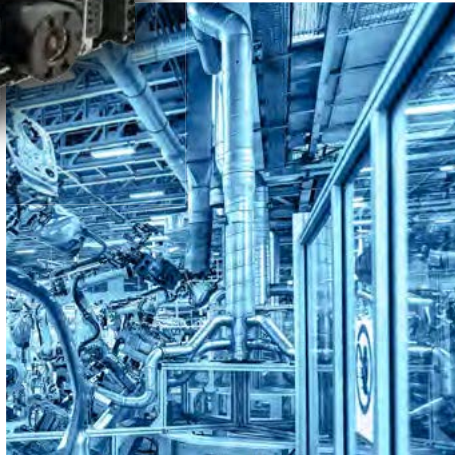
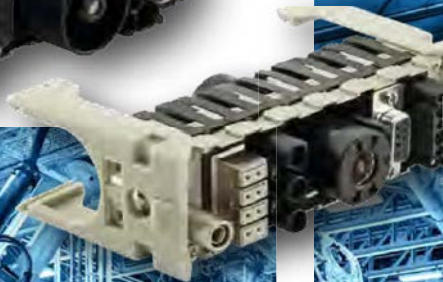


# heavy | mate<sup>®</sup>

## Heavy Duty Connectors



# Note from the CEO



## Ladies and Gentlemen,

For over 75 years Amphenol has enjoyed success as the interconnection technology provider of choice to industry-leading companies around the world. One of our key strategic areas of focus has been and is the Industrial market. Our organization works with leading manufacturers across a wide range of applications - including Energy Generation & Distribution, Transportation, Heavy Equipment, Factory Automation, Wireless Outdoor, ChipCard Readers - enabling smarter, faster and better technologies to connect products to customer solutions.

The Industrial market footprint of Amphenol covers over facilities in more than 12 different European countries and more than 30 countries worldwide. Our successful expansion into new regions as well as new industrial applications is a direct reflection of our agile, entrepreneurial management team and our unwavering commitment to execute Amphenol's strategies for the benefit of our customers, shareholders and employees.

Thank you for partnering with Amphenol. Our entire organization is at your service.

A handwritten signature in black ink, appearing to read 'R. Adam Norwitt'. The signature is fluid and stylized, with a large initial 'R'.

R. Adam Norwitt  
President and CEO, Amphenol Corporation



SECURITY, RELIABILITY AND COMFORTABLE SERVICE FROM ONE SOURCE.

# heavy|mate<sup>®</sup> is a Modular Metal Connector Line

## What is heavy|mate<sup>®</sup> ?

heavy|mate<sup>®</sup> is a modular connector line, consisting of:

- Hoods & Housings
- Inserts
- Contacts

## Why heavy|mate<sup>®</sup> ?

- Connections in harsh industrial environment
- Robust design necessary
- High number of poles or different kinds of signals transmitted
- Very good EMC protection required
- Power and signal transmission outdoor
- Very safe locking system required

# How to select a solution with series heavy | mate®.

## Theory

- Select an insert that meets your requirements.
- Choose the related contacts if not included in inserts.
- Choose related housings.
- Choose related cable gland.
- If you are interested in a cable assembly, please ask us.

## Practice 1

### Requirements

- 250V
- 5A
- 60 contacts
- Termination: crimp

### Solution

- Check: Make a pre-selection on the overview page of the series, s. p. 10/11  
Possible series: heavy | mate® D, DD and M
  - Check: Details on the overview pages of the sub-series, see pages 22, 38, 154
- All 3 variants are possible; Selection heavy | mate® D
- Check: Contact inserts on the detail page of the sub-series  
Selection: C146 10A064 000 2
  - Check: Contacts on the same double page  
Selection: VN01 016 0002 1
  - Check: Housings via crosslink at contact inserts  
Selection: C146 21R024 600 8
  - Check: Gland bushing via crosslink at housings  
Selection: VN16 320 0126X

# Make your selection out of the heavy | mate® series!

Characteristic Series	Voltage						Current					
	250V	400V	500V	690V	830V	1000V	10A	16A	35A	80A	100A	200A
A (page 14)	•	•					•	•				
D (page 22)	•						•					
DD (page 38)	•						•					
E (page 44)	•	•	•				•	•				
EE (page 62)	•	•	•				•	•				
EEE (page 68)	•	•	•				•	•				
E / FE / KO (page 74)	•	•					•					
F (page 80)	•	•	•	•	•	•	•	•	•	•	•	•
HSE (page 132)	•	•					•	•	•			
HvE (page 136)	•	•	•	•			•	•				
K (page 144)	•	•	•	•	•		•	•	•	•		
M (page 154)	•	•	•	•	•	•	•	•	•	•	•	•
Q (page 198)	•	•	•	•			•	•	•			

# The highlights of the series heavy|mate®.

## Contact technology

- Turned contacts, which correspond to the market standard.
- Turned female contacts of copper for higher current-carrying capacity – specifically for the modular system heavy|mate® M.
- Radsok contact technology: These are laminated contacts with very low transition resistance, suitable for high current applications.
- Stamped contacts with high performance for semi-automatic processing at great cost savings.
- Selectively coated gold plating stamped contacts offer great savings.



## Housings

Surface coatings available in two versions: Standard or High-End with a salt mist resistance up to 500 hours.

Flexible cable entry in different positions – possible on request.

Robust metal levers in 1 and 2 locking-lever-system.

Quality EMC solutions.

Tightness classes in IP65, IP67 or IP68 or IP69K!

The background of the entire page is a dynamic industrial scene. In the upper portion, there are blurred lights and mechanical parts. The lower portion is dominated by a shower of bright, glowing sparks falling from a point of contact, likely a welding or grinding process. The overall color palette is a mix of deep blues, oranges, and yellows, creating a sense of intense energy and industrial activity.

# heavy | mate<sup>®</sup> A

- Rated voltage 250 / 400 V
- Rated current 10 A ... 16 A
- Termination: screw
- Number of contacts: 3, 4, 10, 16, 32



## General information

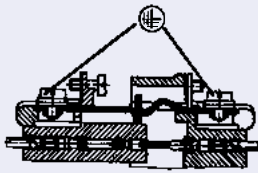
- For series heavy|mate® A connectors may be engaged or disengaged when live but without electrical load. If these connectors are used as plug and socket device, the load shall be reduced to 10 % of the rated current.
- Low and high profile housing for heavy|mate® A series inserts for 10 and 16 contacts.



## No standard for this series, but:

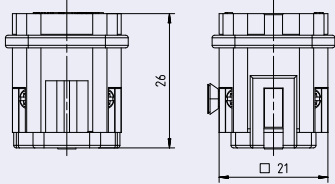

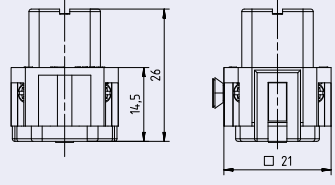

- Interchangeable with other makes
    - a) contact insert to contact insert
    - b) contact insert to housing 10 & 16 contacts
- Housings are designed according to DIN EN 175 301 - 801

## First-to-mate last-to-break protective ground contact

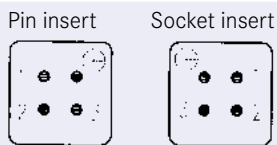


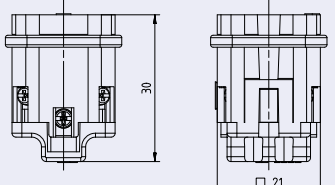

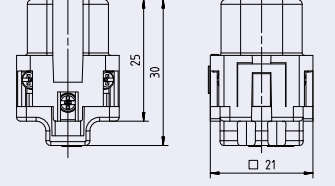

## Range of housings

Size A3/4	Size A10	Size A16

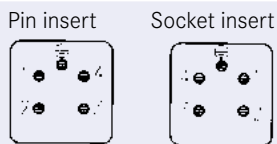
Description	Part Number	Drawing	Figure
<b>Contact insert 3 + ⊕</b>			
Pin insert for screw termination	C146 10A003 002 4		
Socket insert for screw termination	C146 10B003 002 4		

**Pin layout**

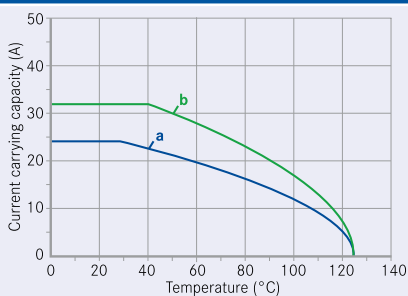


Description	Part Number	Drawing	Figure
<b>Contact insert 4 + ⊕</b>			
Pin insert for screw termination	C146 10A004 002 4		
Socket insert for screw termination	C146 10B004 002 4		

**Pin layout**



**Derating curves**



Curve	Wire gauge
a	1.5 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>





## heavy | mate<sup>®</sup> D

- Rated voltage 250 V
- Rated current 10 A ... 16 A
- Termination: crimp
- Number of contacts: 7, 8, 15, 25, 40,  
50, 64, 128
- HL3 acc. DIN 45545: R22/23

**General information**

- Contact inserts without crimp contacts, crimping tools see separate catalogue „Tools“.
- Contacts must be ordered separately, processing instructions see catalogue „Tools“.
- We recommend using the high profile housings / hoods for the heavy|mate® D inserts.
- Connectors series heavy|mate® D may be engaged or disengaged when live but without electrical load.  
If these connectors are mated or unmated under load, the load shall be reduced to 10 % of the rated current.
- For contact inserts for turned contacts, guide pins and guide socket are recommended (see page 290).
- By using contact inserts with two PE-connections without hoods, it is necessary to connect the facing of each PE-connection.
- If connectors are mounted in non conductive housings both protective earthing terminals shall be mounted.



**Standardised connectors according to DIN EN 175 301 - 801 (DIN 43652)**

Interchangeable with all other products which are according to the standard.

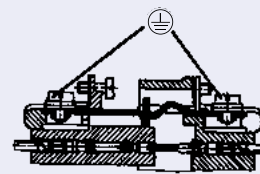
- a) Contact insert to contact insert 15-, 25-, 40-, 64- way
- b) Contact insert to housing 15-, 25-, 40-, 64- way

**High protection against mismatching**

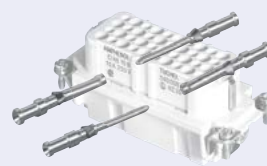
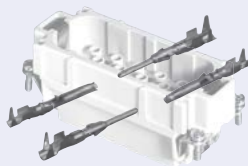
- Socket inserts with funnel shaped contact entry avoids mismatching with stamped contacts.



**First-to-mate last-to-break protective ground contact**



**Contact inserts for stamped contacts and for turned contacts**



**Range of housings**

**Size A3/4**



**Size A10**



**Size A16**



**Size E16**



**Size E24**



**Size E48**



General Characteristics	Standard	Value						
Number of contacts		7+ <sup>⊕</sup> 8-Pol	15 + <sup>⊕</sup>	25 + <sup>⊕</sup>	40 + <sup>⊕</sup>	50+ <sup>⊕</sup> 2x25	64 + <sup>⊕</sup>	128 + <sup>⊕</sup> 2x64
Contact arrangement	DIN EN 175 301-801 (DIN 43652)		•	•	•		•	
Termination technique		crimp						
Wire gauge		0.14 mm <sup>2</sup> - 2.5 mm <sup>2</sup> (AWG 26 - 14)						
Max. wire diameter		4.1 mm						
Flammability	UL 94	V-0						
Electrical Characteristics								
Rated voltage <sup>1)</sup>	IEC 60664-1	250 V (400 V~ <sup>2)</sup> ) (UL/CSA 600V) <sup>1)</sup>						
Rated impulse withstand voltage	IEC60664-1	4 kV						
Rated Current T <sub>u</sub> = 40 °C		16 A	10 A					
Current carrying capacity	IEC 60512-5-2	see derating curves						
Installation (overvoltage) category	IEC 60664-1	III						
Material group	IEC 60664-1	III a						
Contact resistance		≥ 5 m Ω						
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω						
Pollution degree	IEC 60664-1	3						
Climatical Characteristics								
Climatic category	IEC 60068-1	40/125/21						
Upper temperature	IEC 60512-11-9	+ 125°C						
Lower temperature	IEC 60512-11-10	- 40°C						
Mechanical Characteristics								
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20						
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20						
Weight pin insert		8 g	28 g	34 g	53 g	68 g	65 g	130 g
Weight socket insert		8 g	30 g	38 g	64 g	76 g	82 g	164 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles						
Materials								
Insert	IEC 60664-1	PBT	PC					
Colour insert	IEC 60664-1	grey						
Contacts		CuZn (Messing)						
Contact plating		Ag (Silber) / Au (Gold)						

**Description** | **Part Number** | **Drawing** | **Figure**

**Contact insert 15 + ⊕ (Please order contacts separately, see page 34)**

Pin insert for stamped crimp contacts	C146 10A015 000 2		
Pin insert for turned crimp contacts	C146 10A015 500 2		
Socket insert for stamped crimp contacts	C146 10B015 000 2		
Socket insert for turned crimp contacts	C146 10B015 500 2		

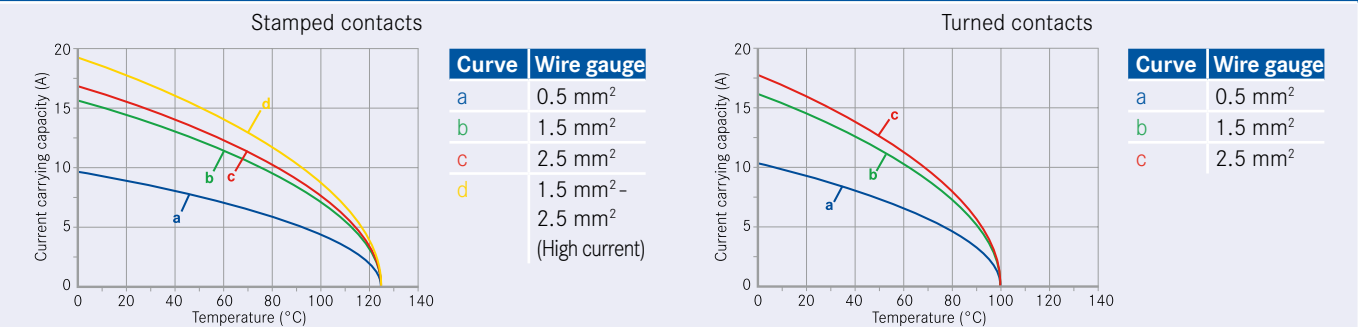
**Contact insert 15 + ⊕, 2 x PE-termination (Please order contacts separately, see page 34)**

Pin insert for stamped crimp contacts	C146 10A015 060 2		
Socket insert for stamped crimp contacts	C146 10B015 060 2		

**Pin layout** | **Assembly instruction**

Pin insert	Socket insert	Panel cut out (insert)	

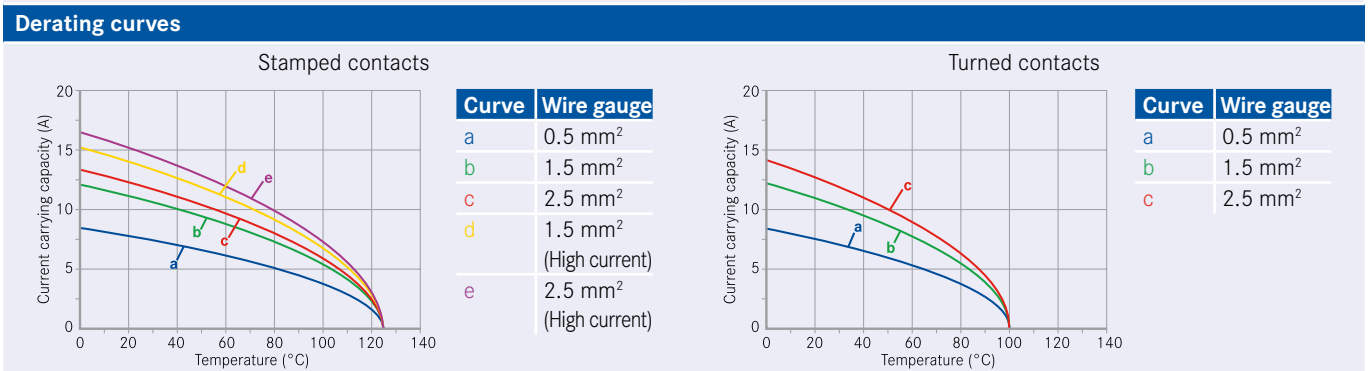
**Derating curves**



Description	Part Number	Drawing	Figure
<b>Contact insert 40 + ⊕ (Please order contacts separately, see page 34)</b>			
Pin insert for stamped crimp contacts	C146 10A040 000 2		
Pin insert for turned crimp contacts	C146 10A040 500 2		
Socket insert for stamped crimp contacts	C146 10B040 000 2		
Socket insert for turned crimp contacts	C146 10B040 500 2		

<b>Contact insert 40 + ⊕ , 2 x PE-termination (Please order contacts separately, see page 34)</b>			
Pin insert for stamped crimp contacts	C146 10A040 060 2		
Socket insert for stamped crimp contacts	C146 10B040 060 2		

Pin layout		Assembly instruction	
Pin insert	Socket insert	Panel cut out (insert)	

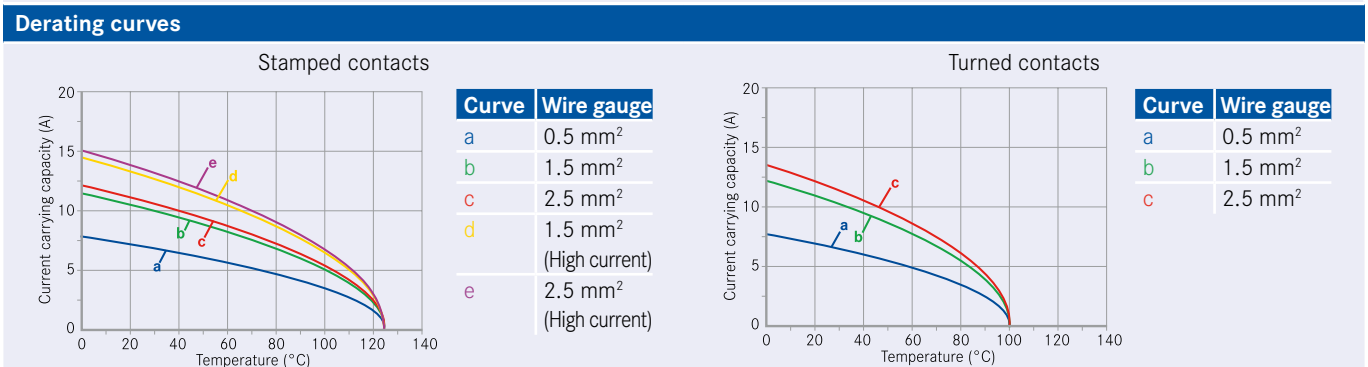




Description	Part Number	Drawing	Figure
<b>Contact insert 64 + ⊕ (Please order contacts separately, see page 34)</b>			
Pin insert for stamped crimp contacts	C146 10A064 000 2		
Pin insert for turned crimp contacts	C146 10A064 500 2		
Socket insert for stamped crimp contacts	C146 10B064 000 2		
Socket insert for turned crimp contacts	C146 10B064 500 2		

<b>Contact insert 64 + ⊕, 2 x PE-termination (Please order contacts separately, see page 34)</b>			
Pin insert for stamped crimp contacts	C146 10A064 060 2		
Socket insert for stamped crimp contacts	C146 10B064 060 2		

Pin layout		Assembly instruction	
Pin insert	Socket insert	Panel cut out (insert)	



Large range of wire gauges

VN01 016 0003 1C



VN01 016 0002 1C



VN01 016 0005 1C



Gas-tight (coldwelding)

0.14

0.25

0.5

0.5

1.0

1.5

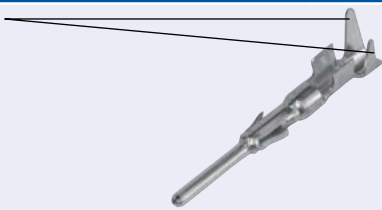
1.5

2.5



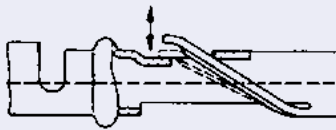
Stamped crimp contacts with insulation crimp, to absorb mechanical stress from the crimped connection

