO	4x	MSTBO 2,5/ 4-G1...L ...	MSTBO 2,5/ 4-G1...R ...	MSTBT 2,5 HC/ 4-STP	PSPT 2,5/ 4-ST
ME 35 OT-MSTBO	8x	MSTBO 2,5/ 3 G1...L ...	MSTBO 2,5/ 3 G1...R ...	MSTBT 2,5 HC/ 3-STP	PSPT 2,5/ 3-ST
ME 45 OT-MSTBO	8x	MSTBO 2,5/ 4-G1...L ...	MSTBO 2,5/ 4-G1...R ...	MSTBT 2,5 HC/ 4-STP	PSPT 2,5/ 4-ST
ME 22,5 OT-3MSTBO	6x	MSTBO 2,5/ 4-G1...L ...	MSTBO 2,5/ 4-G1...R ...	MSTBT 2,5 HC/ 4-STP	PSPT 2,5/ 4-ST

Upper housing part	Header with connector			
	7.25 mm pitch		Suitable connectors	
	Left	Right		
	Header Reflow soldering (THR): GMSTBO 2,5 HV/...-G... THR (see <a href="#">page 21</a> )		Screw connection, see <a href="#">page 25</a>	
ME 22,5 OT-1MSTBO	1x			
ME 45 OT-1MSTBO	2x			
ME 67,5 OT-1MSTBO	3x			
ME 90 OT-1MSTBO	4x	GMSTBO 2,5 HV/3-GL-7,25 THR	GMSTBO 2,5 HV/3-GR-7,25 THR	GMSTBT 2,5 HV/3-ST-7,25 GY7035
ME 17,5 OT-MSTBO	4x	GMSTBO 2,5 HV/2-GL-7,25 THR	GMSTBO 2,5 HV/2-GR-7,25 THR	GMSTBT 2,5 HV/2-ST-7,25 GY7035
ME 22,5 OT-MSTBO	4x	GMSTBO 2,5 HV/3-GL-7,25 THR	GMSTBO 2,5 HV/3-GR-7,25 THR	GMSTBT 2,5 HV/3-ST-7,25 GY7035
ME 35 OT-MSTBO	8x	GMSTBO 2,5 HV/2-GL-7,25 THR	GMSTBO 2,5 HV/2-GR-7,25 THR	GMSTBT 2,5 HV/2-ST-7,25 GY7035
ME 45 OT-MSTBO	8x			
ME 22,5 OT-3MSTBO	6x	GMSTBO 2,5 HV/3-GL-7,25 THR	GMSTBO 2,5 HV/3-GR-7,25 THR	GMSTBT 2,5 HV/3-ST-7,25 GY7035

Upper housing part	PCB terminal block							
	3.5 mm pitch				5 mm pitch			
	Left		Right		Left		Right	
	PCB terminal block with screw connection, see <a href="#">page 14</a>				PCB terminal block with screw connection, see <a href="#">page 15</a>			
ME 12,5 OTU-MKDSO	2x	MKDSO 1,5/ 3-L-3,5	2x	MKDSO 1,5/ 3-R-3,5	2x	MKDSO 2,5/ 2-L	2x	MKDSO 2,5/ 2-R
ME 17,5 OTU-MKDSO	2x	MKDSO 1,5/ 4-L-3,5	2x	MKDSO 1,5/ 4-R-3,5	2x	MKDSO 2,5/ 3-L	2x	MKDSO 2,5/ 3-R
ME 22,5 OTU-MKDSO	2x	MKDSO 1,5/ 5-L-3,5	2x	MKDSO 1,5/ 5-R-3,5	2x	MKDSO 2,5/ 4-L	2x	MKDSO 2,5/ 4-R
ME 45 OTU-MKDSO	4x	MKDSO 1,5/ 5-L-3,5	4x	MKDSO 1,5/ 5-R-3,5	4x	MKDSO 2,5/ 4-L	4x	MKDSO 2,5/ 4-R
	PCB terminal block with spring connection, see <a href="#">page 16</a>							
ME 12,5 OT-FKDSO		-		-	2x	FKDSO 2,5/ 2-L	2x	FKDSO 2,5/ 2-R
ME 17,5 OT-FKDSO		-		-	2x	FKDSO 2,5/ 3-L	2x	FKDSO 2,5/ 3-R
ME 22,5 OT-FKDSO		-		-	2x	FKDSO 2,5/ 4-L	2x	FKDSO 2,5/ 4-R
ME 45 OT-FKDSO		-		-	4x	FKDSO 2,5/ 4-L	4x	FKDSO 2,5/4-R

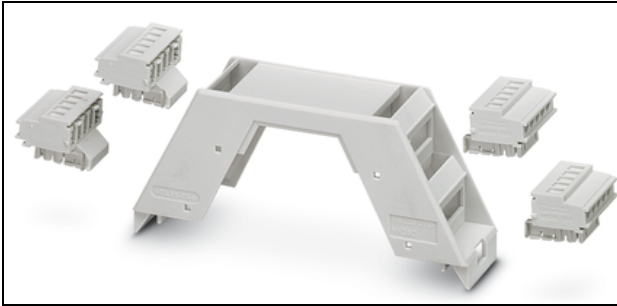
## 10 Connection technology – Technical data