Insulation grip

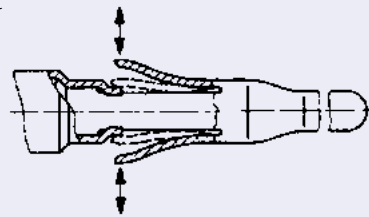


Mechanical retention spring stop on Socket and Pin contact

Socket contact

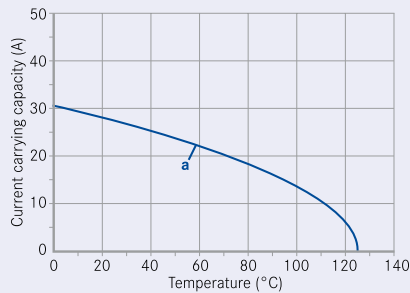


Pin contact

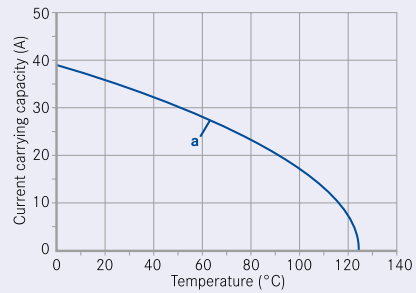


High current carrying capacity

Example single contact






Curve a: 2.5 mm<sup>2</sup> Standard contact. wire gauge



Curve a: 2.5 mm<sup>2</sup> High current contact, wire gauge

## heavy|mate® D Stamped crimp contacts

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
<b>Stamped single contacts</b>						
silver plating standard	0.14 - 0.5 mm <sup>2</sup>	26 - 20	100	VN01 016 0003 1	VN02 016 0003 1	
	0.5 - 1.5 mm <sup>2</sup>	20 - 16	100	VN01 016 0002 1	VN02 016 0002 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	VN01 016 0005 1	VN02 016 0005 1	
silver plating high current	0.5 - 1.5 mm <sup>2</sup>	20 - 16	100	VN01 016 0015 1	VN02 016 0015 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	VN01 016 0016 1	VN02 016 0016 1	
gold plating standard	0.14 - 0.5 mm <sup>2</sup>	26 - 20	100	VN01 016 0003 2	VN02 016 0003 2	
	0.5 - 1.5 mm <sup>2</sup>	20 - 16	100	VN01 016 0002 2	VN02 016 0002 2	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	VN01 016 0005 2	VN02 016 0005 2	
<b>Stamped Contacts on reel for hand crimp tools</b>						
silver plating standard	0.14 - 0.5 mm <sup>2</sup>	26 - 20	200	ZN01 016 0003 1	ZN02 016 0003 1	
	0.5 - 1.5 mm <sup>2</sup>	20 - 16	200	ZN01 016 0002 1	ZN02 016 0002 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	ZN01 016 0005 1	ZN02 016 0005 1	
silver plating high current	0.5 - 1.5 mm <sup>2</sup>	20 - 16	200	ZN01 016 0015 1	ZN02 016 0015 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	ZN01 016 0016 1	ZN02 016 0016 1	
gold plating standard	0.14 - 0.5 mm <sup>2</sup>	26 - 20	200	ZN01 016 0003 2	ZN02 016 0003 2	
	0.5 - 1.5 mm <sup>2</sup>	20 - 16	200	ZN01 016 0002 2	ZN02 016 0002 2	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	ZN01 016 0005 2	ZN02 016 0005 2	
<b>Stamped contacts on reel for crimp machines contact feeding left hand side</b>						
silver plating standard	0.14 - 0.5 mm <sup>2</sup>	26 - 20	2000	TN01 016 0003 1	TN02 016 0003 1	
	0.5 - 1.5 mm <sup>2</sup>	20 - 16	2000	TN01 016 0002 1	TN02 016 0002 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	2000	TN01 016 0005 1	TN02 016 0005 1	
silver plating high current	0.5 - 1.5 mm <sup>2</sup>	20 - 16	2000	TN01 016 0015 1	TN02 016 0015 1	
	1.5 - 2.5 mm <sup>2</sup>	18 - 14	2000	TN01 016 0016 1	TN02 016 0016 1	
gold plating standard	0.14 - 0.5 mm <sup>2</sup>	26 - 20	2000	TN01 016 0003 2	TN02 016 0003 2	
	0.5 - 1.5 mm <sup>2</sup>	20 - 16	2000	TN01 016 0002 2	TN02 016 0002 2	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	2000	TN01 016 0005 2	TN02 016 0005 2	
<b>Tools for stamped crimp contacts</b>						
Description	for wire gauge	Part Number				
		Contact locator	Crimping dies	Tool		
Removal tool for contacts	0,14 - 2.5 mm <sup>2</sup>	-	-	FG 0300 146 1		
Service crimping tool	0.14 - 0.5 mm <sup>2</sup> 0.5 - 1.5 mm <sup>2</sup>	-	-	TA 0100 146		
Crimping tool for single contacts	0.14 - 0.5 mm <sup>2</sup>	TA 0001 146 000 1	TA 0000 202	TA 0000 or TA 0500		
	0.5 - 1.5 mm <sup>2</sup>	TA 0002 146 000 1	TA 0000 163			
	1.5 - 2.5 mm <sup>2</sup>	TA 0007 146 000 3	TA 0000 141			
Further tools see catalogue "Tools"						

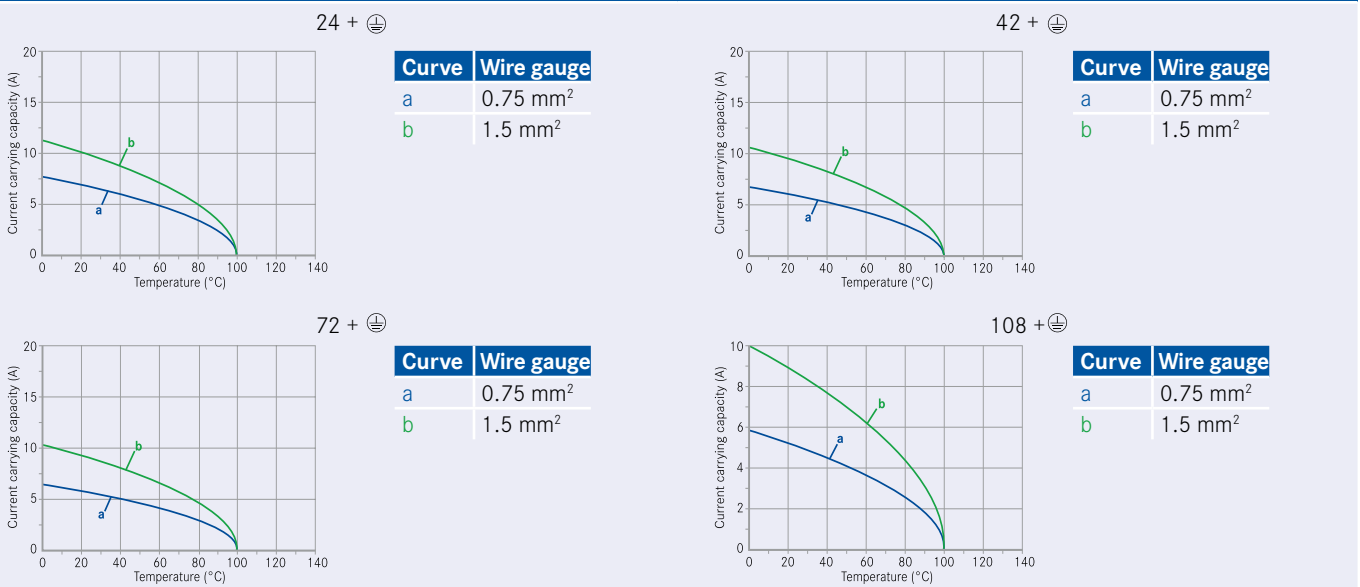
A high-speed train, primarily silver with orange and black accents, is shown from a front-quarter perspective on a track. The train is moving towards the viewer. Above the tracks, a complex network of overhead power lines and support poles is visible, extending into the distance. The background consists of green trees and a clear sky. A semi-transparent white box is overlaid on the left side of the image, containing text and a list of specifications.

# heavy | mate<sup>®</sup> DD

- Rated voltage 250 V
- Rated current 10 A
- Termination: crimp
- Number of contacts: 24, 42, 72, 108
- HL3 acc. EN 45545: R22/23

General Characteristics		Standard	Value			
Number of contacts			24 + ⊕	42 + ⊕	72 + ⊕	108 + ⊕
Termination technique			crimp, PCB (in combination with PCB-adaptor)			
Wire gauge			0.14 mm <sup>2</sup> - 2.5 mm <sup>2</sup> (AWG 26 - 14)			
Max. wire diameter			3.7 mm			
Flammability	UL 94		V-0			
Electrical Characteristics						
Rated voltage	IEC 60664-1		250 V (UL/CSA 600 V)			
Rated impulse withstand voltage	IEC 60664-1		4 kV			
Rated Current T <sub>u</sub> = 40 °C			10 A			
Current carrying capacity	IEC 60512-5-2		see derating curves			
Installation (overvoltage) category	IEC 60664-1		III			
Material group	IEC 60664-1		III b			
Contact resistance	IEC 60512-2-1		≤ 5 m Ω			
Insulation resistance	IEC 60512-3-1		≥ 10 <sup>10</sup> Ω			
Pollution degree	IEC 60664-1		3			
Climatical Characteristics						
Climatic category	IEC 60068-1		40 / 125 / 21			
Upper temperature	IEC 60512-11-9		+ 125 °C			
Lower temperature	IEC 60512-11-10		- 40 °C			
Mechanical Characteristics						
IP-degree of protection pin insert <sup>1)</sup>	IEC 60529		unmated IP00, mated IP20			
IP-degree of protection socket insert <sup>1)</sup>	IEC 60529		unmated IP20, mated IP20			
Weight pin insert			44 g	50 g	63 g	86 g
Weight socket insert			41 g	50 g	67 g	88 g
Mechanical operation	IEC 60512-9-1		> 500 mating cycles			
Materials						
Insert			PC			
Colour insert			grey			
Contacts			CuZn (brass)			
Contact plating			Ag (silver) / Au (gold)			

**Derating curves**



**Description**      **Part Number**      **Drawing**      **Figure**

**Contact insert 108 + ⊕ I Size E 24 (Please order contacts separately, see page 43) Housings from page 241**

Pin insert 108 + ⊕*	C146 10A108 000 9		
---------------------	-------------------	--	--

Socket insert 108 + ⊕*	C146 10B108 000 9		
------------------------	-------------------	--	--

**Contact insert 216 + ⊕ I Size E 48 (Please order contacts separately, see page 43) Housings from page 249**

Pin insert 216 + ⊕*	C146 10A108 000 9 + C146 10A108 005 9		
---------------------	---	--	--

Socket insert 216 + ⊕*	C146 10B108 000 9 + C146 10B108 005 9		
------------------------	---	--	--

**Pin layout**      **Assembly instruction**

<p>Pin insert      Socket insert</p> <p>                 1 4 7 24 pin 1                  2 5 8 25 pin 2                  3 6 9 26 pin 3                  4 10 11 27 pin 4             </p>	<p>Panel cut out (insert)</p> <table border="1"> <tr> <td>40</td> <td>4</td> <td>4</td> </tr> <tr> <td>44</td> <td>3.5</td> <td>4.4</td> </tr> <tr> <td>48</td> <td>4.4</td> <td>5.3</td> </tr> <tr> <td>52</td> <td>5.3</td> <td>6.2</td> </tr> <tr> <td>56</td> <td>6.2</td> <td>7.1</td> </tr> </table>	40	4	4	44	3.5	4.4	48	4.4	5.3	52	5.3	6.2	56	6.2	7.1
40	4	4														
44	3.5	4.4														
48	4.4	5.3														
52	5.3	6.2														
56	6.2	7.1														



## heavy | mate<sup>®</sup> E

- Rated voltage 500 V
- Rated current 16 A
- Termination: screw, crimp, tension spring, push-in
- Numbers of contacts: 6, 10, 16, 24, 48
- HL3 acc. EN 45545: R22/23

**General information**

- Contact inserts without crimp contacts (Contact inserts with crimp termination).
- Connectors series heavy|mate® E may be engaged or disengaged when live but without electrical load. If these connectors are mated or unmated under load, the load shall be reduced to 10 % of the rated current.
- Crimping tools and processing instructions see separate catalogue „Tools“.
- Low and high profile housings are usable.
- If wire ferrule are used, screw terminals without wire protection are preferred.



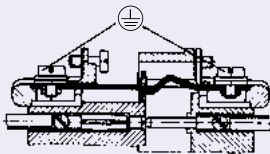
**No standard for this series, but:**

Interchangeable with other products

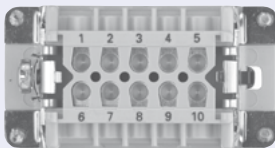
- a) contact insert to contact insert 6-, 10-, 16-, 24- way
- b) contact insert to housing 6-, 10-, 16-, 24- way

Housings are designed according to DIN EN 175 301 - 801

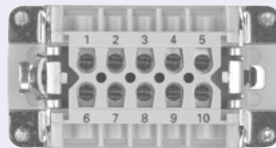
**First-to-mate last-to-break protective ground contact**



**Contact inserts for screw termination, screw termination with wire protection and for crimp termination**



Screw termination



Screw termination with wire protection



Crimp termination

**Range of housings**

**Size E6**



**Size E10**



**Size E16**



**Size E24**



**Size E48**





Description	Part Number	Drawing	Figure
<b>Screw termination</b>			
Pin insert for screw termination	C146 10A006 002 1		
Pin insert with wire protection for screw termination	C146 10A006 102 1		
Socket insert for screw termination	C146 10B006 002 1		
Socket insert with wire protection for screw termination	C146 10B006 102 1		
<b>Tension spring</b>			
Pin insert with Tension spring	C146 10A006 400 1		
Pin insert with Tension spring	C146 10B006 400 1		
<b>Push-in</b>			
Pin insert with push-in connection	C146 10A006 600 1		
Socket insert with push-in connection	C146 10B006 600 1		

Description	Part Number	Drawing	Figure
<b>Screw termination</b>			
Pin insert for screw termination	C146 10A010 002 1		
Pin insert with wire protection for screw termination	C146 10A010 102 1		
Socket insert for screw termination	C146 10B010 002 1		
Socket insert with wire protection for screw termination	C146 10B010 102 1		
<b>Tension spring</b>			
Pin insert with Tension spring	C146 10A010 400 1		
Socket insert with Tension spring	C146 10B010 400 1		
<b>Push-in</b>			
Pin insert with push-in connection	C146 10A010 600 1		
Socket insert with push-in connection	C146 10B010 600 1		

Description	Part Number	Drawing	Figure
<b>Screw termination</b>			
Pin insert for screw termination	C146 10A016 002 1		
Pin insert with wire protection for screw termination	C146 10A016 102 1		
Socket insert for screw termination	C146 10B016 002 1		
Socket insert with wire protection for screw termination	C146 10B016 102 1		
<b>Tension spring</b>			
Pin insert with Tension spring	C146 10A016 400 1		
Socket insert with Tension spring	C146 10B016 400 1		
<b>Push-in</b>			
Pin insert with push-in connection	C146 10A016 600 1		
Socket insert with push-in connection	C146 10B016 600 1		

Description	Part Number	Drawing	Figure
<b>Screw termination</b>			
Pin insert for screw termination	C146 10A024 002 1		
Pin insert with wire protection for screw termination	C146 10A024 102 1		
Socket insert for screw termination	C146 10B024 002 1		
Socket insert with wire protection for screw termination	C146 10B024 102 1		
<b>Tension spring</b>			
Pin insert with Tension spring	C146 10A024 400 1		
Socket insert with Tension spring	C146 10B024 400 1		
<b>Push-in</b>			
Pin insert with push-in connection	C146 10A024 600 1		
Socket insert with push-in connection	C146 10B024 600 1		

Description	Part Number	Drawing	Figure
<b>Screw termination</b>			
Pin insert for screw termination	C146 10A024 002 1 + C146 10A024 002 1		
Pin insert with wire protection for screw termination	C146 10A024 102 1 + C146 10A024 102 1		
Socket insert for screw termination	C146 10B024 002 1 + C146 10B024 002 1		
Socket insert with wire protection for screw termination	C146 10B024 102 1 + C146 10B024 102 1		
<b>Stamped crimp contacts (Please order contacts separately, see page 58)</b>			
Pin insert for stamped crimp contacts	C146 10A024 000 1 + C146 10A024 000 1		
Socket insert for stamped crimp contacts	C146 10B024 000 1 + C146 10B024 000 1		
<b>Turned crimp contacts (Please order contacts separately, see page 58)</b>			
Pin insert for turned crimp contacts	C146 10A024 500 1 + C146 10A024 500 1		
Socket insert for turned crimp contacts	C146 10B024 500 1 + C146 10B024 500 1		

Large range of wire gauges

VN01 025 0001 1C



VN01 025 0010 1C



Gas-tight (coldwelding)

0.5

1.0

1.5



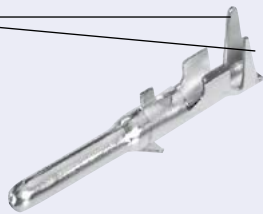
1.5

2.5



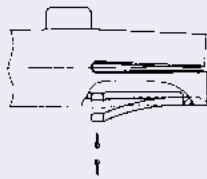
Stamped crimp contacts with insulation crimp, to absorb mechanical stress from the crimped connection

Insulation grip

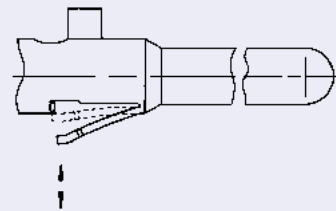


Mechanical retention spring stop on socket and pin contact

Socket contact

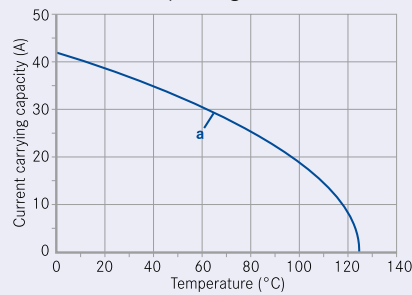


Pin contact



High current carrying capacity

Example single contact



Curve a: 2.5 mm<sup>2</sup> wire gauge

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
<b>Stamped single contacts</b>						
silver plating	0.5 - 1.5 mm <sup>2</sup>	20 - 16	100	VN01 025 0001 101	VN02 025 0001 101	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	VN01 025 0010 101	VN02 025 0010 101	
	2.5 - 4 mm <sup>2</sup>	14 - 12	100	VN01 025 0043 1	VN02 025 0043 1	
gold plating	0.5 - 1.5 mm <sup>2</sup>	20 - 16	100	VN01 025 0001 102	VN02 025 0001 102	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	VN01 025 0010 102	VN02 025 0010 102	
	2.5 - 4 mm <sup>2</sup>	14 - 12	100	VN01 025 0043 2	VN02 025 0043 2	
<b>Stamped Contacts on reel for hand crimp tools</b>						
silver plating	0.5 - 1.5 mm <sup>2</sup>	20 - 16	200	ZN01 025 0001 1	ZN02 025 0001 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	ZN01 025 0010 1	ZN02 025 0010 1	
gold plating	0.5 - 1.5 mm <sup>2</sup>	20 - 16	200	ZN01 025 0001 2	ZN02 025 0001 2	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	100	ZN01 025 0010 2	ZN02 025 0010 2	
<b>Stamped contacts on reel for crimp machines contact feeding left hand side</b>						
silver plating	0.5 - 1.5 mm <sup>2</sup>	20 - 16	2000	TN01 025 0001 1	TN02 025 0001 1	
	1.5 - 2.5 mm <sup>2</sup>	16 - 14	2000	TN01 025 0010 1	TN02 025 0010 1	
	2.5 - 4 mm <sup>2</sup>	14 - 12	2000	TN01 025 0043 1	TN02 025 0043 1	
<b>Tools for turned crimp contacts</b>						
Description	for wire gauge	Part Number				
		Contact locator	Crimping dies	Tool		
Removal tool for contacts	0.5 - 4.0 mm <sup>2</sup>	-	-	FG 0200 146 1		
Crimping tool for stamped single contacts	0.5 - 1.5 mm <sup>2</sup>	TA 0004 146 0001	TA 0000 163	TA 0000 or TA 0500		
	1.5 - 2.5 mm <sup>2</sup>	TA 0005 146 0003	TA 0000 141			
	2.5 - 4.0 mm <sup>2</sup>	TA 0003 146 0001	TA 0000 121			
Further tools see catalogue "Tools"						

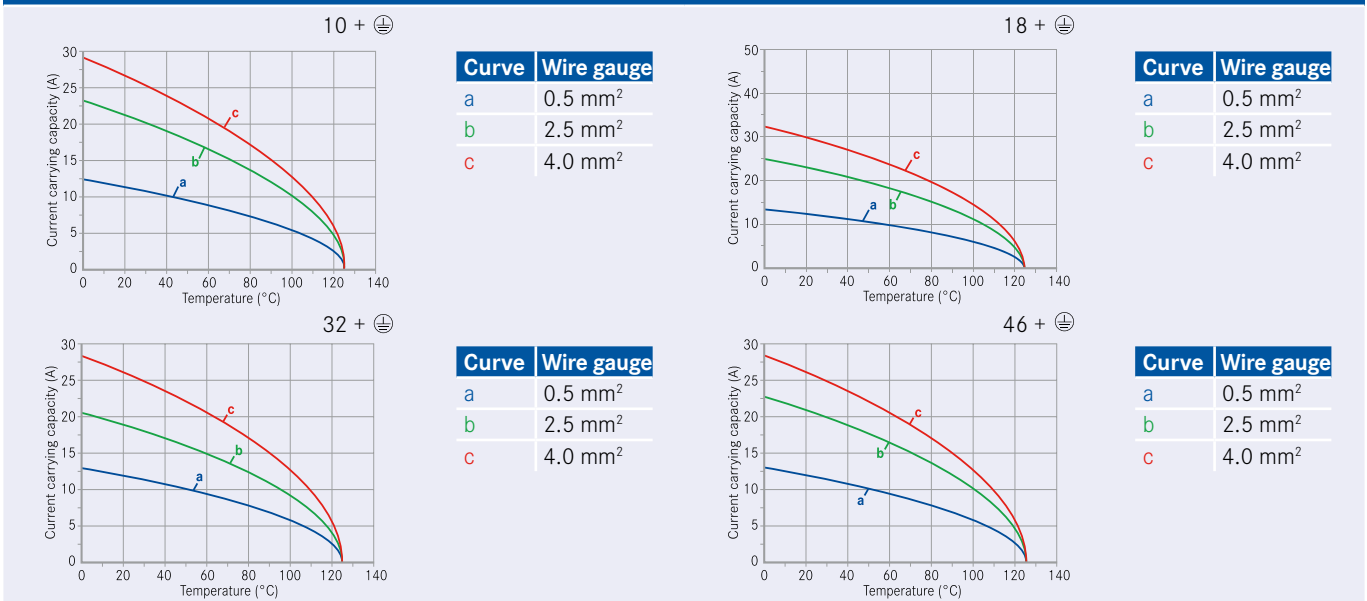
# heavy | mate<sup>®</sup> EE

- Rated voltage 500 V
- Rated current 16 A
- Termination: crimp
- Numbers of contacts: 10, 18, 32, 46
- HL3 acc. EN 45545: R22/23



General Characteristics	Standard	Value			
Number of contacts		10 + ⊕	18 + ⊕	32 + ⊕	46 + ⊕
Termination technique		crimp			
Wire gauge		0.14 mm <sup>2</sup> - 4.0 mm <sup>2</sup> (AWG 26 - 12)			
Max. wire diameter		4.8 mm			
Flammability	UL 94	V-0			
Electrical Characteristics					
Rated voltage	IEC 60664-1	500 V (UL / CSA 600 V)			
Rated impulse withstand voltage	IEC 60664-1	8 kV			
Rated Current T <sub>u</sub> = 40 °C		16 A			
Current carrying capacity	IEC 60512-5-2	see derating curves			
Installation (overvoltage) category	IEC 60664-1	III			
Material group	IEC 60664-1	III b			
Contact resistance	IEC 60512-2-1	≤ 5 mΩ			
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω			
Pollution degree	IEC 60664-1	3			
Climatical Characteristics					
Climatic category	IEC 60068-1	40 / 125 / 21			
Upper temperature	IEC 60512-11-9	+ 125 °C			
Lower temperature	IEC 60512-11-10	- 40 °C			
Mechanical Characteristics					
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20			
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20			
Weight pin insert		55g	60g	63g	80g
Weight socket insert		55g	70g	85g	80g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles			
Materials					
Insert		PC			
Colour insert		grey			
Contacts		CuZn (brass)			
Contact plating		Ag (silver) / Au (gold)			

Derating-Kurven



Description	Part Number	Drawing	Figure
<b>Contact insert 32 + ⊕ I Size E 16 (Please order contacts separately, see page 67) Housings from page 235</b>			
Pin insert 32 + ⊕	C146 10A032 500 10		
Socket insert 32 + ⊕	C146 10B032 500 10		

**Pin layout** **Assembly instruction**

Pin insert      Socket insert      Panel cut out (insert)

Description	Part Number	Drawing	Figure
<b>Contact insert 46 + ⊕ I Size E 24 (Please order contacts separately, see page 67) Housings from page 235</b>			
Pin insert 46 + ⊕	C146 10A046 500 10		
Socket insert 46 + ⊕	C146 10B046 500 10		

**Pin layout** **Assembly instruction**

Pin insert      Socket insert      Panel cut out (insert)

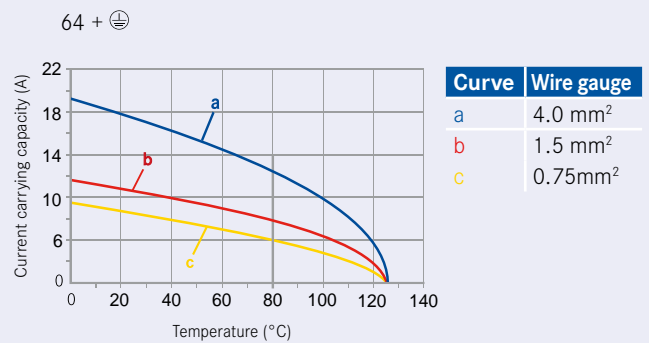
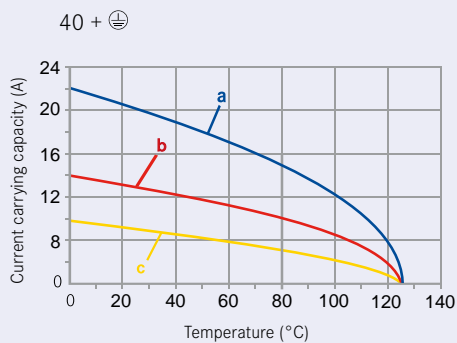


# heavy | mate<sup>®</sup> EEE

- Rated voltage 500 V
- Rated current 16 A
- Termination: crimp
- Numbers of contacts: 40, 64
- HL3 acc. EN 45545: R22/23

General Characteristics		Standard	Value
Number of contacts			40 + ⊕      64 + ⊕
Termination technique			crimp
Wire gauge			0.14 mm <sup>2</sup> - 4.0 mm <sup>2</sup> (AWG 26 - 12)
Max. wire diameter			4.6 mm
Flammability	UL 94		V-0
Electrical Characteristics			
Rated voltage	IEC 60664-1		500 V
Rated impulse withstand voltage	IEC 60664-1		6 kV
Rated Current T <sub>u</sub> = 40 °C			16 A
Current carrying capacity	IEC 60512-5-2		see derating curves
Installation (overvoltage) category	IEC 60664-1		III
Material group	IEC 60664-1		III b
Contact resistance	IEC 60512-2-1		≤ 5 mΩ
Insulation resistance	IEC 60512-3-1		≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1		3
Climatical Characteristics			
Climatic category	IEC 60068-1		40 / 125 / 21
Upper temperature	IEC 60512-11-9		+ 125 °C
Lower temperature	IEC 60512-11-10		- 40 °C
Mechanical Characteristics			
IP-degree of protection pin insert	IEC 60529		unmated IP00, mated IP20
IP-degree of protection socket insert	IEC 60529		unmated IP20, mated IP20
Weight pin insert			56 g      69 g
Weight socket insert			69 g      87 g
Mechanical operation	IEC 60512-9-1		≥ 500 mating cycles
Materials			
Insert			PC
Colour insert			grey
Contacts			CuZn (brass)
Contact plating			Ag (silver) / Au (gold)

**Derating curves**



Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
<b>Turned crimp contacts single contact</b>						
silver plating	0.14 mm <sup>2</sup> - 0.37 mm <sup>2</sup>	26-22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm <sup>2</sup>	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm <sup>2</sup>	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm <sup>2</sup>	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm <sup>2</sup>	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm <sup>2</sup>	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm <sup>2</sup>	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 mm <sup>2</sup> - 0.37 mm <sup>2</sup>	26-22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm <sup>2</sup>	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm <sup>2</sup>	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm <sup>2</sup>	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm <sup>2</sup>	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm <sup>2</sup>	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm <sup>2</sup>	12	100	VN01 025 0039 2C	VN02 025 0039 2C	
<b>Tools for turned crimp contacts</b>						
Description	for wire gauge	Part Number				
		Contact locator	Crimping dies	Tool		
Removal tool for contacts	0.14 - 4.0 mm <sup>2</sup>	-	-	FG 0300 146 7		
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm <sup>2</sup>	TA 0010 146 000 6	TA 0000 144	TA 0000 or TA 0500		
	0.5 - 2.5 mm <sup>2</sup>	TA 0010 146 000 7	TA 0000 124			
	3.0 - 4 mm <sup>2</sup>	TA 0010 146 000 7	TA 0000 124			
4-Indent crimping tool	0.14 - 0.37 mm <sup>2</sup>	-	-	TB 0600 146		
Further tools see catalogue "Tools"						

The background of the image shows a large industrial facility with a high ceiling, steel beams, and overhead lighting. In the foreground, there is a large, light-colored industrial machine with a white top and a grey base. The machine has various components, including a control panel with a black knob and a small display, and several yellow and black connectors on the side. In the background, there are other pieces of machinery, including a large green and yellow machine, and a blue overhead crane system. The floor is concrete with yellow safety markings.

# heavy | mate<sup>®</sup> E / FE / KO

- Rated voltage 500 V
- Material contacts: iron-constantan
- Rated current 10 A
- Number of contacts: 6, 10, 16, 24
- HL3 acc. EN 45545: R22/23

**Connectors with iron (FE) and constantan (CO) contacts**

are basically used in measuring and control circuits to serve as interface between FE/CO thermocouples and control unit, i. e. temperature control of moulds in injection moulding machines. Through the use of FE/CO connectors in the thermocouple circuit the measuring results are more accurate, thus the tolerance of the temperature control is much narrower.

Amphenol's Industrial Connectors with iron (FE) an Constantan (CO) contacts are used to connect FE/CO thermocouples with electronic signal amplifiers in measuring and control circuits, i. e. for temperature control of moulding machines.

**Errors with various combinations**

The connection of unlike metals (FE/Brass and CO/Brass) generate thermoelectric voltage errors in the measuring circuit caused by the flow from iron wire to the brass contact or by temperature changes at the contact elements.

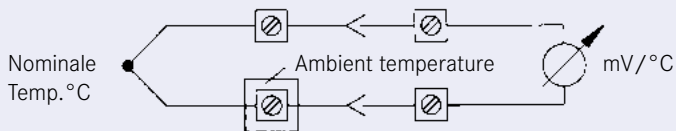
Nominal Temp.	Contact Material	without Thermo Contacts		with Thermo Contacts	
		MS/FE	MS/KO	FE/FE	KO/KO
100 °C		+ 4 %	- 16 %	- 4 %	- 2 %
200 °C		+ 2.5 %	- 8 %	- 3 %	- 1.5 %
300 °C		+ 1.3 %	- 12.7 %	- 1.3 %	0 %
400 °C		+ 1.5 %	- 4.5 %	- 1.0 %	0 %

By using FE/CO contacts respectively these deviations will be minimized.

**Material / Temperature Range**

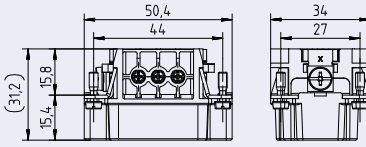

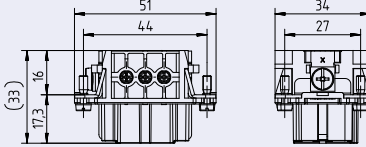

Temperatur range	Material/measurement procedure
< 150 °C	any/Resistance measurement
150 °C - 450 °C	FE-CO (iron/Constantan)
450 °C - approx. 1000 °C	Ni/Cr-Ni (Nickel/Chrome/Nickel)

**Temperature changes cause errors**





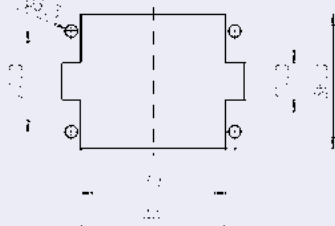
Description	Part Number	Drawing	Figure
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**Contact insert 6 + ⊕ with iron-constantan contacts I Size E6, Housings from page 226**

Pin insert with wire protection	C146 10A006 810 1		
Socket insert with wire protection	C146 10B006 810 1		

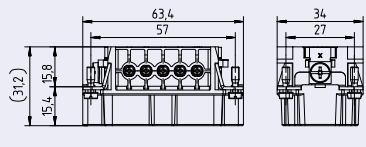

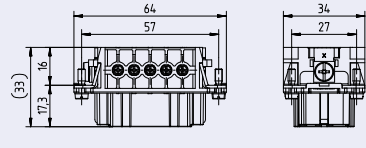

**Pin layout**

**Assembly instruction**

Pin insert	Socket insert	Panel cut out (insert)
		

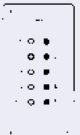
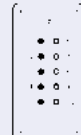
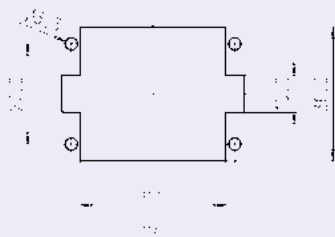
Description	Part Number	Drawing	Figure
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**Contact insert 10 + ⊕ with iron-constantan contacts I Size E10, Housings from page 228**

Pin insert with wire protection	C146 10A010 810 1		
Socket insert with wire protection	C146 10B010 810 1		

**Pin layout**

**Assembly instruction**

Pin insert	Socket insert	Panel cut out (insert)
		





# heavy | mate<sup>®</sup> F

- **Modular connector**
- **Compatible with market standard**
- **Rated voltage up to 1000 V**
- **Rated current up to 220 A**
- **Numbers of contacts: 1 - 108**
- **HL3 acc. EN 45545: R22/23**

## General information

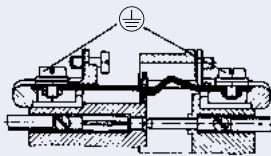
- Modules inserts without crimp contacts, crimping tools see separate catalogue “Tools”.
- Contacts must be ordered separately, processing instructions see catalogue “Tools”.
- Connectors series heavy|mate® F may be engaged or disengaged when live but without electrical load.  
If these connectors are mated or unmated under load, the load shall be reduced to 10 % of rated current.
- We recommend using the high profile housings / hoods for the heavy|mate® F inserts.
- Empty modul spaces have to be filled with blind modules.
- Torque for PE connection 1.2 Nm



## Advantages of the system

- No standard but interchangeable with competitive products.
- Housings are designed according to DIN EN 175 301 801
- Simply connecting of the modules and frames.

## First-to-mate last-to-break protective ground contact



## Range of housings

Size E6



Size E10



Size E16

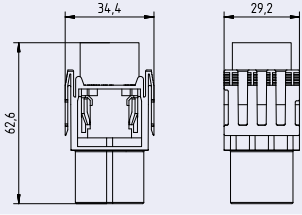

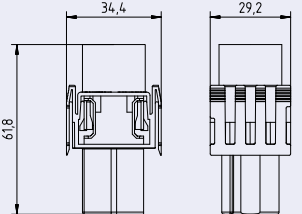

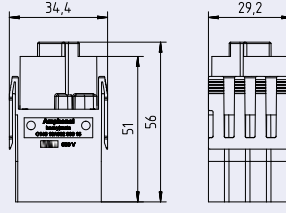

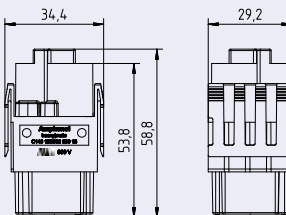

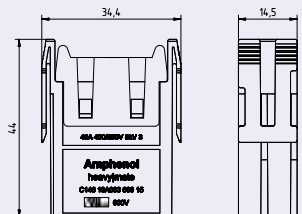

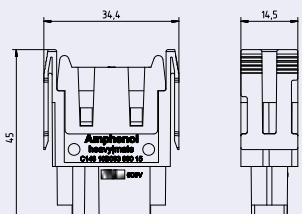



Size E24



Size E48



Description	Part Number	Drawing	Figure
<b>1 contacts module, 1000V, details see page 96*</b>			
Pin module 1 contact	C146 10A001 600 15		
Socket module 1 contact	C146 10B001 600 15		
<b>2 contacts module, 1000V, details see page 98</b>			
Pin module 2 contacts	C146 10A002 600 15		
Socket module 2 contacts	C146 10B002 600 15		
<b>3 contacts module, details see page 100</b>			
Pin module 3 contacts	C146 10A003 600 15 C146 10A003 601 15		
Socket module 3 contacts	C146 10B003 600 15 C146 10B003 601 15		

Description	Part Number	Drawing	Figure
<b>6 contacts module, 500 V, details see page 106</b>			
Pin module 6 contacts	C146 10A006 600 15		
Socket module 6 contacts	C146 10B006 600 15		
<b>8 contacts module, 400 V, details see page 108</b>			
Pin module 8 contacts	C146 10A008 600 15		
Socket modules 8 contacts	C146 10B008 600 15		
<b>12 contacts module, 250 V, details see page 110</b>			
Pin module 12 contacts	C146 10A012 600 15		
Socket module 12 contacts	C146 10B012 600 15		

Description	Part Number	Drawing	Figure
<b>Adaptor modules, details see page 122</b>			
Adaptor modules for Gigabit- and Megabit pin contact carrier	C146 10A001 800 15		
Adaptor modules for Gigabit- and Megabit socket contact carrier 8 pole	C146 10B001 800 15		
<b>Gigabit contact carrier 8 pole, CAT7, details see page 123*</b>			
Pin contact carrier - without shieldconnection to the frame - with shieldconnection to the frame	C146 10A008 901 15 C146 10A008 902 15		
Socket contact carrier - without shieldconnection to the frame - with shieldconnection to the frame	C146 10B008 901 15 C146 10B008 902 15		
<b>Megabit contact carrier 8 pole, CAT5e, details see page 124 *</b>			
Pin contact carrier - without shieldconnection to the frame - with shieldconnection to the frame	C146 10A008 905 15 C146 10A008 906 15		
Socket contact carrier - without shieldconnection to the frame - with shieldconnection to the frame	C146 10B008 905 15 C146 10B008 906 15		

Description	Part Number	Drawing	Figure
<b>Adaptor modules, details see page 116</b>			
Adaptor modules for Quintax- and Coax pin contact carrier	C146 10A002 800 15		
Adaptor modules for Quintax- and Coax socket contact carrier	C146 10B002 800 15		
<b>Quintax contact carrier, CAT5e, 50 V, details see page 116</b>			
Pin contact carrier 4 pole	C146 10A004 901 15		
Socket contact carrier 4 pole	C146 10B004 901 15		
<b>Coax contact carrier, 50 Ω, details see page 118</b>			
Pin contact carrier 1 pole	C146 10A001 902 15		
Socket contact carrier 1 pole	C146 10B001 902 15		

Description	Part Number	Drawing	Figure
<b>Frame for 2 modules   Size E6   Housings from page 226</b>			
Frame for 2 pin modules	C146 10P06 000 15		
Frame for 2 socket modules	C146 10S06 000 15		
<b>Frame for 3 modules   Size E10   Housings from page 228</b>			
Frame for 3 pin modules	C146 10P10 000 15		
Frame for 3 socket modules	C146 10S10 000 15		
<b>Frame for 4 modules   Size E16   Housings from page 235</b>			
Frame for 4 pin modules	C146 10P16 000 15		
Frame for 4 socket modules	C146 10S16 000 15		

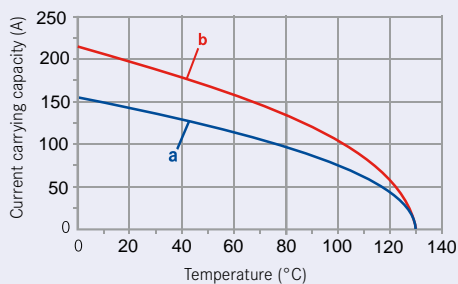
Description	Part Number	Drawing	Figure
<b>Multiframe for 2 modules   Size E6   Housings from page 226</b>			
Frame for 2 pin modules	C146 10P006 100 15		
Frame for 2 socket modules	C146 10S006 100 15		
<b>Multiframe for 3 modules   Size E10   Housings from page 228</b>			
Frame for 3 pin modules	C146 10P010 100 15		
Frame for 3 socket modules	C146 10S010 100 15		
<b>Multiframe for 4 modules   Size E16   Housings from page 235</b>			
Frame for 4 pin modules	C146 10P016 100 15		
Frame for 4 socket modules	C146 10S016 100 15		



General Characteristics	Standard	Value
Number of contacts		1
Termination technique		crimp
Wire gauge		25 - 95 mm <sup>2</sup> (AWG 4 - 000)
Max. wire diameter		20 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		200 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category		40 / 125 / 21
Upper temperature		+125°C
Lower temperature		-40°C
Mechanical Characteristics		
IP-degree of protection pin module		unmated IP00, mated IP20
IP-degree of protection socket module		unmated IP20, mated IP20
Weight pin module		18 g
Weight socket module		15 g
Mechanical operation		≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)
Derating curves		
in preparation		
General requirements		
<ul style="list-style-type: none"> <li>Due to reduced cross sections at PE contacts of frames, the PE contact has to be additionally protected against short circuits by using a protection circuit offering a sufficiently short breaking time (&lt;0.25s).</li> </ul>	<ul style="list-style-type: none"> <li>Parts to be used as connectors, not as plug devices (connector with breaking capacity). Do not mate under current or voltage!</li> </ul>	

General Characteristics	Standard	Value
Number of contacts		2
Termination technique		crimp
Wire gauge		10 - 35 mm <sup>2</sup> (AWG 8-2)
Max. wire diameter		13 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		100 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category		40 / 125 / 21
Upper temperature		+125°C
Lower temperature		-40°C
Mechanical Characteristics		
IP-degree of protection pin module		unmated IP00, mated IP20
IP-degree of protection socket module		unmated IP20, mated IP20
Weight pin module		18 g
Weight socket module		22 g
Mechanical operation		≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