### 10.1 PCB terminal blocks

#### 10.1.1 PCB terminal blocks, soldered, 3.5 mm pitch

Mounting: soldering

Figure 18 MKDSO PCB terminal blocks



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### MKDSO 1,5/...3,5

##### Dimensions

Pitch	3.5 mm
Pin dimensions	0.8 x 0.8
Hole diameter	1.2 mm

Product		Dimension a	No. of pos.
MKDSO 1,5/ 5-L-3,5 KMGY	2278393	14.00	5
MKDSO 1,5/ 5-R-3,5 KMGY	2278416	14.00	5
MKDSO 1,5/ 4-R-3,5 KMGY	2278429	10.50	4
MKDSO 1,5/ 4-L-3,5 KMGY	2278432	10.50	4
MKDSO 1,5/ 3-L-3,5 KMGY	2278445	7.00	3
MKDSO 1,5/ 3-R-3,5 KMGY	2278458	7.00	3

##### Technical data

Insulation material group	PA / I
Rated surge voltage (III/3)	2.5 kV
Rated surge voltage (III/2)	2.5 kV
Rated surge voltage (II/2)	2.5 kV
Rated voltage (III/3)	160 V
Rated voltage (III/2)	160 V
Rated voltage (II/2)	320 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	24 A
Nominal cross section	1.5 mm <sup>2</sup>
Rated current, with 1.5 mm <sup>2</sup> conductor cross section	8 A
Insulation material	PA
Flammability rating UL 94	V0
Internal cylindrical gauge	A1
Stripping length	7 mm
Screw thread	M2
Tightening torque	0.22 Nm ... 0.25 Nm

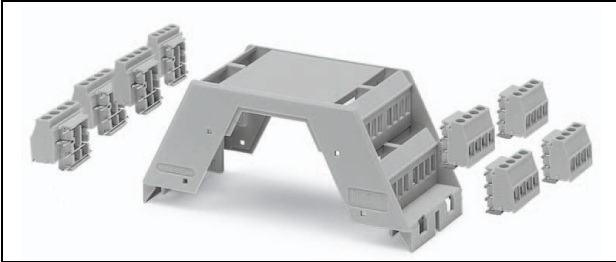
##### Conductor cross section

Conductor cross section rigid	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule with plastic sleeve	0.25 mm <sup>2</sup> ... 0.5 mm <sup>2</sup>
Conductor cross section AWG	28 ... 16
2 conductors with the same cross section rigid	0.08 mm <sup>2</sup> ... 0.5 mm <sup>2</sup>
2 conductors with the same cross section flexible	0.08 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 0.34 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 0.5 mm <sup>2</sup>

### 10.1.2 PCB terminal blocks, soldered, 5 mm pitch, screw connection

Mounting: soldering

Figure 19 MKDSO PCB terminal blocks



The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### MKDSO 2,5

##### Dimensions

Pitch	5 mm
Pin dimensions	0.8 x 1.0
Hole diameter	1.4 mm

##### Product

		Dimension a	No. of pos.
MKDSO 2,5/ 2-L	2915261	5	2
MKDSO 2,5/ 2-R	2915258	5	2
MKDSO 2,5/ 3-R	2854102	10	3
MKDSO 2,5/ 3-L	2854092	10	3
MKDSO 2,5/ 4-L	2908485	15	4
MKDSO 2,5/ 4-R	2908472	15	4

##### Technical data

Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/3)	250 V
Rated voltage (III/2)	320 V
Rated voltage (II/2)	630 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	24 A
Nominal cross section	2.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0
Internal cylindrical gauge	A2
Stripping length	8 mm
Screw thread	M3
Tightening torque, min.	0.5 Nm ... 0.6 Nm

##### Conductor cross section

Conductor cross section rigid	0.14 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible	0.14 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section AWG	26 ... 14
2 conductors with the same cross section rigid	0.14 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>
2 conductors with the same cross section flexible	0.14 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>

### 10.1.3 PCB terminal blocks, soldered, 5 mm pitch, spring connection

Mounting: soldering

Figure 20 FKDSO 2,5 PCB terminal blocks



**i** The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### FKDSO 2,5

##### Dimensions

Pitch	5 mm
Pin dimensions	0.8 x 1.0
Hole diameter	1.4 mm

##### Product

Product		Dimension a	No. of pos.
FKDSO 2,5/ 2-L	2200315	5	2
FKDSO 2,5/ 2-R	2200316	5	2
FKDSO 2,5/ 3-R	2200317	10	3
FKDSO 2,5/ 3-L	2200318	10	3
FKDSO 2,5/ 4-L	2200319	15	4
FKDSO 2,5/ 4-R	2200320	15	4

##### Technical data

Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/3)	250 V
Rated voltage (III/2)	320 V
Rated voltage (II/2)	630 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	22 A
Nominal cross section	2.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0
Stripping length	10 mm

##### Conductor cross section

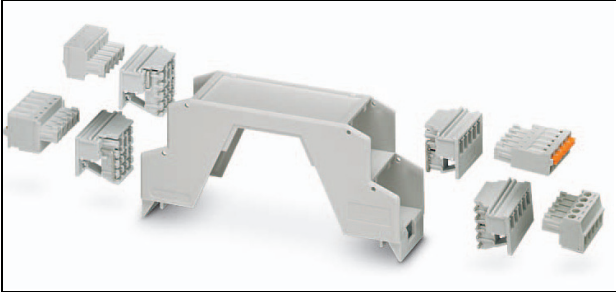
Conductor cross section rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section AWG	24 ... 14
Conductor cross section flexible with ferrule without plastic sleeve	0.14 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>
Conductor cross section flexible with ferrule and plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>

## 10.2 Header

### 10.2.1 Header, soldered, 3.5 mm pitch

Mounting: soldering

Figure 21 MCO 1,5 header with connectors



The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

### MCO 1,5/...G1...3,5

#### Dimensions

Pitch	3.5 mm
Pin dimensions	0.8 x 0.8
Length of solder pin	3.0 mm
Hole diameter	1.2 mm

#### Product

		Dimension a	No. of pos.
MCO 1,5/ 3-G1L-3,5	2278319	7	3
MCO 1,5/ 3-G1R-3,5	2278322	7	3
MCO 1,5/ 4-G1L-3,5	2278364	10.5	4
MCO 1,5/ 4-G1R-3,5	2278377	10.5	4
MCO 1,5/ 5-G1L-3,5	2278380	14	5
MCO 1,5/ 5-G1R-3,5	2278351	14	5

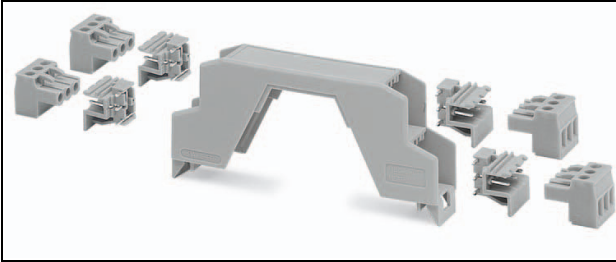
#### Technical data

Insulation material group	PA / I
Rated surge voltage (III/3)	2.5 kV
Rated surge voltage (III/2)	2.5 kV
Rated surge voltage (II/2)	2.5 kV
Rated voltage (III/3)	160 V
Rated voltage (III/2)	160 V
Rated voltage (II/2)	20 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	8 A
Maximum load current	8 A
Insulation material	PA
Flammability rating UL 94	V0

### 10.2.2 Header, wave soldered, 5 mm pitch

Mounting: soldering

Figure 22 MSTBO 2,5/... G1 header with connectors



**i** The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### MSTBO 2,5/...G1...

Dimensions	
Pitch	5 mm
Pin dimensions	1 x 1
Length of solder pin	3.5 mm
Hole diameter	1.4 mm

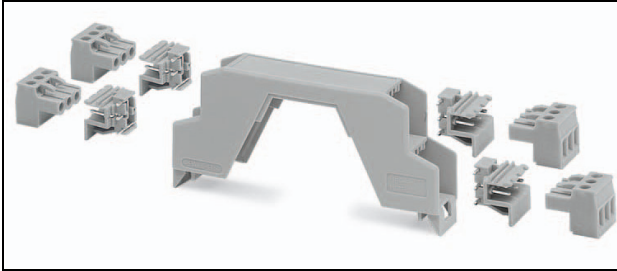
Product		Dimension a	No. of pos.
MSTBO 2,5/ 2-G1L KMGY	2854788	5	2
MSTBO 2,5/ 2-G1R KMGY	2854791	5	2
MSTBO 2,5/ 3-G1L KMGY	2853750	10	3
MSTBO 2,5/ 3-G1R KMGY	2853763	10	3
MSTBO 2,5/ 4-G1L KMGY	2907774	15	4
MSTBO 2,5/ 4-G1R KMGY	2907787	15	4


Technical data	
Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/3)	250 V
Rated voltage (III/2)	320 V
Rated voltage (II/2)	400 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	12 A
Maximum load current	12 A
Insulation material	PA
Flammability rating UL 94	V0

### 10.2.3 Header, wave soldered, 5 mm pitch

Mounting: soldering

Figure 23 MSTBO 2,5/... G1P header with connectors



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### MSTBO 2,5/...G1P...

##### Dimensions

Pitch	5 mm
Pin dimensions	1 x 1
Length of solder pin	3.5 mm
Hole diameter	1.4 mm

##### Product

		Dimension a	No. of pos.
MSTBO 2,5/ 2-G1PL GY7035	2200330	5	2
MSTBO 2,5/ 2-G1PR GY7035	2200331	5	2
MSTBO 2,5/ 3-G1PL GY7035	2200328	10	3
MSTBO 2,5/ 3-G1PR GY7035	2200329	10	3
MSTBO 2,5/ 4-G1PL GY7035	2200325	15	4
MSTBO 2,5/ 4-G1PR GY7035	2200326	15	4