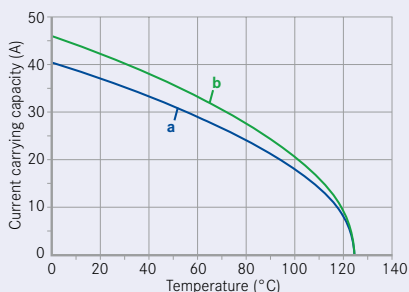
**Derating curves**



Curve	Wire gauge
a	25 mm <sup>2</sup>
b	35 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp
Wire gauge		1.5 - 10.0 mm <sup>2</sup> (AWG 16 - 8)
Max. wire diameter		5.2 / 6.4 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (conductor - earth) 690 V (conductor - conductor)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		40 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		13 g
Weight socket module		13 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

**Derating curves**

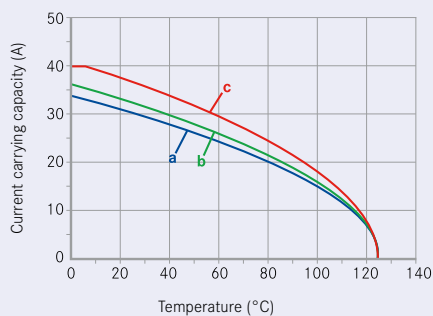


Curve	Wire gauge
a	4 mm <sup>2</sup>
b	6 mm <sup>2</sup>
c	10 mm <sup>2</sup>

## heavy|mate® F Characteristics 3+4 contacts module

Brief information		
High contact density, receptable- and cable side finger proof.		
General Characteristics	Standard	Value
Number of contacts		3 + 4
Termination technique		crimp
Wire gauge		Power: 1.5 - 6 mm <sup>2</sup> (AWG 16 - 10) Signal: 0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		Power: 6.4 mm, Signal 3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	Power: 830 V Signal: 690 V (conductor-earth) 830 V (conductor-earth)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		Power: 40 A, Signal: 10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 10
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		12 g
Weight socket module		9 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating power		Ag (silver)
Contact plating signal		Ag (silver) / Au (gold)

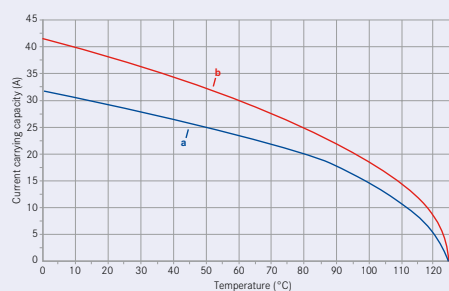
### Derating curves



Curve	Wire gauge
a	4 mm <sup>2</sup>
b	6 mm <sup>2</sup>
c	10 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		4
Termination technique		crimp
Wire gauge		1.5 - 6.0 mm <sup>2</sup> (AWG 16-10)
Max. wire diameter		5.2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	830 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		40 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		13 g
Weight socket module		10 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

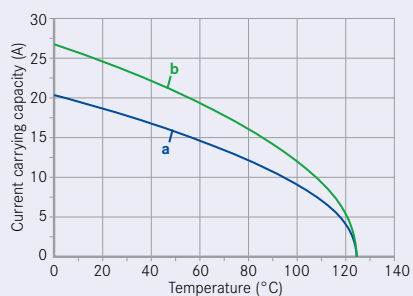
**Derating curves**



Curve	Wire gauge
a	4.0 mm <sup>2</sup>
b	6.0 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		6
Termination technique		crimp
Wire gauge		0.14 - 4.0 mm <sup>2</sup> (AWG 26-12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	630 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP00, mated IP20
Weight pin module		10 g
Weight socket module		10 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

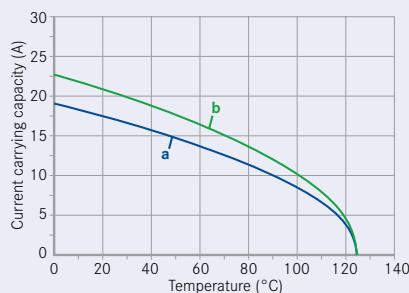
**Derating curves**



Curve	Wire gauge
a	1.5 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		8
Termination technique		crimp
Wire gauge		0.14 - 4.0 mm <sup>2</sup> (AWG 26-12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		9 g
Weight socket module		10 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

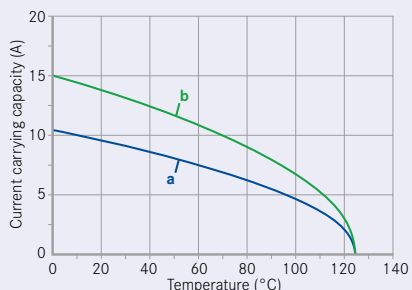
**Derating curves**



Curve	Wire gauge
a	1.5 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		12
Termination technique		crimp, PCB (in combination with PCB adaptor)
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26-14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (conductor - earth) 400 V (conductor - conductor) (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	4 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP00, mated IP20
Weight pin module		11 g
Weight socket module		11 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

Derating curves

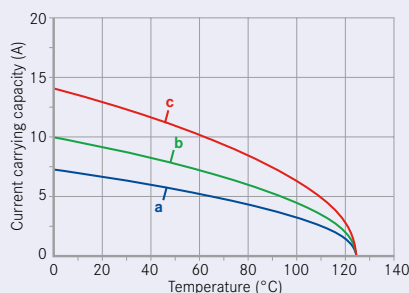


Curve	Wire gauge
a	1.0 mm <sup>2</sup>
b	1.5 mm <sup>2</sup>



General Characteristics	Standard	Value
Number of contacts		17
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	160 V (UL/CSA 250 V)
Rated impulse withstand voltage	IEC 60664-1	2.5 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		9 g
Weight socket module		11 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

**Derating curves**

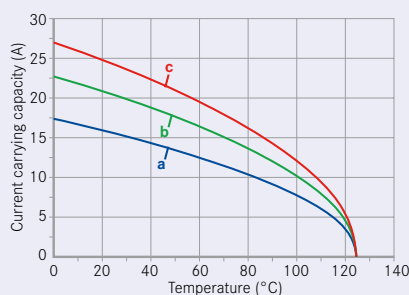


Curve	Wire gauge
a	0.5 mm <sup>2</sup>
b	1.0 mm <sup>2</sup>
c	1.5 mm <sup>2</sup>

## heavy|mate® F Characteristics 20 contacts module

General Characteristics	Standard	Value
Number of contacts		20
Termination technique		crimp
Wire gauge		0.14 - 4.0 mm <sup>2</sup> (AWG 26 - 12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	500 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		18 g
Weight socket module		23 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

### Derating curves



Curve	Wire gauge
a	1.5 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>
c	4.0 mm <sup>2</sup>

**Brief information**

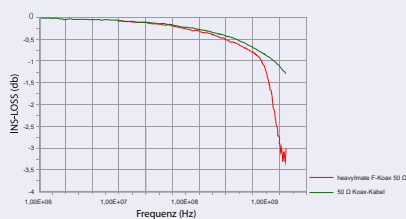
CAT 5e for Ethernet acc. ISO/IEC 11801, for 10/100/1000 MBit/s data rate.

General Characteristics	Standard	Value
Number of contacts		4 + shielding   1
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		3 - 9.5 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	50 V (UL/CSA 50 V)
Rated impulse withstand voltage	IEC 60664-1	0.8 kV
Rated current T <sub>u</sub> =40°C		10 A
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance		≤ 10 <sup>10</sup> mΩ
Category of connection	IEC 11801 ANSI/TIA/EIA-568-C2	CAT5e
Data rate		max. 1 GBit/s
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 100 / 21
Upper temperature	IEC 60512-11-9	+100°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection module		unmated IP00, mated IP20
IP-degree of protection socket module		unmated IP00, mated IP20
Weight pin contact carrier		50 g
Weight socket contact carrier		40 g
Weight pin module		13 g
Weight socket module		15 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Au (gold)
Contact insert		PA
Colour contact insert		black
Shielding		Zink alloy
Cable clamp		Zink alloy

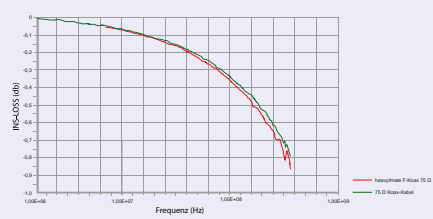
General Characteristics	Standard	Value
Number of contacts		1 + shielding
Termination technique		crimp
Wire gauge		0.14 - 4.5mm <sup>2</sup> (AWG 26 - 12)
Max. wire diameter		3 - 9.5 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	50 V (UL/CSA 50 V)
Rated impulse withstand voltage	IEC 60664-1	0.8 kV
Screening effectiveness		see curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category		40 / 100 / 21
Upper temperature		+100°C
Lower temperature		-40°C
Mechanical Characteristics		
IP-degree of protection pin contact carrier	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket contact carrier	IEC 60529	unmated IP20, mated IP20
Weight pin contact carrier		28 g
Weight socket contact carrier		28 g
Weight pin module		13 g
Weight socket module		15 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Au (gold)
Contact insert		PC
Colour contact insert		grey
Shielding		Cu alloy
Cable clamp		Cu alloy

Curves

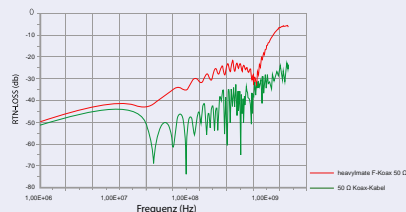
50 Ω INS



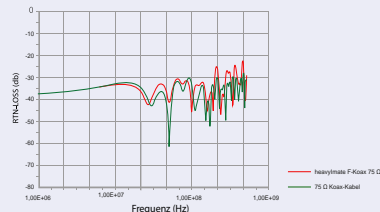
75 Ω INS



50 Ω RTN



75 Ω RTN



**Brief information**

High contact density, receptable- and cable side finger proof.

General Characteristics	Standard	Value
Number of contacts		36 (18 x Pin, 18 x Socket)
Termination technique		crimp, PCB (in combination with PCB Adaptor)
Wire gauge		0.14 - 2.5mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0

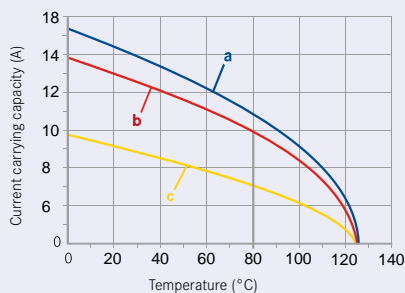
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (UL/CSA 250 V)
Rated impulse withstand voltage	IEC 60664-1	4 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3

Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 10
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C

Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		21 g
Weight socket module		21 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles

Material		
Insert / module		PA
Colour insert / module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

**Derating curves**



Curve	Wire gauge
a	1.5 mm <sup>2</sup>
b	1.0 mm <sup>2</sup>
c	0.5 mm <sup>2</sup>

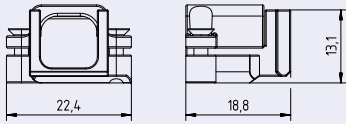
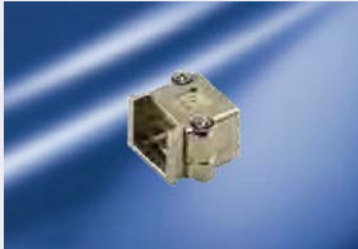
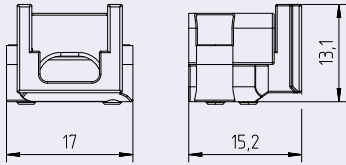
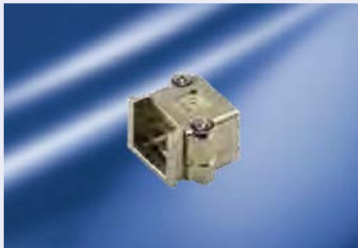
**Brief information**

CAT7 for Ethernet acc. ISO/IEC 11801, up to 10 GBit/s data rates.

General Characteristics	Standard	Value
Number of contacts		8 + shielding
Termination technique		crimp
Wire gauge		0.09 - 0.52 mm <sup>2</sup> (AWG 28 - 20)
Max. wire diameter		1x5 - 12 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	50 V
Rated impulse withstand voltage	IEC 60664-1	0.8 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Category of connection	IEC 11801 ANSI/TIA/EIA-568-C2	CAT7
Data rate		max. 10 GBit/s
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 85 / 21
Upper temperature	IEC 60512-11-9	+85°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin contact carrier	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket contact carrier	IEC 60529	unmated IP20, mated IP20
Weight pin contact carrier		34 g
Weight socket contact carrier		36 g
Weight pin module		6 g
Weight socket module		4 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Au (gold)
Contact insert		PC
Colour contact insert		grey
Shielding		Cu alloy
Cable clamp (separate Part number)		Cu alloy

## heavy|mate® F Characteristics Adaptor module + MegaBit-contact carrier

Brief information		
Cat5e for Ethernet acc. ISO/IEC 11801, up to 1 GBit/s data rate.		
General Characteristics	Standard	Value
Number of contacts		8 + shielding
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		2x5 - 12 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	50 V
Rated impulse withstand voltage	IEC 60664-1	0.8 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Category of connection	IEC 11801 ANSI/TIA/EIA-568-C2	CAT5e
Data rate		max 1 GBit/s
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 85 / 21
Upper temperature	IEC 60512-11-9	+85°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin contact carrier	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket contact carrier	IEC 60529	unmated IP20, mated IP20
Weight pin contact carrier		41 g
Weight socket contact carrier		44 g
Weight pin module		6 g
Weight socket module		4 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Au (gold)
Contact insert		PC
Colour contact insert		grey
Shielding		Cu alloy
Cable clamp (separate part number)		Cu alloy

Description	Part number	Drawing	Figure
<b>Cable clamps for GigaBit contact carrier</b>			
Cable clamp 5 - 7 mm Cable clamp 7 - 10 mm Cable clamp 10 - 12 mm	N 16 146 0011 N 16 146 0012 N 16 146 0013		
<b>Cable clamps for MegaBit contact carrier</b>			
Cable clamp 5 - 7 mm Cable clamp 7 - 10 mm Cable clamp 10 - 12 mm	N 16 146 0021 N 16 146 0022 N 16 146 0023		



General Characteristics	Standard	Value	
Number of contacts		9	15
Termination technique		crimp	
Wire gauge		0.09 - 0.52 mm <sup>2</sup> (AWG 28 - 20)	0.09 - 0.25 mm <sup>2</sup> (AWG 28-24)
Clamping range		2x 3.8 - 6.8mm	
Max. wire diameter		2.3 mm	1.6 mm
Flammability	UL94	V-0	
Electrical Characteristics			
Rated voltage	IEC 60664-1	500 V	
Rated impulse withstand voltage	IEC 60664-1	0.8 kV	
Rated Current T <sub>u</sub> = 40 °C		5 A	
Current carrying capacity			
Installation (overvoltage) category	IEC 60664-1	III	
Material group	IEC 60664-1	I	
Contact resistance	IEC 60512-2-1	≤ 5 mΩ	
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω	
Pollution degree	IEC 60664-1	3	
Climatical Characteristics			
Climatic category	IEC 60068-1	40 / 85 / 10	
Upper temperature	IEC 60512-11-9	+85°C	
Lower temperature	IEC 60512-11-10	-40°C	
Mechanical Characteristics			
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20	
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20	
Weight pin module 9 contacts		35 g	
Weight socket module 9 contacts		34 g	
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles	
Material			
Module		PA	
Colour module		black	
Contacts		CuZn (brass)	
Contact plating		Au (gold)	
Material		PC	
Shielding		Cu alloy	
Cable clamp		Stainless steel	
Derating curves			

**Brief information**

Modules with centering function allow the use of the modular system in rack and panel applications without housing. The modules align a floating frame so that modules can be plugged central. For optimal function two modules must be used in the frame.

<b>Climatical Characteristics</b>		
Climatic category	IEC 60068-1	40/ 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
<b>Mechanical Characteristics</b>		
Weight blind module with centering function		9 g
Weight blind module standard		6 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
<b>Materials</b>		
Contact module		PA
Colour contact module		black



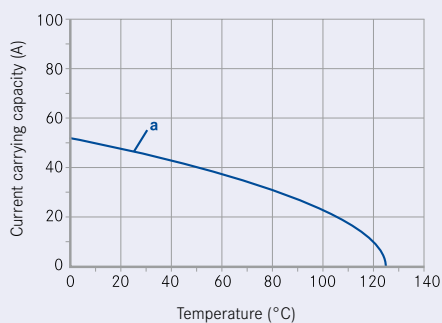
# heavy | mate<sup>®</sup> HSE

- Rated voltage 400 V
- Rated current 42 A
- Termination: screw
- Number of contacts: 6

## heavy|mate® HSE Characteristics contact inserts

General Characteristics	Standard	Value
Number of contacts		6 + ⊕
Termination technique		screw
Wire gauge		0.5 - 6.0 mm <sup>2</sup> (AWG 20 - 10)
Max. wire diameter		6.4 mm
Flammability	UL 94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated current T <sub>amp</sub> = 40 °C		42 A
Rated current	IEC 60512-5-2	see Derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 1 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+ 125 °C
Lower temperature	IEC 60512-11-10	- 40 °C
Mechanical Characteristics		
IP-degree of protection pin insert <sup>1)</sup>	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert <sup>1)</sup>	IEC 60529	unmated IP20, mated IP20
Weight pin insert		80 g
Weight socket insert		80 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Contact insert		PA
Colour contact insert		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

### Derating curves



Curve a: 6 mm<sup>2</sup> screw contact



## heavy | mate<sup>®</sup> HvE

- Rated voltage 660 V
- Rated current 16 A
- Termination: screw
- 2 delayed mating contacts
- Number of contacts: 3, 6, 10, 16, 32
- HL3 acc. EN 45545: R22/23 (3 - 10 contacts)

### Construction of connectors Type HVE

Connectors of heavy|mate® HVE series only connect with counter parts of heavy|mate HVE series.

The connectors of series heavy|mate® HVE are based on series heavy|mate® E with the following deviations:

### Inserts

The HVE-inserts with 3, 6 and 10 contacts are basically the same as the 10, 16 and 24-contacts inserts of series heavy|mate® E. However they are only partly loaded with contacts and have two delayed mating pilot duty contacts.

Only type 16 HVE has special inserts with a different contact arrangement. The mounting dimensions are however identical with the 24 contacts version of heavy|mate® E.

The delayed mating contacts are intended for switching a relay coil for electrically locking in order to have unloaded socket contacts in an unmated condition.

If connectors without breaking capacity are used as connectors with breaking capacity the electrical power data must be reduced in accordance with the manufacturer's specification. These specifications are available from the manufacturer.

heavy|mate® E inserts with pin contacts are not intermatable with heavy|mate® HVE inserts with socket contacts due to

- two empty contact holes are closed at 3, 6 and 10 contact inserts.
- the 16 contacts HVE insert has a different contact arrangement.

### Housings: (made of aluminium)

heavy|mate® E housings with an inside insulation (plastic foil) are used for the 16-contacts insert.

The inside barriers at the narrow sides preventing mounting of 660 V-inserts in 400 V housings are removed and the 16-contacts insert is now mountable.