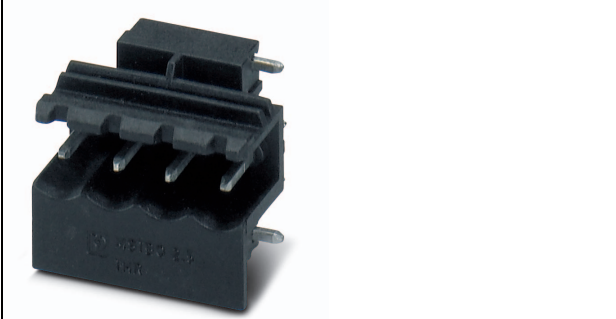
##### Technical data

Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/3)	250 V
Rated voltage (III/2)	320 V
Rated voltage (II/2)	400 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	16 A
Maximum load current	16 A
Insulation material	PA
Flammability rating UL 94	V0

### 10.2.4 Header, reflow soldered (THR), 5 mm pitch

Mounting: reflow soldering (THR)

Figure 24 MSTBO 2,5/... G1...THR header



**i** The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

### MSTBO 2,5/...G1...THR

#### Dimensions

Pitch	5 mm
Pin dimensions	1 x 1
Length of solder pin	3.5 mm
Hole diameter	1.6 mm

#### Product

Product	Dimension a	No. of pos.
MSTBO 2,5/ 2-G1L THRR32 BK 2200251	5	2
MSTBO 2,5/ 2-G1R THRR32 BK 2200252	5	2
MSTBO 2,5/ 3 G1L THRR44 BK 2915216	10	3
MSTBO 2,5/ 3 G1R THRR44 BK 2915229	10	3
MSTBO 2,5/ 4-G1L THRR44 BK 2697194	15	4
MSTBO 2,5/ 4-G1R THRR44 BK 2697204	15	4

#### Technical data


Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/3)	250 V
Rated voltage (III/2)	320 V
Rated voltage (II/2)	400 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	16 A
Maximum load current	16 A
Insulation material	PA
Flammability rating UL 94	V0

### 10.2.5 Header, reflow soldered (THR), 7.25 mm pitch

Mounting: reflow soldering (THR)

Figure 25 GMSTBO 2,5/... G...-7,25 THR header



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### GMSTBO 2,5/...G...-7,25 THR

##### Dimensions

Pitch	7.25 mm
Pin dimensions	1 x 1 mm
Hole diameter	1.5 mm

##### Product

Product	Dimension a	No. of pos.
GMSTBO 2,5 HV/2-GL-7,25 THR	7.25	2
GMSTBO 2,5 HV/2-GR-7,25 THR	7.25	2
GMSTBO 2,5 HV/3-GL-7,25 THR	14.5	3
GMSTBO 2,5 HV/3-GR-7,25 THR	14.5	3

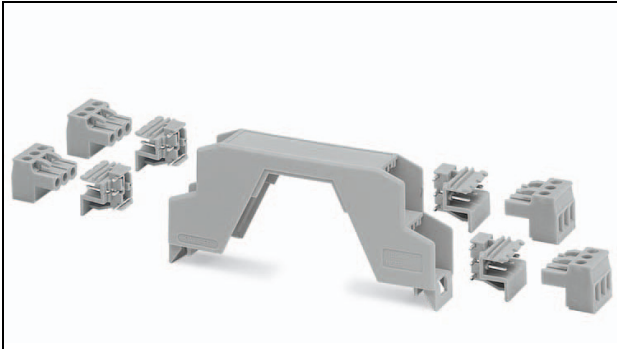
##### Technical data


Insulation material group	IIIa
Rated surge voltage (III/3)	6 kV
Rated surge voltage (III/2)	6 kV
Rated surge voltage (II/2)	6 kV
Rated voltage (III/3)	400 V
Rated voltage (III/2)	630 V
Rated voltage (II/2)	630 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	16 A
Maximum load current	16 A
Insulation material	LCP
Flammability rating UL 94	V0

## 10.3 Connector

### 10.3.1 Connector, 3.5 mm pitch, screw connection

Figure 26 MC 1,5/ ...-ST-3,5 connector with MCO 1,5...G1...-3,5 header



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

### MC 1,5/ ...-ST-3,5

#### Dimensions

Pitch 3.5 mm

#### Product

Product		Dimension a	No. of pos.
MC 1,5/ 3-ST-3,5 GY7035	1769061	7	3
MC 1,5/ 4-ST-3,5 GY7035	1769074	10.5	4
MC 1,5/ 5-ST-3,5 GY7035	1769087	14	5

#### Technical data

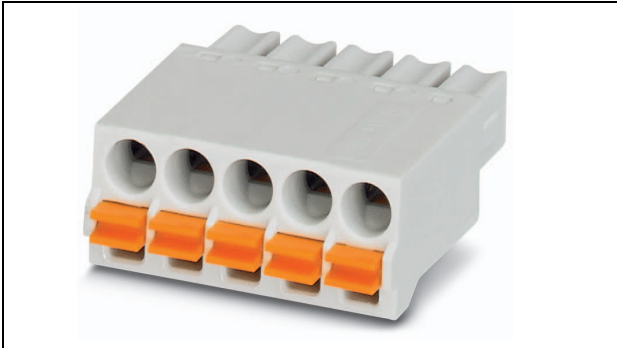
Insulation material group	PA / I
Rated surge voltage (III/3)	2.5 kV
Rated surge voltage (III/2)	2.5 kV
Rated surge voltage (II/2)	2.5 kV
Rated voltage (III/3)	160 V
Rated voltage (III/2)	160 V
Rated voltage (II/2)	320 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	8 A
Nominal cross section	1.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0
Internal cylindrical gauge	A1
Stripping length	7 mm
Screw thread	M2
Tightening torque, min.	0.22 Nm ... 0.25 Nm


#### Conductor cross section

Conductor cross section rigid	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section AWG	28 ... 16
2 conductors with the same cross section rigid	0.08 mm <sup>2</sup> ... 0.5 mm <sup>2</sup>
2 conductors with the same cross section flexible	0.08 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 0.34 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 0.5 mm <sup>2</sup>

### 10.3.2 Connector, 3.5 mm pitch, Push-in connection, FK-MCP

Figure 27 FK-MCP 1,5/ ...-ST-3,5 connector



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### FK-MCP 1,5/ ...-ST-3,5

##### Dimensions

Pitch 3.5 mm

##### Product

Product	Dimension a	No. of pos.
FK-MCP 1,5/ 4-ST-3,5 GY7035 1773594	10.5	4
FK-MCP 1,5/ 5-ST-3,5 GY7035 1773604	14	5

##### Technical data

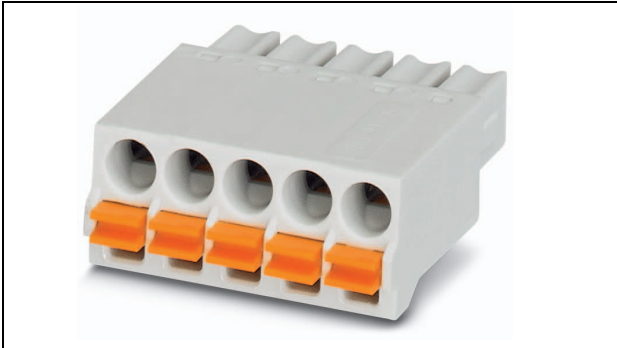
Insulation material group	PA / I
Rated surge voltage (III/3)	2.5 kV
Rated voltage (III/3)	160 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	8 A
Nominal cross section	1.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0


##### Conductor cross section

Conductor cross section rigid	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section AWG	28 ... 16
Conductor cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule and plastic sleeve	0.25 mm <sup>2</sup> ... 0.5 mm <sup>2</sup>

### 10.3.3 Connector, 3.5 mm pitch, Push-in connection, FMC

Figure 28 FMC 1,5/ ...-ST-3,5 connector



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### FMC 1,5/ ...-ST-3,5

##### Dimensions

Pitch 3.5 mm

##### Product

Product	Part No.	Dimension a	No. of pos.
FMC 1,5/ 4-ST-3,5 GY7035	1773578	10.5	4
FMC 1,5/ 5-ST-3,5 GY7035	1773581	14	5

##### Technical data

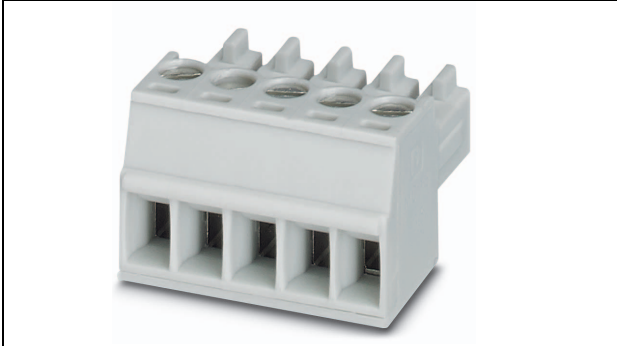
Insulation material group	PA / I
Rated surge voltage (III/3)	2.5 kV
Rated voltage (III/3)	160 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	8 A
Nominal cross section	1.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0


##### Conductor cross section

Conductor cross section rigid	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section AWG	24 ... 16
Conductor cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule and plastic sleeve	0.25 mm <sup>2</sup> ... 0.75 mm <sup>2</sup>

### 10.3.4 Connector, 5 mm pitch, screw connection

Figure 29 MC 1,5/3-HC connector



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### MSTBT 2,5 HC

##### Dimensions

Pitch 5 mm

##### Product

Product	Dimension a	No. of pos.
MSTBT 2,5 HC/ 2-STP GY7035 2200334	5	2
MSTBT 2,5 HC/ 3-STP GY7035 2200333	10	3
MSTBT 2,5 HC/ 4-STP GY7035 1769087	15	4

##### Technical data

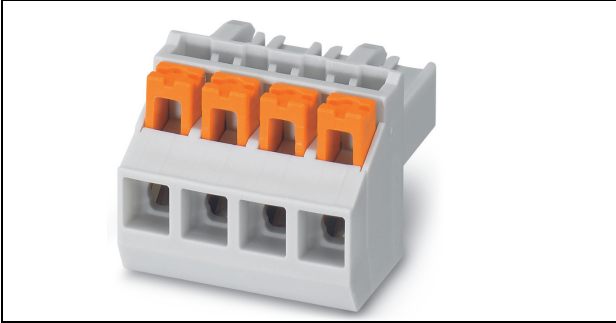
Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/3)	250 V
Rated voltage (III/2)	320 V
Rated voltage (II/2)	630 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	16 A
Maximum load current, for 2.5 mm <sup>2</sup> conductor cross section	16 A
Nominal cross section	2.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0
Internal cylindrical gauge	A3
Stripping length	7 mm
Screw thread	M3
Tightening torque, min.	0.5 Nm ... 0.6 Nm