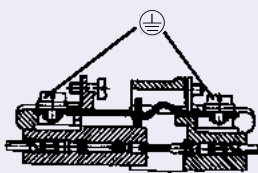
### No standard for this series, but:

Intermateable and exchangeable with other makes

- Contact insert to contact insert
- Contact insert to housing 6, 10, 16, 24 pin

Housings are designed according to  
DIN EN 175 301-801

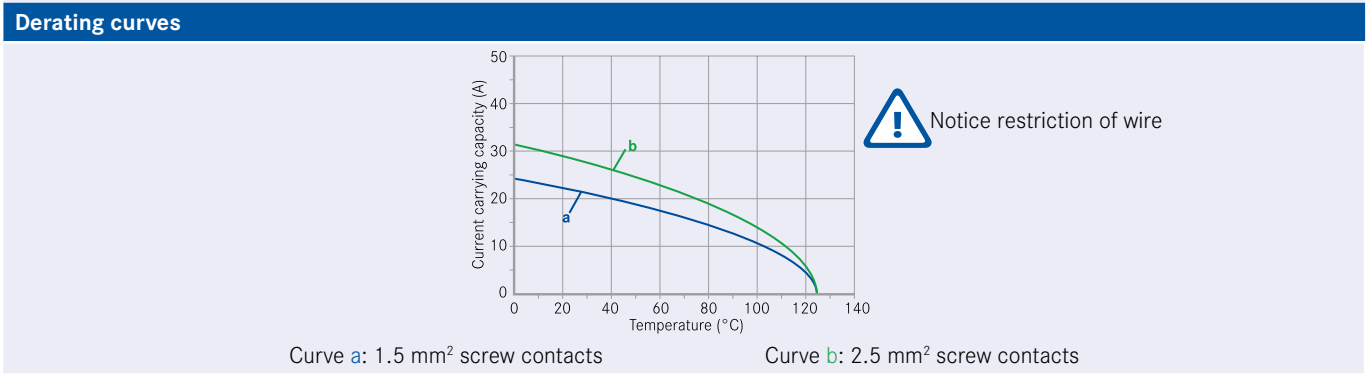
### First-to-mate last-to-break protective ground contact





Description	Part Number	Drawing	Figure
<b>Contact insert 10 + ⊕ + 2 (delayed mating contacts)</b>			
Pin insert with wire protection for screw termination	C146 10A010 102 3		
Socket insert with wire protection for screw termination	C146 10B010 102 3		

Pin layout		Assembly instruction	
Pin insert	Socket insert	Panel cut out (insert)	
	<ul style="list-style-type: none"> <li>● Working contact</li> <li>○ Mating contact</li> <li>○ Without contact</li> </ul>		





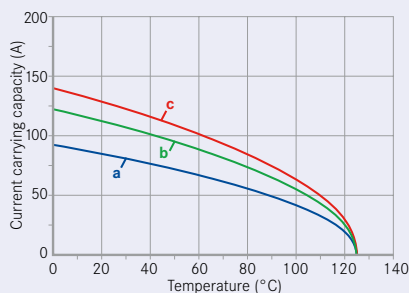


# heavy | mate<sup>®</sup> K

- Power + signal as mixed arrangement
- Rated voltage up to 830 V
- Termination: screw, crimp
- HL3 acc. EN 45545: R22/23

General Characteristics	Standard	Value	
Number of contacts		4+0+ ⊕ (4 Power)	4+2+ ⊕ (4 Power + 2 Signal)
Termination technique		screw	
Wire gauge		1.5 - 16 mm <sup>2</sup> (AWG 16 - 6)	Power: 1.5 - 16 mm <sup>2</sup> (AWG 16 - 6) Signal: 0.5 - 2.5 mm <sup>2</sup> (AWG 20 - 14)
Max. wire diameter		11 mm	Power: 11 mm, Signal: 4.8 mm
Flammability	UL94	V-0	
Electrical Characteristics			
Rated voltage	IEC 60664-1	830 V (UL/CSA 600 V)	Power: 830 V (UL/CSA 600 V) Signal: 400 V (UL/CSA 300 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV	Power: 8 kV Signal: 6 kV
Rated Current T <sub>u</sub> = 40 °C		80 A	Power: 80 A Signal: 16 A
Current carrying capacity	IEC 60512-5-2	see derating curves	
Installation (overvoltage) category	IEC 60664-1	III	
Material group	IEC 60664-1	III b	
Contact resistance	IEC 60512-2-1	≤ 5 mΩ	
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω	
Pollution degree	IEC 60664-1	3	
Climatical Characteristics			
Climatic category	IEC 60068-1	40 / 125 / 21	
Upper temperature	IEC 60512-11-9	+125°C	
Lower temperature	IEC 60512-11-10	-40°C	
Mechanical Characteristics			
IP-degree of protection pin insert <sup>1)</sup>	IEC 60529	unmated IP00, mated IP20	
IP-degree of protection socket insert <sup>1)</sup>	IEC 60529	unmated IP20, mated IP20	
Weight pin insert		109 g	114 g
Weight socket insert		108 g	113 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles	
Materials			
Insert		PC	
Colour insert		grey	
Contacts		CuZn (brass)	
Contact plating		Ag (silver)	

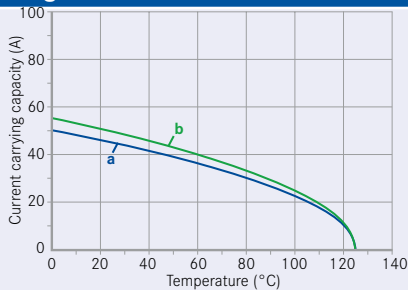
### Derating Kurven



Curve	Wire gauge
a	10 mm <sup>2</sup>
b	16 mm <sup>2</sup>
c	Single contacts with 16 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		6 + 36 + ⊕ (6 Power + 36 Signal)
Termination technique		crimp
Wire gauge		1.5 – 6.0mm <sup>2</sup> (AWG 16 – 10) 0.14 – 2.5mm <sup>2</sup> (AWG 26 – 14)
Max. wire diameter		Power: 5.2 mm, Signal: 3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	Power: 690 V, Signal: 160 V (UL/CSA 600 V, 300 V)
Rated impulse withstand voltage	IEC 60664-1	Power: 8.0 kV, Signal: 2.5 kV
Rated Current T <sub>u</sub> = 40 °C		Power: 40 A, Signal: 10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20
Weight pin insert		65 g
Weight socket insert		74 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

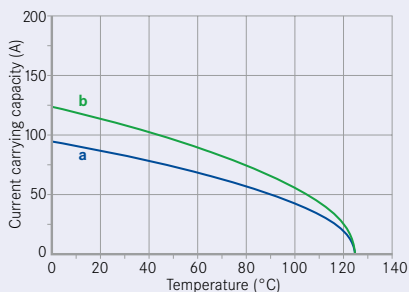
**Derating curves**



Curve	Wire gauge
a	6 mm <sup>2</sup> with signal-contacts 1.5 mm <sup>2</sup>
b	6 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		4+8 + ⊕ (4 Power + 8 Signal)
Termination technique		screw
Wire gauge		Power: 1.5 - 16 mm <sup>2</sup> (AWG 16 - 6) Signal: 0.5 - 2.5 mm <sup>2</sup> (AWG 20 - 14)
Max. wire diameter		Power: 11 mm, Signal: 4.8 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	Power: 400 V, Signal: 400 V (UL/CSA 600 V, 660 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		Power: 80 A, Signal: 16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert <sup>1)</sup>	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert <sup>1)</sup>	IEC 60529	unmated IP20, mated IP20
Weight pin insert		147 g
Weight socket insert		148 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver)

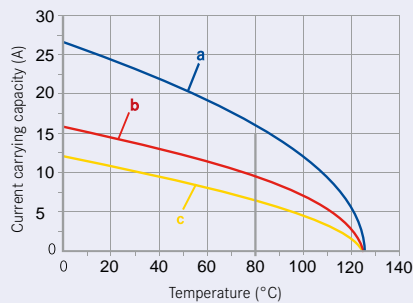
**Derating curves**



Curve	Wire gauge
a	10 mm <sup>2</sup>
b	16 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		8+24+ ⊕ (8 Power + 24 Signal)
Termination technique		crimp
Wire gauge		Power: 0.5 - 4 mm <sup>2</sup> (AWG 20 - 12) Signal: 0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		Power: 4.6 mm, Signal 3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	Power: 230 V (conductor-earth), 400 V (conductor-earth) Signal: 160 V
Rated impulse withstand voltage	IEC 60664-1	Power: 4 kV, Signal: 2,5 kV
Rated Current T <sub>u</sub> = 40 °C		Power: 16 A, Signal: 10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert <sup>1)</sup>	IEC 60529	unmated IP00, mated IP20 unmated IP20, mated IP20
IP-degree of protection socket insert <sup>1)</sup>	IEC 60529	IP20
Weight pin insert		51 g
Weight socket insert		57 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

**Derating curves**



Curve	Wire gauge
a	2.5 mm <sup>2</sup>
b	4.0 mm <sup>2</sup>
c	4.0 mm <sup>2</sup>



# heavy | mate<sup>®</sup> M

- Modular connector
- More module slots than heavy|mate<sup>®</sup> F and market standard
- Rated voltage 63 - 1000 V
- Rated current 5 A ... 220 A
- Termination: crimp

## General information

- Modules inserts without crimp contacts, crimping tools see separate catalogue "Tools".
- Contacts must be ordered separately, processing instructions see catalogue "Tools".
- Connectors series heavy|mate® M may be engaged or disengaged when live but without electrical load. If these connectors are mated or unmated under load, the load shall be reduced to 10 % of rated current.

- We recommend using the high profile housings / hoods for the heavy|mate® M inserts.
- Empty modul spaces have to be filled with blind modules.
- Torque for PE connection 1.8 Nm

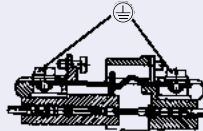


## Advantages of the system

- High combination possibilities
- Possibility of inverse configuration
- Rated voltage up to 1000 V
- Low cost

## First-to-mate last-to-break protective ground contact

Minimum wire size 0.5 mm<sup>2</sup>



## Modules

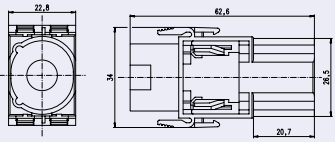

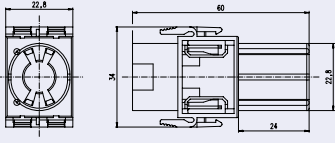

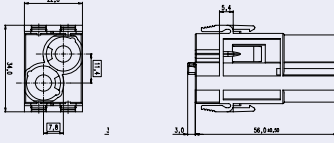

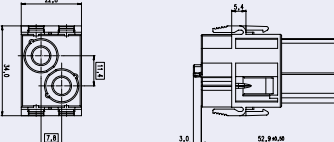

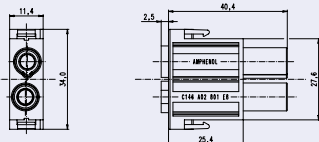

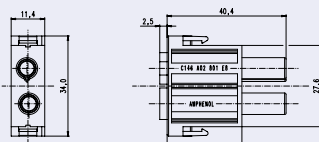



## Frames



## Range of housings



Description	Part Number	Drawing	Figure
<b>1 contact module, 1000 V, Details see page 166</b>			
Pin module 1 contact	C146 A01 001 E8		
Socket module 1 contact	C146 B01 004 E8		
<b>2 contacts module, 1000 V, Details see page 168</b>			
Pin module 2 contacts	C146 A02 001 E8		
Socket module 2 contacts	C146 B02 001 E8		
<b>2 contacts module, 1000 V, Details see page 170</b>			
Pin module 2 contacts	C146 A02 801 E8		
Socket module 2 contacts	C146 B02 801 E8		



Description	Part number	Drawing	Figure
<b>5 contacts module für stanced contacts, 1000 V, Details see page 178</b>			
Pin module 5 contacts	C146 D04 001 E8 (4-Pol) C146 D05 001 E8 (4 + ⊕) C146 D05 801 E8 (5-Pol)		
Socket module 5 contacts	C146 C04 001 E8 (4-Pol) C146 C05 001 E8 (4 + ⊕) C146 C05 801 E8 (5-Pol)		
<b>5 contacts module for turned contacts, 400 V, Details see page 180</b>			
Pin module 5 contacts	C146 A05 001 E8		
Socket module 5 contacts	C146 B05 001 E8		
<b>10 contacts module for stanced contacts, 400 V, Details see page 182</b>			
Pin module 10 contacts	C146 D10 001 E8		
Socket module 10 contacts	C146 C10 001 G8		

Description	Part Number	Drawing	Figure
<b>RJ45 module, Details see page 191</b>			
Pin module RJ45	C146 E12 001 E8		
Socket module RJ45	C146 F12 001 G8		
<b>Pneumatic module, 1 or 2 connections, Details see page 193</b>			
Pin module	C146 G01 014 G8 (2.5 mm) C146 G01 024 G8 (4.0 mm) C146 G02 014 G8 (2.5 mm) C146 G02 024 G8 (4.0 mm)		
Socket module	C146 H01 034 G8 (2.5 mm) C146 H01 044 G8 (4.0 mm) C146 H02 034 G8 (2.5 mm) C146 H02 044 G8 (4.0 mm)		
<b>Shielded Quintax - module, details see on page 195</b>			
Pin module	C146 A08 102 E8 C146 A05 100 G8		
Socket Module	C146 B08 102 E8 C146 B05 100 G8		

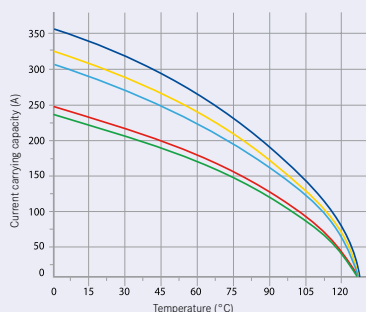
Description	Part Number	Drawing	Figure
<b>Frame for 2 modules   Size E6   Housings from page 226</b>			
Frame for 2 pin modules	C146 P06 001 G8 C146 P06 002 G8 (2 x PE)		
Frame for 2 socket modules	C146 S06 001 G8 C146 S06 002 G8 (2 x PE)		
<b>Frame for 3 modules   Size E10   Housings from page 228</b>			
Frame for 3 pin modules	C146 P10 001 G8 C146 P10 002 G8 (2 x PE)		
Frame for 3 socket modules	C146 S10 001 G8 C146 S10 002 G8 (2 x PE)		
<b>Frame for 5 modules   Size E16   Housings from page 235</b>			
Frame for 5 pin modules	C146 P16 001 G8 C146 P16 002 G8 (2 x PE)		
Frame for 5 socket modules	C146 S16 001 G8 C146 S16 002 G8 (2 x PE)		

## heavy|mate® M Characteristics 1 contact module

General Characteristics	Standard	Value
Number of contacts		1
Termination technique		crimp
Wire gauge		25 - 95 mm <sup>2</sup> (AWG 4 - 000)
Max. wire diameter		20 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		220 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		10 g
Weight socket module		20 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

### Derating Curves

95 mm<sup>2</sup>



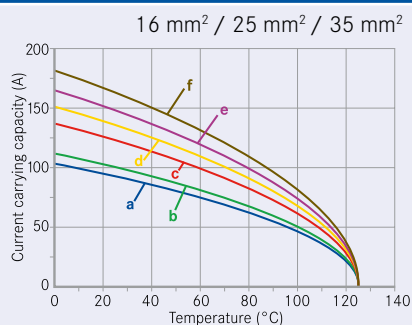
Curve	Frame
a	1 Module
b	1 Module
c	3 Modules
d	1 Module
e	3 Modules

### General requirements

- Due to reduced cross sections at PE contacts of frames, the PE contact has to be additionally protected against short circuits by using a protection circuit offering a sufficiently short breaking time (<0.25s).
- Parts to be used as connectors, not as plug devices (connector with breaking capacity). Do not mate under current or voltage!

General Characteristics	Standard	Value
Number of contacts		2
Termination technique		crimp
Wire gauge		16 - 35 mm <sup>2</sup> (AWG 6 - 2)
Max. wire diameter		12.8 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		150 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		19 g
Weight socket module		20 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

### Derating Curves

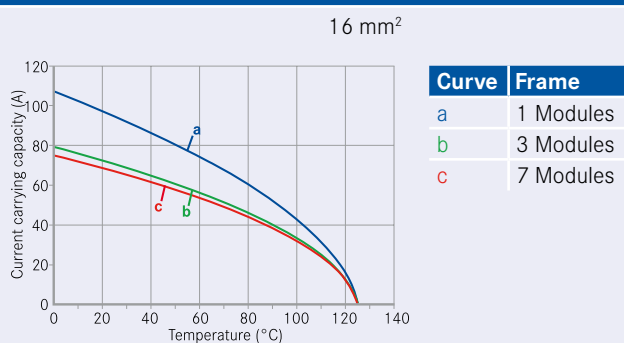


### General requirements

- Due to reduced cross sections at PE contacts of frames, the PE contact has to be additionally protected against short circuits by using a protection circuit offering a sufficiently short breaking time (<0.25s).
- Parts to be used as connectors, not as plug devices (connector with breaking capacity). Do not mate under current or voltage!

General Characteristics	Standard	Value
Number of contacts		2
Termination technique		crimp
Wire gauge		16 (AWG 6)
Max. wire diameter		8.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current $T_u = 40\text{ °C}$		65 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	$\leq 5\text{ m}\Omega$
Insulation resistance	IEC 60512-3-1	$\geq 10^{10}\ \Omega$
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		8 g
Weight socket module		8 g
Mechanical operation	IEC 60512-9-1	$\geq 500$ mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

## Derating curves

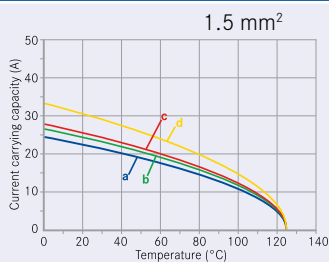


## General requirements

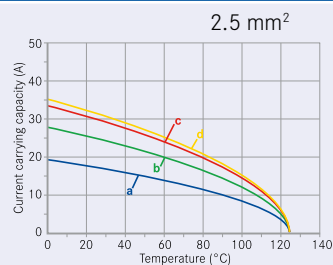
- Due to reduced cross sections at PE contacts of frames, the PE contact has to be additionally protected against short circuits by using a protection circuit offering a sufficiently short breaking time (<0.25s).
- Parts to be used as connectors, not as plug devices (connector with breaking capacity). Do not mate under current or voltage!

General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp
Wire gauge		1.5 - 10 mm <sup>2</sup> (AWG 16 - 8)
Max. wire diameter		7.2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		50 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module		unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		8 g
Weight socket module		8 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

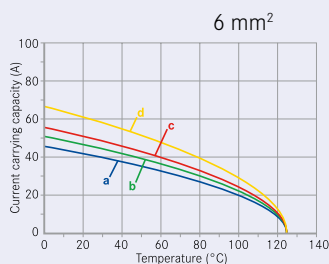
**Derating Curves**



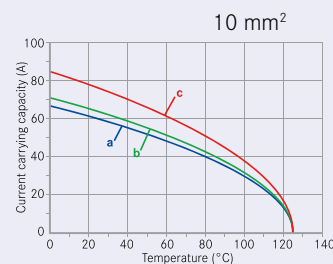
Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules



Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules



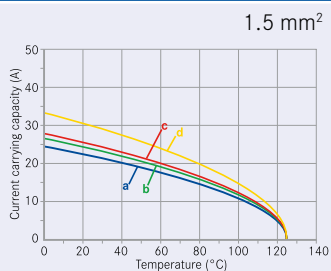
Curve	Frame
a	5-7 Modules
b	3 Modules
c	2 Modules
d	1 Modules



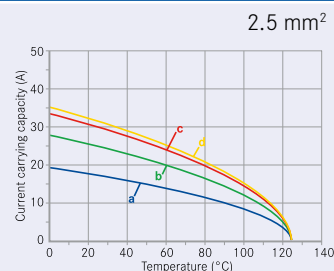
Curve	Frame
a	3-7 Modules
b	2 Modules
c	1 Modules

General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp
Wire gauge		1.5 - 10 mm <sup>2</sup> (AWG 16 - 8)
Max. wire diameter		7.2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	630 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current $T_u = 40\text{ °C}$		40 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		7 g
Weight socket module		9 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)

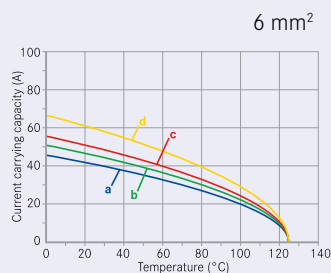
## Derating Curves



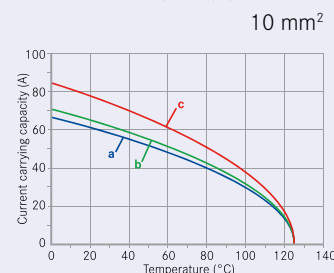
Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules



Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules



Curve	Frame
a	5-7 Modules
b	3 Modules
c	2 Modules
d	1 Modules



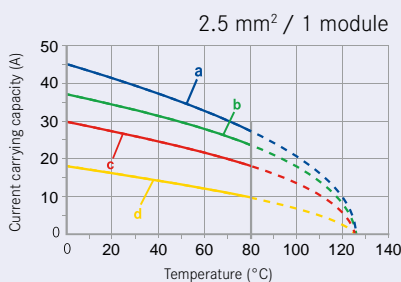
Curve	Frame
a	3-7 Modules
b	2 Modules
c	1 Modules



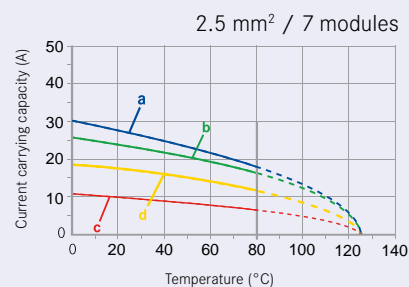
# heavy|mate<sup>®</sup> M Characteristics 4 contacts module for turned contacts

General Characteristics	Standard	Value
Number of contacts		4
Termination technique		crimp
Wire gauge		0.5 - 4 mm <sup>2</sup> (AWG 26 - 12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	630 V
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		25 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	I
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		9 g
Weight socket module		8 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

## Derating curves



Curve	Wire gauge
a	4.0 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>
c	1.5 mm <sup>2</sup>
d	0.5 mm <sup>2</sup>

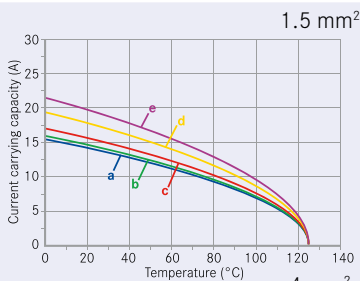


Curve	Wire gauge
a	4.0 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>
c	1.5 mm <sup>2</sup>
d	0.5 mm <sup>2</sup>