##### Conductor cross section

Conductor cross section rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section AWG	24 ... 12
2 conductors with the same cross section rigid	0.2 mm <sup>2</sup> ... 1 mm <sup>2</sup>
2 conductors with the same cross section flexible	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 1 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>

### 10.3.5 Connector, 5 mm pitch, Push-in connection

Figure 30 PSPT 2,5 connector



**i** The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### PSPT 2,5/ ...-ST

##### Dimensions

Pitch 5 mm

##### Product

Product	Part No.	Dimension a	No. of pos.
PSPT 2,5/ 2-ST KMGY	2202346	5	2
PSPT 2,5/ 3-ST KMGY	2202345	10	3
PSPT 2,5/ 4-ST KMGY	2202344	15	4

##### Technical data

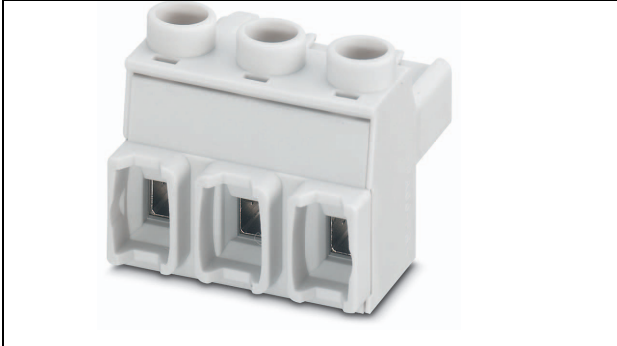
Insulation material group	PA / I
Rated surge voltage (III/3)	4 kV
Rated surge voltage (III/2)	4 kV
Rated surge voltage (II/2)	4 kV
Rated voltage (III/2)	300 V
Rated voltage (II/2)	600 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	16 A
Nominal cross section	2.5 mm <sup>2</sup>
Insulation material	PA
Flammability rating UL 94	V0


##### Conductor cross section

Conductor cross section rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section AWG	24 ... 16
Conductor cross section flexible with ferrule without plastic sleeve	0.20 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule and plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 0.34 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>

### 10.3.6 Connector, 7.25 mm pitch, screw connection

Figure 31 GMSTBT 2,5 connector



 The latest data and drawings for the product can be found at [phoenixcontact.com](http://phoenixcontact.com).

#### GMSTBT 2,5

##### Dimensions

Pitch 3.5 mm

##### Product

Product	Part No.	Dimension a	No. of pos.
GMSTBT 2,5 HV/2-ST-7,25 GY7035	1769061	7.25	2
GMSTBT 2,5 HV/3-ST-7,25 GY7035	1769074	14.5	3

##### Technical data

Insulation material group	I
Rated surge voltage (III/3)	8 kV
Rated surge voltage (III/2)	8 kV
Rated surge voltage (II/2)	8 kV
Rated voltage (III/3)	1000 V
Rated voltage (III/2)	1000 V
Rated voltage (II/2)	1000 V
Connection in acc. with standard	EN-VDE
Nominal current $I_N$	16 A
Nominal cross section	2.5 mm <sup>2</sup>
Maximum load current	16 A
Insulation material	PA
Flammability rating UL 94	V0
Stripping length	8 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

##### Conductor cross section

Conductor cross section rigid	0.1 mm <sup>2</sup> ... 1.0 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section AWG	24 ... 12
2 conductors with the same cross section rigid	0.1 mm <sup>2</sup> ... 1.0 mm <sup>2</sup>
2 conductors with the same cross section flexible	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
2 conductors with the same cross section flexible with ferrule and plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
AWG in acc. with UL/CUL	24 ... 12

## 11 Mounting the housing

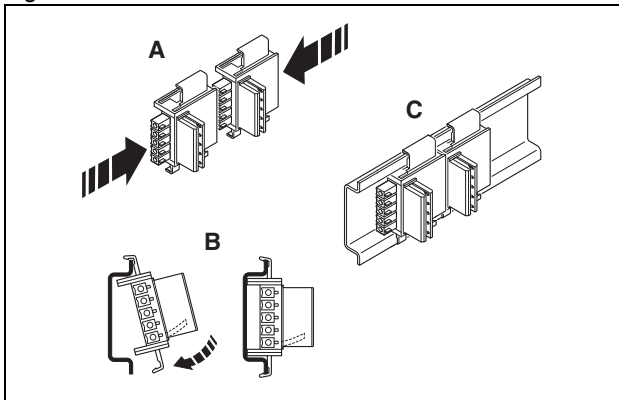
### 11.1 Mounting the DIN rail connector

If using a DIN rail connector, you must first insert it into the DIN rail.

The DIN rail connector is used to bridge the power supply and communication.

**WARNING:** Do not connect or disconnect the DIN rail connector under load.

Figure 32 DIN rail connectors

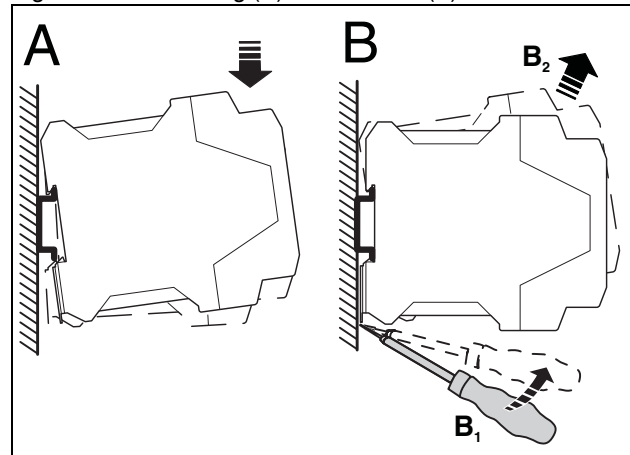


Observe the snap-in direction of the housing and DIN rail connector: snap-on foot below and connector on the left.

- Connect the DIN rail connectors together.
- Push the connected DIN rail connectors onto the DIN rail.
- Place the device onto the DIN rail from above.
- Push the front of the device toward the mounting surface until it snaps into place with a click.

### 11.2 Mounting on a DIN rail

Figure 33 Mounting (A) and removal (B)



#### Mounting

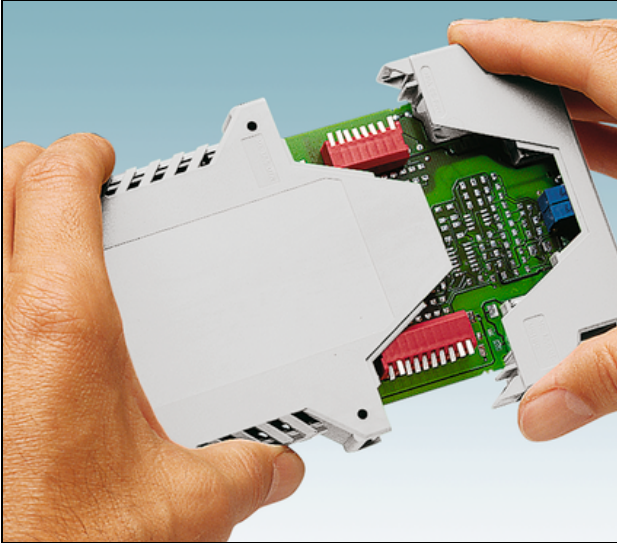
- Place the device onto a 35 mm DIN rail from above. The upper housing keyway hooks onto the top edge of the DIN rail (A).
- Holding the device by the housing cover, carefully push it toward the mounting surface.
- Once the snap-on foot has audibly snapped onto the DIN rail, check that it is attached securely.

#### Removal

- Use a suitable screwdriver to release the locking mechanism on the snap-on foot of the device (B).
- Hold onto the device by the housing cover and carefully tilt it upwards.
- Carefully lift the device off the DIN rail.

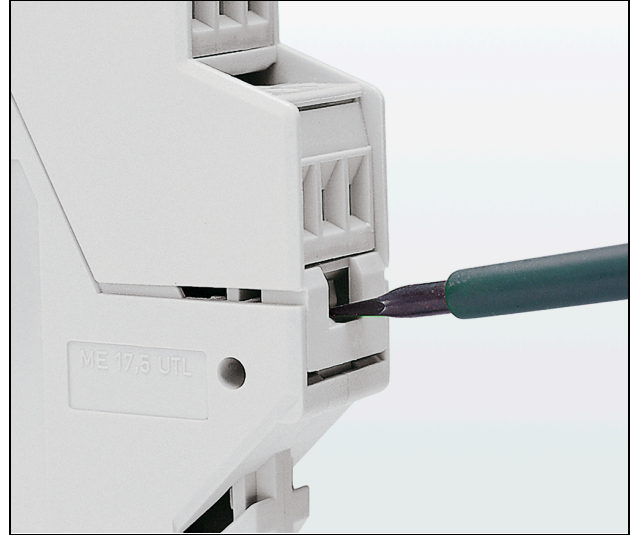
### 11.3 Assembling the housing

Figure 34 Mounting the upper housing part



- Latch the upper housing part to the soldered connection technology.
- Push the pre-assembled upper housing part into the lower housing part using the guide provided. It automatically locks in place.

Figure 35 Opening the upper housing part



- Open the housing by simply pressing on the lock hook, e.g., using a screwdriver.

## 12 Accessories and customization

### 12.1 Accessories

#### Filler plugs

Figure 36 ME B-17,5 MSTBO KMGY, 2853776



ME B... filler plugs are used to seal unused terminal points. One filler plug is required per terminal point.

#### Shield connection clamp

Figure 37 ME MAX-SAS, 2853899



The ME SAS shield connection clamp is used for the potential connection of shielded cables.