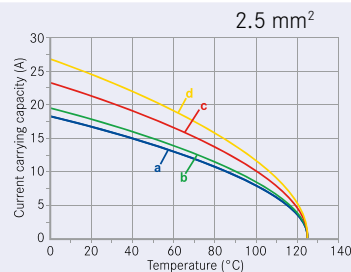
# heavy|mate<sup>®</sup> M Characteristics 4 contacts, 4 + ⊕ , 5 contacts module

General Characteristics	Standard	Value
Number of contacts		4 / 4 + ⊕ / 5
Termination technique		crimp
Wire gauge		0.5 - 4 mm <sup>2</sup> (AWG 20 - 12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T <sub>u</sub> = 40 °C		16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module		unmated IP20, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		8 g
Weight socket module		7 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Pin contacts		CuZn (brass)
Socket contact		CuSn (bronze)
Contact plating		Ag (silver) / Au (gold)

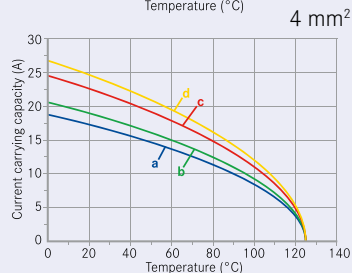
## Derating Curves



Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	2 Modules



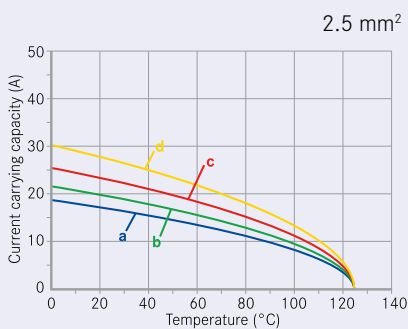
Curve	Frame
a	7 Modules
b	3-5 Modules
c	2 Modules
d	1 Modules



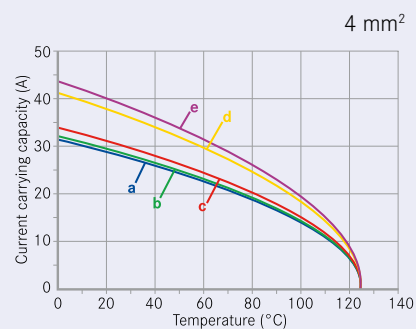
Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	1+2 Modules

# heavy|mate<sup>®</sup> M Characteristics 5 contacts module for turned contacts

General Characteristics	Standard	Value
Number of contacts		5
Termination technique		crimp
Wire gauge		0.5 - 4 mm <sup>2</sup> (AWG 20 - 12)
Max. wire diameter		4.8 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		20 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP00, mated IP20
Weight pin module		5 g
Weight socket module		9 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Ag (silver)
Derating curves		



Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	1+2 Modules

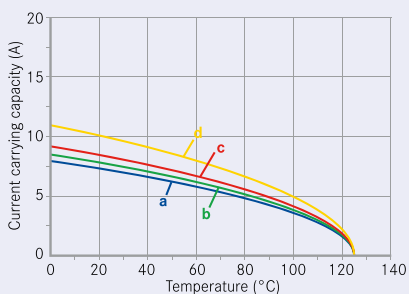


Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	2 Modules
e	1 Modules

# heavy|mate<sup>®</sup> M Characteristics 10 contacts module

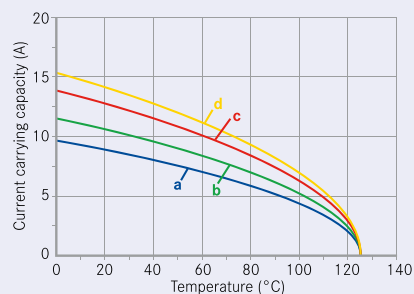
General Characteristics	Standard	Value
Number of contacts		10
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module		Unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	Unmated IP20, mated IP20
Weight pin module		7 g
Weight socket module		8 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Pin contacts		CuZn (brass)
Socket contacts		CuSn (bronze)
Contact plating		Ag (silver)
Derating curves		

0.5 mm<sup>2</sup>



Curve	Frame
a	5-7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

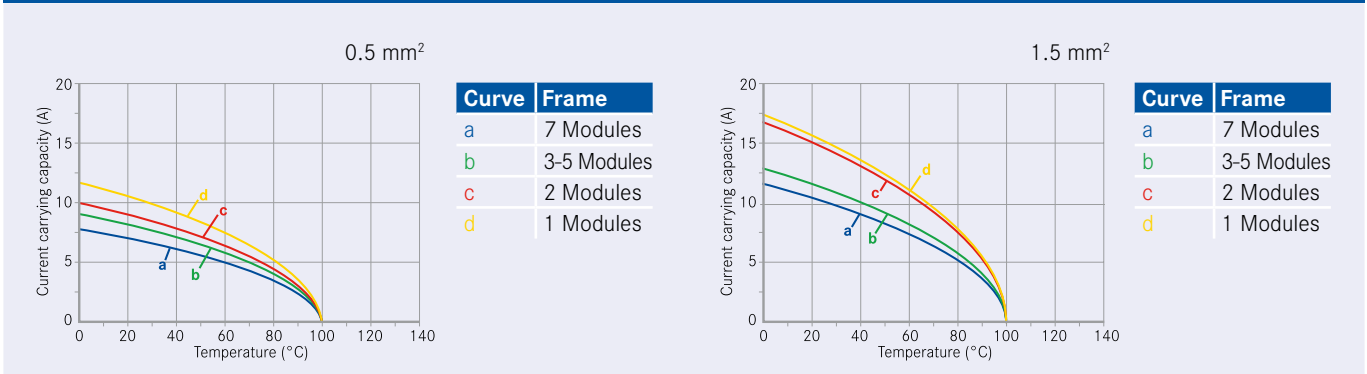
1.5 mm<sup>2</sup>



Curve	Frame
a	5-7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

General Characteristics	Standard	Value
Number of contacts		10
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5m Ω
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		7 g
Weight socket module		8 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Insert / module		PA
Colour insert / module		black
Pin contacts		CuZn (brass)
Contact plating		Ag (silver)

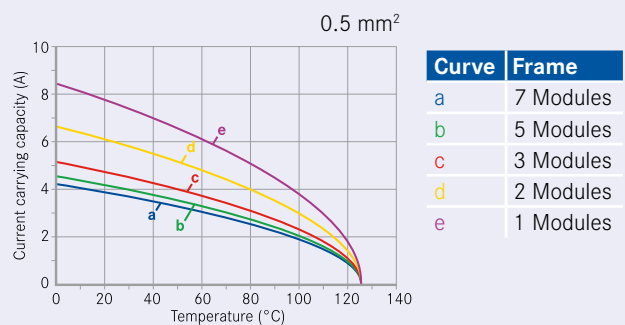
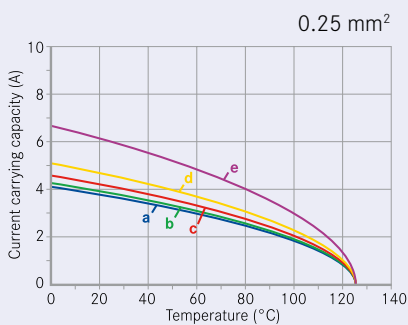
**Derating curves**



# heavy|mate<sup>®</sup> M Characteristics 20 contacts module

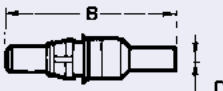
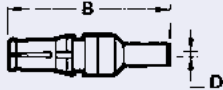
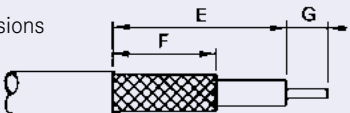
General Characteristics	Standard	Value
Number of contacts		20
Termination technique		crimp
Wire gauge		0.09 - 0.5 mm <sup>2</sup> (AWG 28 - 20)
Max. wire diameter		2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	63 V (UL/CSA 50 V)
Rated impulse withstand voltage	IEC 60664-1	4 kV
Rated Current T <sub>u</sub> = 40 °C		4 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20
Weight pin module		5 g
Weight socket module		7 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Au (gold)

## Derating curves



General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp, solder
Max. wire diameter		7.2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V
Rated impulse withstand voltage		8 kV
Rated Current T <sub>u</sub> = 40 °C		0.5 A
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	II
Contact resistance	IEC 60512-2-1	≤ 2.7 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Impedance		50 Ω
Working frequency		0 - 2 GHz
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket module	IEC 60529	unmated IP00, mated IP20
Weight pin module		7 g
Weight socket module		9 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		redbrown
Contacts		CuZn (brass), CuSn (bronze)
Contact plating		Au (gold)

**Contact dimensions ( Figure without crimp ferrule)**

	Part Number	B	D	E	F	G
Pin contact 	17 DM 537 401	18 <sup>1)</sup>	1.6	4.6	4.3	1.9
Socket contact 	17 DM 537 421	18 <sup>1)</sup>	1.6	5.1	4.4	1.9
	17 DM 537 405	23.6 <sup>2)</sup>	3.2	9.5	7.9	2
Stripping dimensions 	17 DM 537 425	23.6 <sup>2)</sup>	3.2	9.5	7.9	2

**Brief information**

- For integration of standard RJ45 components
- Worldwide real-time access on machines and facilities
- Easy assembly through the use of standard RJ45 components
- One connector for power, signal and data transmission
- 4 additional power crimp contacts
- Time- and money saving through the use of similar active- and passive components
- Unitary transmission protocol in the office- and production environment.
- Meets CAT 5 for Ethernet acc. ISO/IEC 11801, suitable for 10/100/1000 Mbps transfer rate

General Characteristics	Standard	Value module	Value RJ45
Number of contacts		4	8
Termination technique		crimp, solder	mate
Wire gauge		0.14 - 2.5mm <sup>2</sup>	-
Max. wire diameter		3.7 mm	-
Flammability	UL 94	V-0	V - 0
Electrical Characteristics			
Rated voltage	IEC 60664-1	250 V AC	125 V AC
Rated impulse withstand voltage	IEC 60664-1	6 kV	1.8 kV
Current carrying capacity	IEC 60512-5-2	13 A <sup>1)</sup>	1.5 A
Installation (overvoltage) category	IEC 60664-1	III	III
Material group	IEC 60664-1	II	II
Contact resistance	IEC 60512-2-1	≤ 5 mΩ	≤ 20 mΩ
Insulation resistance	IEC 60512-3-1	10 <sup>10</sup> Ω	5 <sup>9</sup> Ω
Pollution degree	IEC 60664-1	3	3
Climatical Characteristics			
Climatic category	IEC 60068-1	40 / 125 / 21	20 / 8 / 21
Upper temperature	IEC 60512-11-9	+ 125 °C	+ 80 °C
Lower temperature	IEC 60512-11-10	-40 °C	- 20 °C
Mechanical Characteristics			
IP-degree of protection pin module	IEC 60529	unmated IP00, mated IP20	
IP-degree of protection socket module	IEC 60529	unmated IP20, mated IP20	
Weight pin module		12 g	
Weight socket module		26 g	
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles	
Materials			
Module		PA	
Colour module		black	
Contacts		CuZn (brass)	
Contact plating		Ag (silver) / Au (gold)	Au (gold)



**Brief information**

- Power, signal and pneumatic within a single connector
- Very stable brass contacts
- Pneumatic socket contacts with barrier, closes when the connector is open
- Available with single or double connections
- Connection for 2.5 mm or 4 mm PTFE (Teflon)-tubes
- Tubes can be disassembled from the terminations

General Characteristics	Standard	Value module	Value RJ45
Number of contacts		1	2
Termination technique		tube termination	
Wire gauge		2.5mm <sup>2</sup> / 4 mm <sup>2</sup>	2.5mm <sup>2</sup> / 4 mm <sup>2</sup>
Max. wire diameter		9.1 mm	
Flammability	UL 94	V-0	
Operating pressure		8 bar with PTFE tube	
Operating path		4.0 mm	
Locking		locking on one side	
Pneumatic tube		only use PTFE tubes <sup>1)</sup>	
Climatical Characteristics			
Climatic category	IEC 60068-1	20 / 100 / 21	
Upper temperature	IEC 60512-11-9	+ 100 °C	
Lower temperature	IEC 60512-11-10	- 20 °C	
Mechanical Characteristics			
Weight pin module		10 g	15 g
Weight socket module		17 g	26 g
Mechanical operation		≥ 5000 mating cycles	
Materials			
Module		PA	
Colour module		black	
Contacts		Brass MS 58	

**Kurzinformationen**

CAT 5e for Ethernet acc. ISO/IEC 11801, for 10/100/1000 MBit/s data rates.

General Characteristics	Standard	Value
Number of contacts		4 + shielding
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	50 V
Rated impulse withstand voltage	IEC 60664-1	0.8 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	IIIb
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance		≤ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin module		unmated IP00, mated IP20
IP-degree of protection socket module		unmated IP20, mated IP20
Weight pin module		23 g
Weight socket module		25 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Module		PA
Colour module		black
Contacts		CuZn (brass)
Contact plating		Au (gold)
Contact insert		PC
Colour contact insert		grey
Shielding		Zink alloy
Cable clamp		Zink alloy

Contact size	Part Number	Figure
Removal tool for modules	FG 1000 146	
Blank modules	C146 A00 001 E8 (pin) C146 B00 001 E8 (socket)	
Assembly angle	C146 10Z001 001 8	
Strain relief	C146 10Z002 001 8	

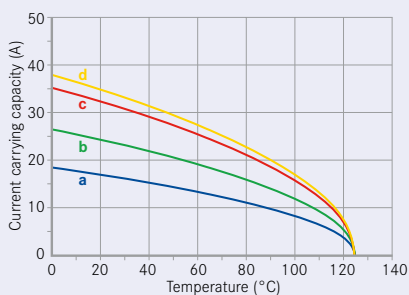


## heavy | mate<sup>®</sup> Q

- Compact design
- Even in a metal housing
- Rated voltage up to 690 V
- Numbers of contacts: 5, 4/2, 7, 8, 12, 17
- HL3 acc. EN 45545: R22/23

General Characteristics	Standard	Value
Number of contacts		5 + ⊕
Termination technique		crimp
Wire gauge		0.5 – 4.0 mm <sup>2</sup> (AWG 20 -12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (conductor – conductor) 230 V (conductor – earth) (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40/125/21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20
Weight pin insert		16 g
Weight socket insert		18 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver) /Au (gold)

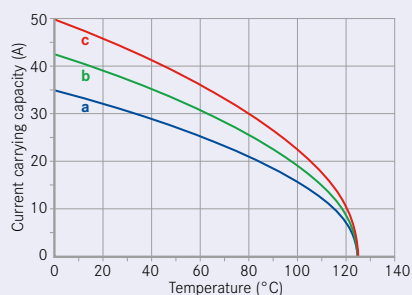
**Derating curves**



Curve	Wire gauge
a	1.0 mm <sup>2</sup>
b	1.5 mm <sup>2</sup>
c	2.5 mm <sup>2</sup>
d	4.0 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		4 + 2 + ⊕
Termination technique		crimp
Wire gauge		Power: 1.5 - 6 mm <sup>2</sup> (AWG 16 - 10) Signal: 0.14 - 2.5 mm <sup>2</sup> (AWG 26 - 14)
Max. wire diameter		Power: 5.2 mm, Signal: 3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	Power: 400 V (conductor - earth) 690 V (conductor - conductor) Signal: 250 V (UL/ CSA 600, 250 V)
Rated impulse withstand voltage	IEC 60664-1	Power: 6 kV / 4 kV, Signal: 4 kV
Rated Current T <sub>u</sub> = 40 °C		Power: 40 A, Signal: 10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40/125/21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP20, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20
Weight pin insert		22 g
Weight socket insert		18 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver), Au (gold)

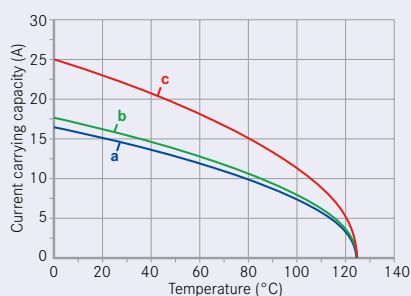
### Derating curves



Curve	Wire gauge
a	2.5 mm <sup>2</sup>
b	4 mm <sup>2</sup>
c	6 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		7 + ⊕
Termination technique		crimp
Wire gauge		0.14 – 2.5 mm <sup>2</sup> (AWG 26 – 14)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40/125/21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP 00, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP 20, mated IP20
Weight pin insert		16 g
Weight socket insert		16 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

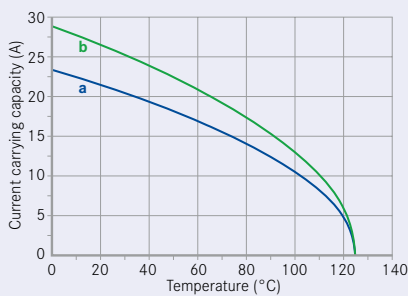
**Derating curves**



Curve	Wire gauge
a	0.75 mm <sup>2</sup>
b	1.5 mm <sup>2</sup>
c	2.5 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		8 + ⊕
Termination technique		crimp
Wire gauge		0.5 - 4.0 mm <sup>2</sup> (AWG 20 - 12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	500 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		16 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40/125/21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20
Weight pin insert		18 g
Weight socket insert		17 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		Cu-alloy
Contact plating		Ag (silver) / Au (gold)

**Derating curves**

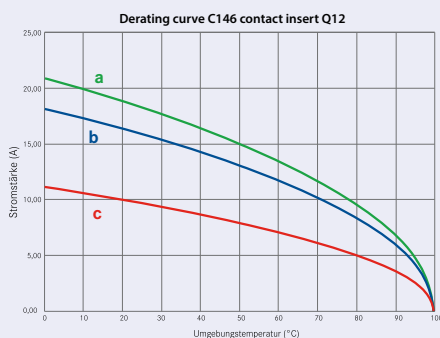


Curve	Wire gauge
a	1.5 mm <sup>2</sup>
b	2.5 mm <sup>2</sup>



General Characteristics	Standard	Value
Number of contacts		12 + ⊕
Termination technique		crimp
Wire gauge		0.14 – 2.5 mm <sup>2</sup> (AWG 26 – 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40/125/21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20
Weight pin insert		12 g
Weight socket insert		15 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

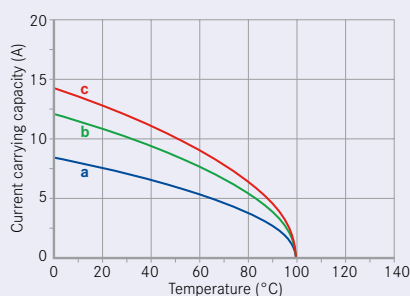
**Derating curves**



Curve	Wire gauge
a	2.5 mm <sup>2</sup>
b	1.5 mm <sup>2</sup>
c	0.75 mm <sup>2</sup>

General Characteristics	Standard	Value
Number of contacts		17 + ⊕
Termination technique		crimp
Wire gauge		0.14 – 2.5 mm <sup>2</sup> (AWG 26 – 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (UL/CSA 250 V)
Rated impulse withstand voltage	IEC 60664-1	4 kV
Rated Current T <sub>u</sub> = 40 °C		10 A
Current carrying capacity	IEC 60512-5-2	see derating curves
Installation (overvoltage) category	IEC 60664-1	III
Material group	IEC 60664-1	III b
Contact resistance	IEC 60512-2-1	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10 <sup>10</sup> Ω
Pollution degree	IEC 60664-1	3
Climatical Characteristics		
Climatic category	IEC 60068-1	40/125/21
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C
Mechanical Characteristics		
IP-degree of protection pin insert	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert	IEC 60529	unmated IP20, mated IP20
Weight pin insert		16 g
Weight socket insert		14 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Material		
Insert		PC
Colour insert		grey
Contacts		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

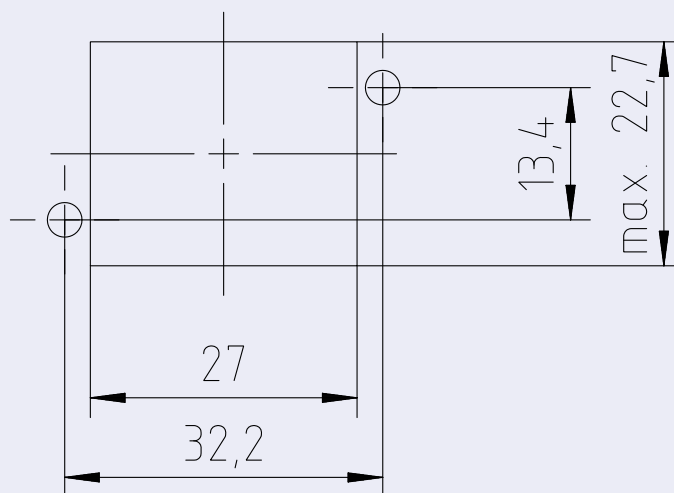
**Derating curves**



Curve	Wire gauge
a	0.5 mm <sup>2</sup>
b	1 mm <sup>2</sup>
c	1.5 mm <sup>2</sup>

General Characteristics	Standard	Value
Protection class housing		IP65
Locking system	DIN EN 175 301-801 (DIN 43 652)	locking levers
Salt mist resistance	IEC 60512-11-6:2002	>500h
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 125 / 21
Temperature range	IEC 60068-1	- 40 °C / + 125 °C
Upper temperature	IEC 60512-11-9	+ 125 °C
Lower temperature	IEC 60512-11-10	- 40 °C
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials thermoplastic housing		
Housings		PA
Rubber gasket		NBR
Locking lever		PA
Colour		black
Materials metal housing		
Housings		Cu-alloy
Rubber gasket		NBR
Locking lever		Steel / zinc coated
Colour		grey