#### Functional ground contact

Figure 38 ME BUS FE CONTACT, 2278076

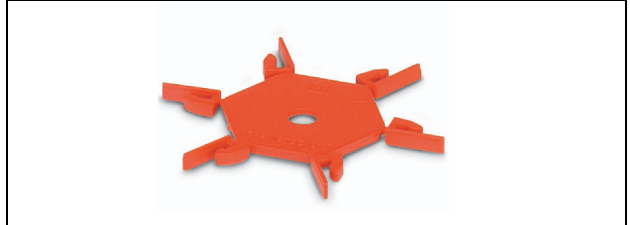


When you snap the housing onto a DIN rail, you can establish a conductive connection between the PCB and DIN rail.

The functional ground contact (FE) does not satisfy the demands on a protective grounding connection (PE).

#### Coding section

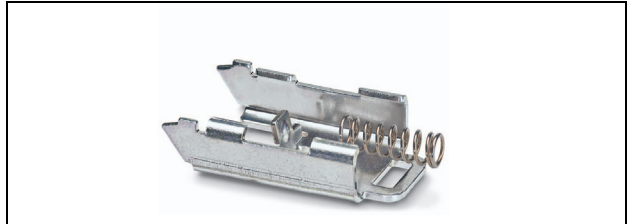
Figure 39 CR MSTBO-G1 coding section, 2199618



Using the coding section for MSTBO headers, you can ensure that connectors are only plugged onto the appropriate header.

#### Base latch

Figure 40 ME MF 12,5/17,5 base latch

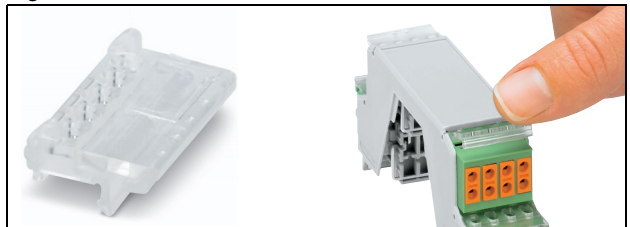


Base latch for increasing the housing width with an ME...UTM... intermediate element. The base latch ensures that the housing is securely attached to the DIN rail.

- ME MF 12,5, 2707466
- ME MF 17,5, 2908281

#### Ejector for COMBICON connectors

Figure 41 ME PS-22,5 MC TRANS, 2279745



Ejector for COMBICON connectors. For use with ME...OTP-MSTBO PS upper housing parts.

- ME PS-17,5 ... TRANS
- ME PS-22,5 ... TRANS

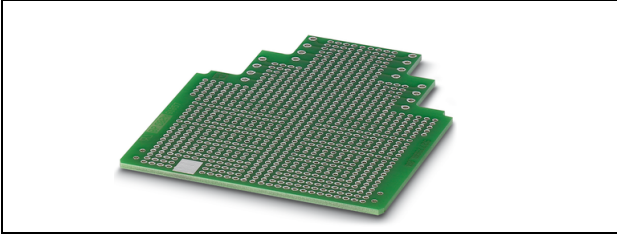
For the following connectors:

MC FMC FKCT MSTBT TVFKCL TVFKC

## PCB

Sample PCB, for self-assembly with contact for DIN rail in accordance with EN 60715.

Figure 42 Sample PCB: ME LP 29, 2906908



## ME LPZS PCB stop

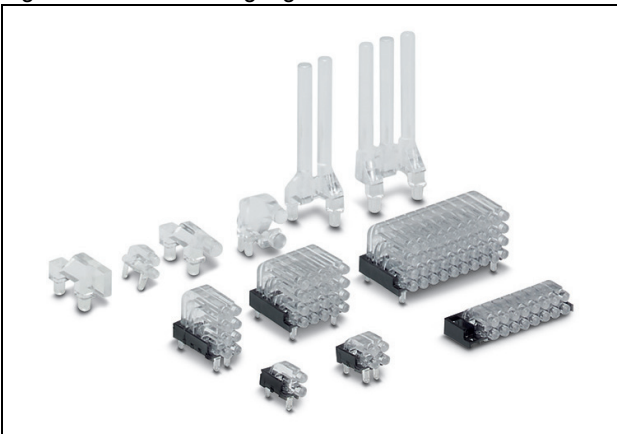
Figure 43 ME LPZS PCB stop, 2906911



The ME LPZS PCB stop prevents the PCB from being removed completely. The PCB stop simultaneously locks the PCB in place. It allows you to remove the PCB by approximately 4 cm.

## HS LC light guide

Figure 44 HS LC... light guide



Light guides for visualization are available in a variety of designs. HS LC... light guides are fixed to the PCB.

## TFT display for ME housing

2.4" TFT display for use in ME...90... upper part. The display is locked into the upper part with matching recess.

## 12.2 Housing customization

Customer-specific solutions are available in addition to the standard range.

- **Color variants**
- **Markings** using different printing technologies
  - Pad printing: ideal for single-color or two-color printing
  - Screen printing: for multi-color markings on larger surfaces
  - Laser marking: particularly suitable for content that changes on a regular basis, e.g., serial numbers
- **Mechanical processing** of the housing parts



Further information can be found under web code #0685.