**Panel cut out**





# heavy | mate<sup>®</sup> Housings

## Available Types

- **Standard-Housings IP65** see page 216
- **Housings in IP67** see page 254
- **Housings in IP68** see page 262
- **EMC-Housings** see page 270
- **Corrosion resistant Housings** see page 278



Range of housings

Size A3/4



Size A10



Size A16



Size A32



Size E6



Size E10



Size E16

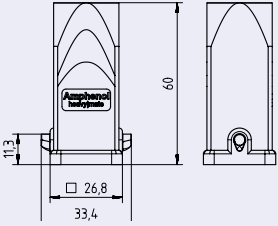

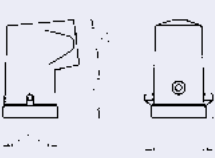

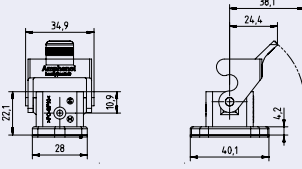

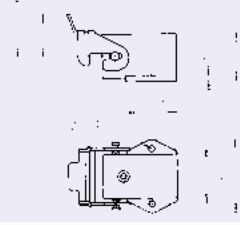

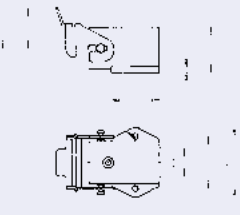

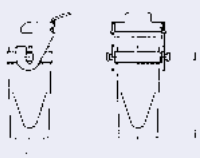





Size E24



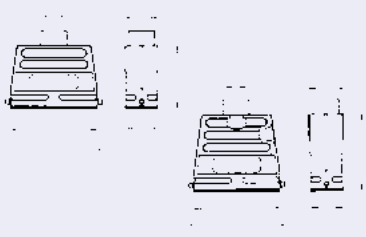
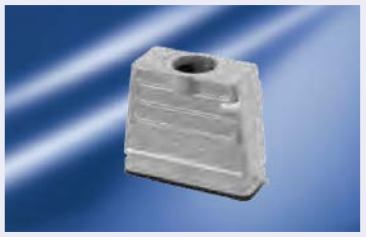

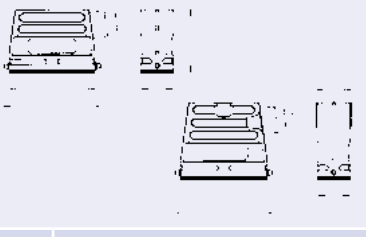

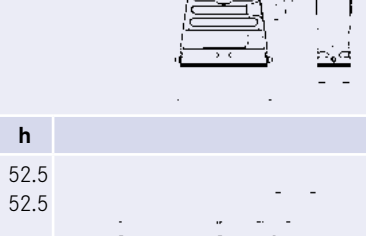

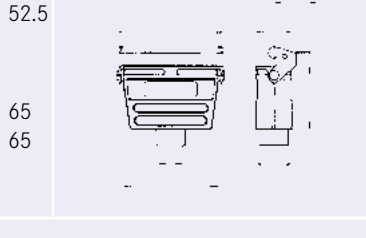

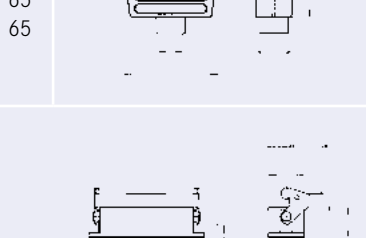

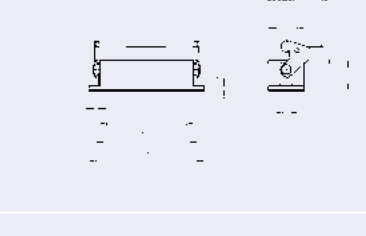

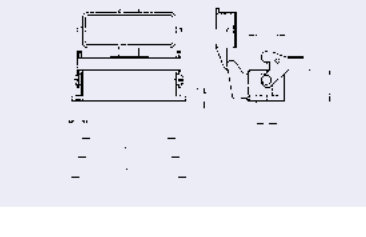

Size E48



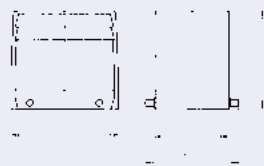

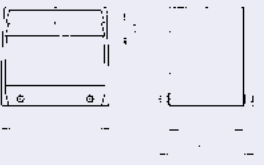

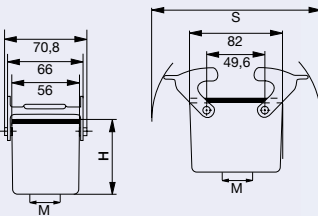

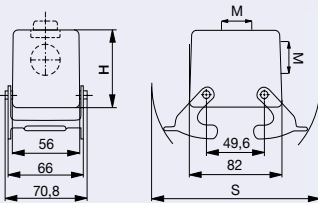

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	20	C146 10R003 600 4 C146 10R003 601 4 (black design)		
Hood side entry	20	C146 10R003 500 4		
<b>Housings</b>				
Housing bulkhead mounting with gasket	-	C146 10F003 000 4 C146 10F003 001 4 (black design)		
Housing bulkhead end mounting with gasket	-	C146 10F003 004 4		
Housing single side entry with gland bushing	20	C146 10N003 500 4		
Hood cable to cable coupling	20	C146 10R003 804 4		
<b>Protective cover (only in connection with Pin insert)</b>				
Cover for housings	-	C146 10Z003 100 4		

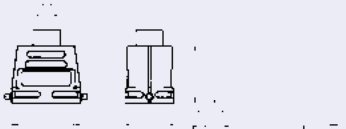

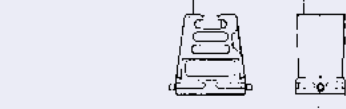

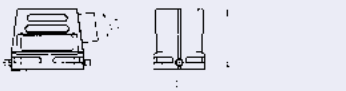




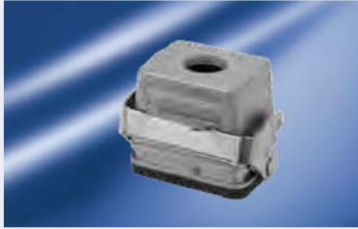


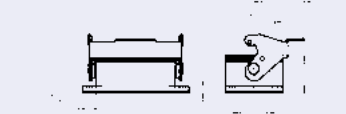

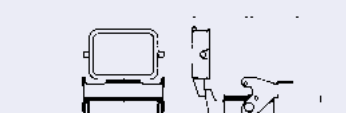

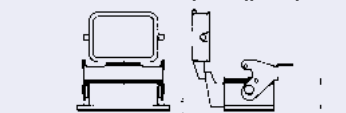

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	20	C146 21R010 650 4		
	25	C146 21R010 600 4		
Hood top entry high profile	20	C146 21R015 650 2		
	25	C146 21R015 600 2		
Hood side entry low profile	20	C146 21R010 550 4		
	25	C146 21R010 500 4		
Hood side entry high profile	20	C146 21R015 550 2		
	25	C146 21R015 500 2		
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	20	C146 21R010 854 4		
	25	C146 21R010 804 4		
Hood coupling application high profile	20	C146 21R015 854 2		
	25	C146 21R015 804 2		
Housing bulkhead mounting with gasket	-	C146 10F015 000 2		
Housing bulkhead mounting with spring cover with gasket	-	C146 10F015 003 2		

# heavy|mate® Housings standard Size A16

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	20	C146 21R016 650 4		
	25	C146 21R016 600 4		
Hood top entry high profile	20	C146 21R025 650 2		
	25	C146 21R025 600 2		
Hood side entry low profile	20	C146 21R016 550 4		
	25	C146 21R016 500 4		
Hood side entry high profile	20	C146 21R025 550 2		
	25	C146 21R025 500 2		
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	20	C146 21R016 854 4		
	25	C146 21R016 804 4		
Hood coupling application high profile	20	C146 21R025 854 2		
	25	C146 21R025 804 2		
Housing bulkhead mounting with gasket	-	C146 10F025 000 2		
Housing bulkhead mounting with spring cover with gasket	-	C146 10F025 003 2		


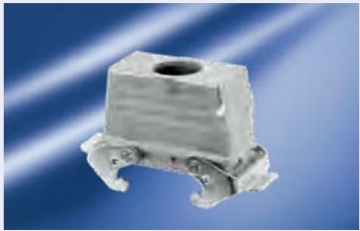
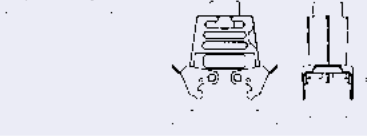

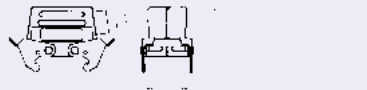


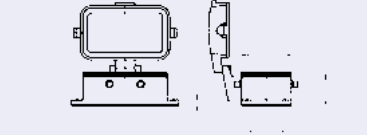



Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	25 32 40	C146 21R032 650 4 C146 21R032 600 4 C146 21R032 601 4		
Hood side entry	25 32 40	C146 21R032 550 4 C146 21R032 500 4 C146 21R032 501 4		
Hood coupling application	25 32 40	C146 21R032 852 4 C146 21R032 802 4 C146 21R032 803 4		
Hood side entry	25 32	C146 21R032 552 4 C146 21R032 502 4		

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	16 20	C146 21R006 656 1 C146 21R006 606 1		
Hood top entry high profile	25 32	C146 21R006 656 8 C146 21R006 606 8		
Hood side entry low profile	20 25	C146 21R006 506 1 C146 21R006 507 1		
Hood side entry high profile	25 32	C146 21R006 556 8 C146 21R006 506 8		
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	20	C146 21R006 804 1		
Hood coupling application high profile	25	C146 21R006 854 8		
Housing bulkhead mounting with gasket	-	C146 10F006 000 1		
Housing bulkhead mounting with thermoplastic spring cover with gasket	-	C146 10F006 003 1		
Housing bulkhead mounting with metal spring cover with gasket	-	C146 30F006 003 1		



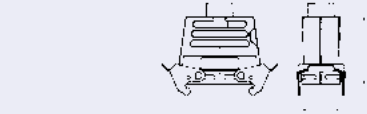

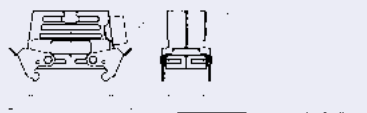



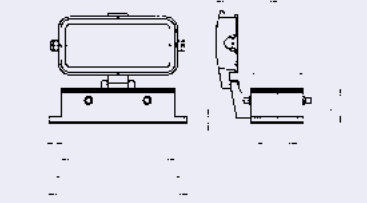

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	20	C146 21R010 650 1		
	25	C146 21R010 600 1		
Hood top entry high profile	25	C146 21R010 650 8		
	32	C146 21R010 600 8		
Hood side entry low profile	20	C146 21R010 550 1		
	25	C146 21R010 500 1		
Hood side entry high profile	25	C146 21R010 550 8		
	32	C146 21R010 500 8		
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	20	C146 21R010 852 1		51
	25	C146 21R010 802 1		51
Hood coupling application high profile	25	C146 21R010 852 8		70
	32	C146 21R010 802 8		70
Housing bulkhead mounting with gasket	-	C146 10F010 000 1		
Right-angled housing with gasket	-	C146 10F010 090 1		

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	20 25 32	C146 21R010 656 1 C146 21R010 606 1 C146 21R010 607 1		
Hood top entry high profile	25 32 40	C146 21R010 656 8 C146 21R010 606 8 C146 21R010 607 8		
Hood side entry low profile	20 25	C146 21R010 556 1 C146 21R010 506 1		
Hood side entry high profile	25 32	C146 21R010 556 8 C146 21R010 506 8		
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	20 25 32	C146 21R010 854 1 C146 21R010 804 1 C146 21R010 805 1		
Hood coupling application high profile	25 32 40	C146 21R010 854 8 C146 21R010 804 8 C146 21R010 805 8		
Housing bulkhead mounting with gasket	-	C146 10F010 001 1		
Housing bulkhead mounting with thermoplastic spring cover with gasket	-	C146 10F010 003 1		
Housing bulkhead mounting with metal spring cover with gasket	-	C146 30F010 003 1		

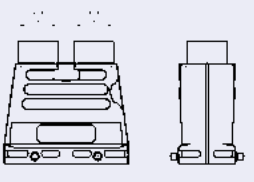

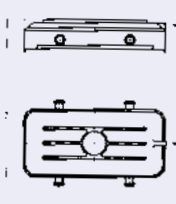

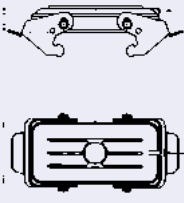

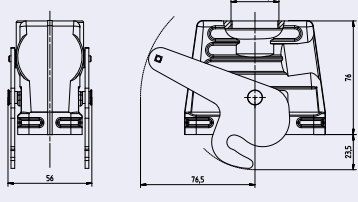

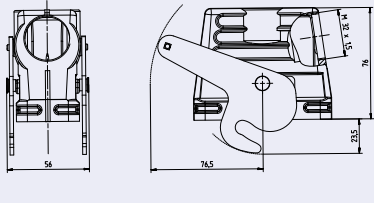

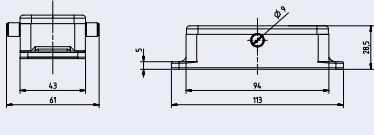

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	20	C146 21R010 652 1		
Hood top entry high profile	25 32	C146 21R010 652 8 C146 21R010 602 8		
Hood side entry low profile	20	C146 21R010 552 1		
Hood side entry high profile	25 32	C146 21R010 552 8 C146 21R010 502 8		
<b>Housings</b>				
Housing with spring cover with gasket	-	C146 10F010 002 1		








Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood 2 top entry high profile	25	C146 10R010 902 8		
<b>Protective cover (only in connection with Pin insert)</b>				
Cover for housings	-	C146 10Z010 100 1		
Cover for hoods	-	C146 10Z010 200 1		
<b>Further special housings on request.</b>				

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	25	C146 21R016 656 1		
	32	C146 21R016 606 1		
Hood top entry high profile	32	C146 21R016 606 8		
	40	C146 21R016 607 8		
Hood side entry low profile	25	C146 21R016 556 1		
	32	C146 21R016 506 1		
Hood side entry high profile	32	C146 21R016 506 8		
	40	C146 21R016 507 8		
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	25	C146 21R016 854 1		
	32	C146 21R016 804 1		
Hood coupling application high profile	32	C146 21R016 804 8		
	40	C146 21R016 805 8		
Housing bulkhead mounting with gasket	-	C146 10F016 001 1		
Housing bulkhead mounting with thermoplastic spring cover with gasket	-	C146 10F016 003 1		
Housing bulkhead mounting with metal spring cover with gasket	-	C146 30F016 003 1		

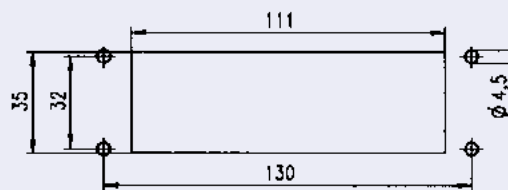
Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	25	C146 21R016 652 1		
	32	C146 21R016 602 1		
Hood top entry high profile	32	C146 21R016 602 8		
	40	C146 21R016 603 8		
Hood side entry low profile	25	C146 21R016 552 1		
	32	C146 21R016 502 1		
Hood side entry high profile	32	C146 21R016 502 8		
	40	C146 21R016 503 8		
<b>Housings</b>				
Housing bulkhead mounting with spring cover with gasket	-	C146 10F016 002 1		

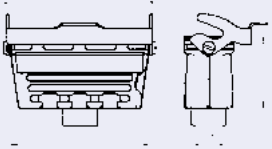

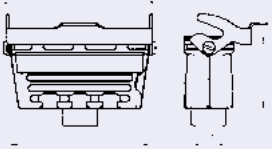

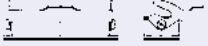

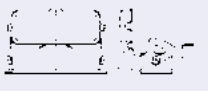

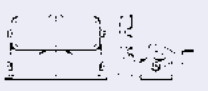






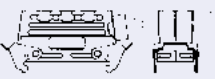


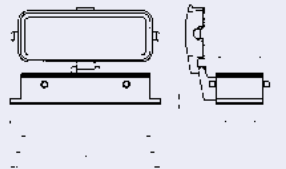

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood 2 top entry high profile	25 32	C146 10R016 910 8 C146 10R016 902 8		
<b>Protective cover (only in connection with Pin insert)</b>				
Cover for housings	-	C146 10Z016 100 1		
Cover for hoods	-	C146 10Z016 200 1		
<b>Central lever / Hoods</b>				
Hood top entry	32	C146 36R016 602 8		
Hood side entry high profile	32	C146 36R016 502 8		
<b>Central lever / Housings</b>				
Housing with central lever bulkhead mounting	-	C146 36F016 000 1		
<b>Further special housings on request.</b>				

Description	M	Part Number	Drawing	Figure
<b>Housings</b>			<b>h</b>	
Hood	25	C146 21R024 852 1	62	
coupling application low profile	32	C146 21R024 802 1	62	
Hood	32	C146 21R024 802 8	76	
coupling application high profile	40	C146 21R024 803 8	76	
Housing -bulkhead mounting with gasket - foam rubber sealing (2 mm)	- -	C146 10F024 000 1 C146 10F024 100 1		
Housing single side entry low profile	25	C146 10N024 500 1	64	 1 closed if single entry
Housing single side entry high profile	32	C146 10N024 500 2	80	
Housing double side entry low profile	25	C146 10N024 600 1	64	 
Housing double side entry high profile	25 32	C146 10N024 601 2 C146 10N024 600 2	80 80	

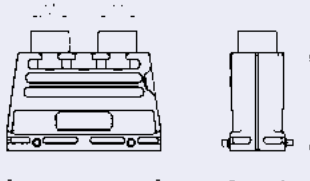

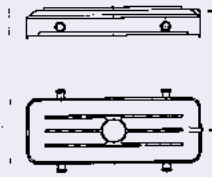

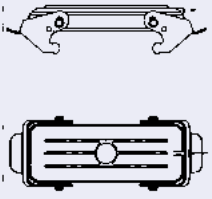

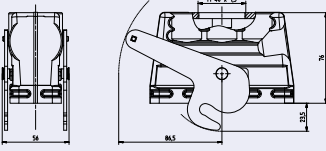

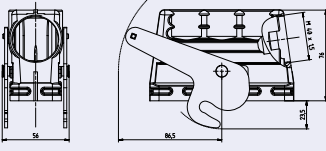

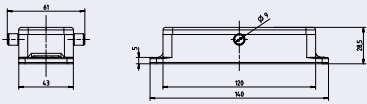

**Panel cut out for bulkhead mounting**




Description	M	Part Number	Drawing	Figure
<b>Housings</b>			<b>h</b>	
Hood coupling application low profile	25	C146 21R024 854 1	62	 
	32	C146 21R024 804 1	62	
Hood coupling application high profile	32	C146 21R024 804 8	76	 
	40	C146 21R024 805 8	76	
Housing bulkhead mounting with gasket	-	C146 10F024 001 1		
Housing bulkhead mounting with thermoplastic spring cover with gasket	-	C146 10F024 003 1		
Housing bulkhead mounting with metal spring cover with gasket	-	C146 30F024 003 1		

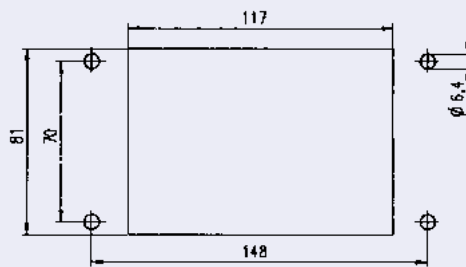
Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	25	C146 21R024 652 1		
	32	C146 21R024 602 1		
Hood top entry high profile	32	C146 21R024 602 8		
	40	C146 21R024 603 8		
Hood side entry low profile	25	C146 21R024 552 1		
	32	C146 21R024 502 1		
Hood side entry high profile	32	C146 21R024 502 8		
	40	C146 21R024 503 8		
<b>Housings</b>				
Housing bulkhead mounting with spring cover with gasket	-	C146 10F024 002 1		

**heavy|mate® Special housings** Size E24 for 2 lever locking system and central lever locking

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood 2 top entry high profile	32 40	C146 10R024 903 8 C146 10R024 908 8		
<b>Protective cover (only in connection with Pin insert)</b>				
Cover for housings	-	C146 10Z024 100 1		
Cover for hoods	-	C146 10Z024 200 1		
<b>Central lever / Hoods</b>				
Hood top entry	40	C146 36R024 601 8		
Hood side entry high profile	40	C146 36R024 501 8		
<b>Central lever / Housings</b>				
Hood with central lever and gasket	-	C146 36F024 000 1		

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Housing bulkhead mounting with gasket	-	C146 10F048 001 1		
Housing bulkhead mounting with spring cover with gasket	-	C146 10F048 003 1		
Housing single side entry	40	C146 10N048 803 1		
Housing with spring cover	40	C146 10N048 807 1		

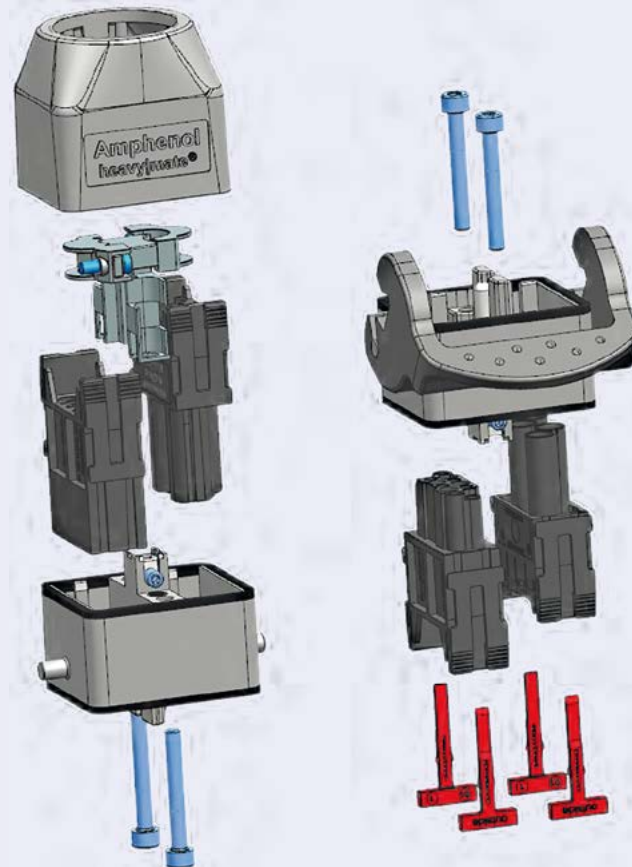
**Panel cut out for bulkhead mounting**



## heavy|mate® Twin Housings Series F | Characteristics

General Characteristics	Standard	Value
Entry		M32 top entry
Protection class housing		IP65
Number of modules		2
Number of contacts		up to 2 x 17 + ⊕
Wire Gauge		1.0 – 6 mm <sup>2</sup> (AWG 18 - 10)
Tightening torque		Mounting screw Housing: 3.2 Nm Hood and carrier hood: 5 Nm Clamping screw: 1.2 Nm
Locking system		locking levers
Climatical Characteristics		
Climatic category		40 / 100 / 21
Upper temperature		+ 100 °C
Lower temperature		- 40 °C
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Housings		Zinc die cast alloy
Colour housings		grey
Rubber gasket		HNBR
Surface		nickel plated

### Schematic construction



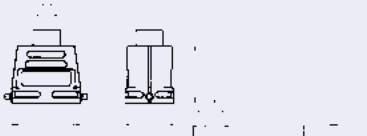



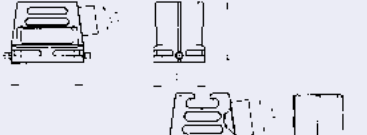



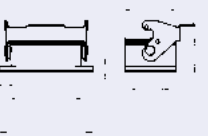

# heavy | mate<sup>®</sup> Housings

- Housings in IP67

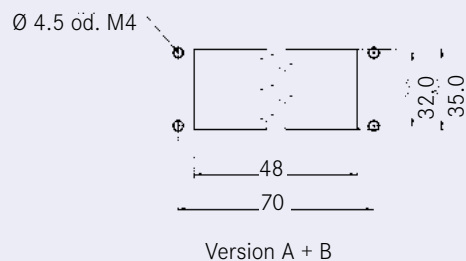


Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	20 20	C146 10R003 600 4 C146 10R003 601 4 (black design)		
<b>Housings</b>				
Housing bulkhead mounting with gasket	- -	C146 10F003 000 4 C146 10F003 001 4 (black design)		

# heavy|mate® Housings IP67 Size E6

Description	M	Part Number	Drawing		Figure
<b>Hoods</b>					
Hood top entry low profile	16	C146 21R006 656 1			
	20	C146 21R006 606 1			
Hood top entry high profile	25	C146 21R006 656 8			
	32	C146 21R006 606 8			
Hood side entry low profile	20	C146 21R006 506 1			
	25	C146 21R006 507 1			
Hood side entry high profile	25	C146 21R006 556 8			
	32	C146 21R006 506 8			
<b>Housings</b>			<b>L1</b>	<b>L2</b>	
Housing bulkhead mounting	-	C146 67F006 000 8	70	80	 

## Panel cut out for bulkhead mounting



# heavy|mate® Housings IP67 Size E16

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	25	C146 21R016 650 1		
	32	C146 21R016 600 1		
Hood top entry high profile	32	C146 21R016 600 8		
	40	C146 21R016 601 8		
Hood side entry low profile	25	C146 21R016 550 1		
	32	C146 21R016 500 1		
Hood side entry high profile	32	C146 21R016 500 8		
	40	C146 21R016 501 8		
<b>Housings</b>			<b>L1</b>	<b>L2</b>
Housing bulkhead mounting		C146 21F016 000 8	103	113
<b>Panel cut out for bulkhead mounting</b>				
<p>Ø 4.5 od. M4</p> <p>82</p> <p>103</p> <p>32.0</p> <p>35.0</p> <p>Version A + B</p>				

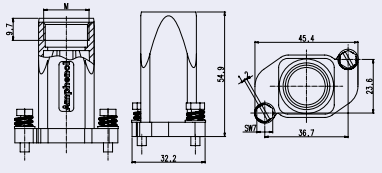

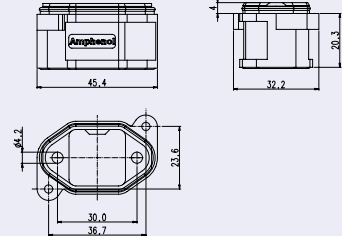



# heavy | mate<sup>®</sup> Housings

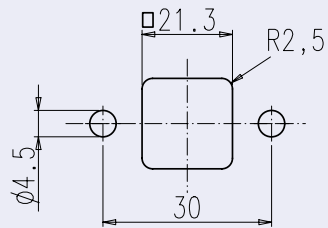
- Housings IP68 / 69K

**Brief information**

Please remove the sealing on the socket insert before assembling the insert to the IP68 / 69K housings size A3/4.

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	20 25	C146 68R003 600 4 C146 68R003 601 4		
<b>Housings</b>				
Housing bulkhead mounting		C146 68F003 000 4		

**Panel cut out for bulkhead mounting**



Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	32	C146 68R010 600 8		
	40	C146 68R010 601 8		
	25	C146 68R010 650 8		
Hood side entry	32	C146 68R010 500 8		
	40	C146 68R010 501 8		
	25	C146 68R010 550 8		
<b>Housings</b>				
Housing bulkhead mounting	-	C146 68F010 001 1		
Housing bulkhead mounting easy mount	-	C146 68F010 011 1		
Housing	32	C146 68N010 500 2		
<b>Protective cover</b>				
Protective cover for housings	-	C146 68Z010 100 1		
<b>Panel cut out for bulkhead mounting</b>				

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	32	C146 68R024 600 8		
	40	C146 68R024 601 8		
	25	C146 68R024 650 8		
Hood side entry	32	C146 68R024 500 8		
	40	C146 68R024 501 8		
	25	C146 68R024 550 8		
<b>Housings</b>				
Housing bulkhead mounting	-	C146 68F024 001 1		
Housing bulkhead mounting easy mount	-	C146 68F024 011 1		
Housing	40	C146 68N024 501 2		
<b>Protective cover</b>				
Protective cover for housing	-	C146 68Z024 100 1		
<b>Panel cut out for bulkhead mounting</b>				

# heavy | mate<sup>®</sup> Housings

- EMC-Housings

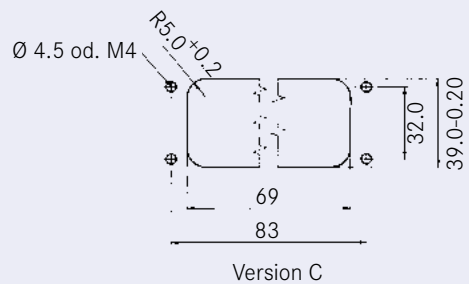
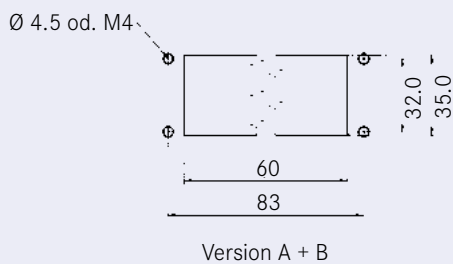




Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	PG 11	C146 11R003 600 4		
Hood side entry	20	C146 11R003 500 4		
<b>Housings</b>				
Hood cable to cable coupling	20	C146 11R003 804 4		
Housing bulkhead mounting		C146 11F003 000 4		
Housing bulkhead mounting with spring cover		C146 11F003 003 4		
Housing		C146 11N003 500 4		

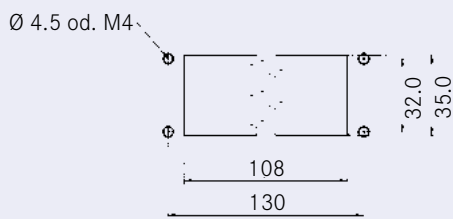
Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	20 25 32	C146 11R010 650 1 C146 11R010 600 1 C146 11R010 601 1		
Hood top entry high profile	25 32 40	C146 11R010 650 8 C146 11R010 600 8 C146 11R010 601 8		
Hood side entry low profile	20 25	C146 11R010 550 1 C146 11R010 500 1		
Hood side entry high profile	25 32	C146 11R010 550 8 C146 11R010 500 8		
<b>Housings</b>				
Housing bulkhead mounting Version A Standard flange without ground strap		C146 11F010 901 8		
Housing bulkhead mounting Version B Standard flange with ground strap		C146 11F010 902 8		
Housing bulkhead mounting Version C Centering flange with ground strap		C146 11F010 000 8		

**Panel cut out for bulkhead mounting**

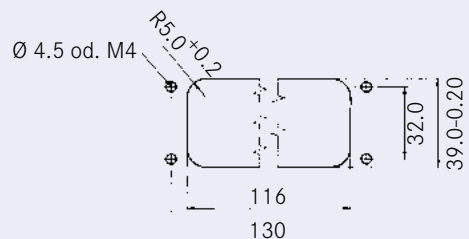


Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry low profile	25	C146 11R024 650 1		
	32	C146 11R024 600 1		
Hood top entry high profile	25	C146 11R024 650 8		
	32	C146 11R024 600 8		
	40	C146 11R024 601 8		
Hood side entry low profile	25	C146 11R024 550 1		
	32	C146 11R024 500 1		
Hood side entry high profile	25	C146 11R024 550 8		
	32	C146 11R024 500 8		
	40	C146 11R024 501 8		
<b>Housings</b>				
Housing bulkhead mounting Version A Standard flange without ground strap		C146 11F024 901 8		
Housing bulkhead mounting Version B Standard flange with ground strap		C146 11F024 902 8		
Housing bulkhead mounting Version C Centering flange with ground strap		C146 11F024 000 8		

**Panel cut out for bulkhead mounting**



Version A + B



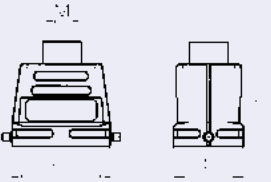

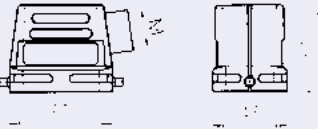

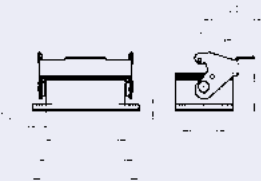

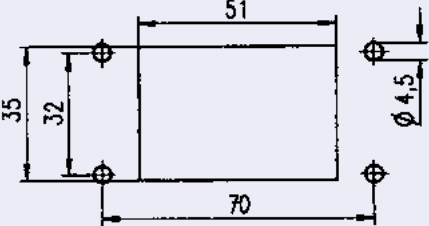
Version C

A photograph of an offshore wind farm in the ocean. The foreground shows a close-up of a white wind turbine nacelle and part of a blade. In the background, several other wind turbines are visible on the horizon under a clear sky.

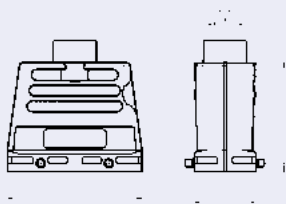

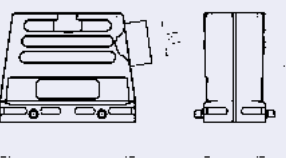

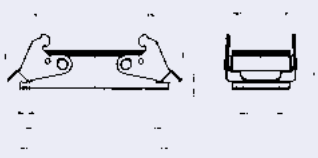

# heavy | mate<sup>®</sup> Housings

- Corrosion resistant Housings

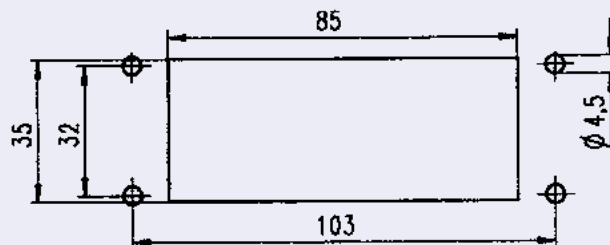
# heavy|mate® Housings corrosion resistant Size E6

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	25	C146 50R006 607 1		
Hood side entry	25	C146 50R006 507 1		
<b>Housings</b>				
Housing bulkhead mounting		C146 50F006 000 1		
<b>Panel cut out for bulkhead mounting</b>				
				

# heavy|mate® Housings corrosion resistant Size E16

Description	M	Part Number	Drawing	Figure
<b>Hoods</b>				
Hood top entry	32	C146 50R016 600 8		
Hood side entry	32	C146 50R016 500 8		
<b>Housings</b>				
Housing bulkhead mounting		C146 50F016 000 1		

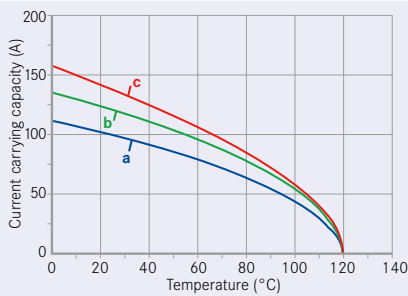
## Panel cut out for bulkhead mounting





General Characteristics	Standard	Value
Number of contacts		1
Termination technique		crimp
Wire gauge		10 - 25 mm <sup>2</sup> (Radsok)
Termination technique ( wall and cable lug)		screw
Wall thickness		1.5 - 6 mm
Dimensions of wall cutout		Ø 31.5 mm ± 0.2 without burr
Torque when mounting the WBC		6Nm ± 3%
Mechanical and Electrical Characteristics		
Protection class (side wall to side wall)	IEC 60 529	IP67
Protection class (Radsokseite)	IEC 60 529	IP20
Rated voltage	IEC 61140 cl. 6	≤ 60 V DC / ≤ 25 V AC
Contact resistance	IEC 60512; test 1	≤ 0.2 mΩ
Climatical Characteristics		
Upper temperature	IEC 60512-11-9	+125°C
Lower temperature	IEC 60512-11-10	-40°C

#### Derating Curves



Curve	Wire gauge
a	10 mm <sup>2</sup>
b	16 mm <sup>2</sup>
c	25 mm <sup>2</sup>

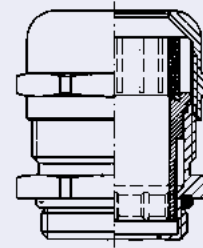
#### Pluggable equipotential bonding with Wallbushing universal port

The Wallbushing universal port is a pluggable grounding system. Based on the two patented Wallbushing and Radsok technologies, the Wallbushing universal port enables a practical equipotential bonding, which need not be time consuming hardwired. For this purpose, only standard tools are needed, even for the most one-sided montage. The click |fit technology is furthermore vibration-proofed and VDE approved as a grounding connection.



**Assembly instructions for metric clamp**

- The cable jacket should be removed as far as the underside of the cable clamping; the wire netting is then to be cut down a little further and subsequently must be formed into a circular rim. The protective jacket can remain attached to the cable provided that it passes through the lower opening of the clamp.
- On assembly, while screwing the cable clamp, the circular rim has to be pushed through and pressed on the fins commutator on the base of the underside and settle into a depression. By doing this the EMC security will remain.
- Tightening torque of the gland bushing:



Description	M	Part Number	Drawing	Figure
<b>Gland bushing IP54 (Attention: not usable for hoods without stud / -30°C up to +120°C)</b>				
Thermoplast clamp with variable inner diameter 10 Pieces	20	VN16 200 0113 X		
Metal with variable inner diameter 10 Pieces	20	VN16 200 0114 X		
	25	VN16 250 0114 X		
	32	VN16 320 0114 X		
	40	VN16 400 0114 X		
50	VN16 500 0114 X			
Cable clamp without gasket 5 Pieces	16	VN16 160 0102 V		
	20	VN16 200 0102 V		
	25	VN16 250 0102 V		
	32	VN16 320 0102 V		
Cable clamp without gasket 5 Pieces	20	VN16 200 0103 V		
	25	VN16 250 0103 V		
	32	VN16 320 0103 V		
Stud <sup>1)</sup>	16	N16 016 0112 1		
	20	N16 020 0112 1		
	25	N16 025 0112 1		
	32	N16 032 0112 1		
	40	N16 040 0112 1		

# heavy|mate® Key pins and lockings

Description	L	Part Number	Drawing	Figure
Key pin with lock washer 10 Pieces		VN17 050 0004 1		
Key pin with lock washer 100 Pieces		VN17 050 0004 101		
Locking pin for inserts heavy mate® F 10 Stück		VN13 040 0014 1 X		
Guide pin 10 Pieces		VN13 040 0009 1 X		
Guide pin for inserts heavy mate® F 10 Stück		VN13 040 0012 1 X		
Guide socket 10 Pieces		VN13 040 0008 1 X		
Guide socket for inserts heavy mate® F 10 Stück		VN13 040 0013 1 X		
Locking screw for contact inserts heavy mate® D 15, D 25, A 10, A 16 20 Pieces	20	VN03 030 0021 1 XX		
Locking screw for contact inserts heavy mate® D 40, D 64, E, M, H 20 Pieces	17	VN03 030 0020 1 XX		
Locking set 10 Pieces		VN03 030 3000 X		

Description	Size	Part Number	a	b	D-Sub	Drawing	Figure
Foam rubber sealing 2 mm	6	N06 080 0003 1	80	70			
	10	N06 080 0003 2	93	83			
	16	N06 080 0003 3	113	103			
	24	N06 080 0003 4	140	130			
Adaptor for D-Sub set metal	15	C146 N32 015 G2	57	49.5	15	<p>2 x adaptor 4 x M3 x 6.5 8 x M3 x 14</p>	
	25	C146 N32 025 G2	57	49.5	25		
Adaptor for D-Sub set single-row	6	C146 N32 009 G1	51.5	44	9	<p>2 x adaptor 4 x M3 x 6.5 8 x M3 x 14</p>	
	6	C146 N32 015 G1	51.5	44	15		
	10	C146 N32 025 G1	64.5	57	25		
	16	C146 N32 037 G1	85	77.5	37		
	16	C146 N32 050 G1	85	77.5	50		
Adaptor for D-Sub set double-row	6	C146 N33 009 G1	51.5	44	9	<p>2 x adaptor 4 x M3 x 6.5 8 x M3 x 14</p>	
	6	C146 N33 015 G1	51.5	44	15		
	10	C146 N33 025 G1	64.5	57	25		
	16	C146 N33 037 G1	85	77.5	37		
	16	C146 N33 050 G1	85	77.5	50		
PE-Screw + washer	M4	VN03 040 0001 X	-	-	-		
Label for CSA application 50 Pieces	VN07 045 0001 L						

# heavy|mate® Removal tools

Kontaktdurchmesser	Part number	Figure
1.0 mm	17D 438 SP	
1.6 mm	FG 0300 146 1	
2.5 mm turned, with clip	FG 0300 146 4	
2.5 mm turned, without clip	FG 0300 146 7	
2.5 mm, stamped	FG 0200 146 1	
3.6 mm	FG 0300 146 3	
4 mm	FG 0300 146 5000	
8 mm	FG 0300 146 6000	

Description	Part Number	Drawing	Figure
<b>Shielding levers for contact inserts</b>			
Shielding lever for contact inserts Size E6	N 25 006 0012		
Shielding lever for contact inserts Size E10	N 25 010 0012		
Shielding lever for contact inserts Size E16	N 25 016 0012		
Shielding lever for contact inserts Size E24	N 25 024 0011		
<b>Shielding levers for module frames heavy I mate F</b>			
Shielding lever for module frames Size E6	N 25 006 2001		
Shielding lever for module frames Size E 10	N 25 010 0001		
Shielding lever for module frames Size E16	N 25 016 0001		
Shielding lever for module frames Size E24	N 25 024 000 1		

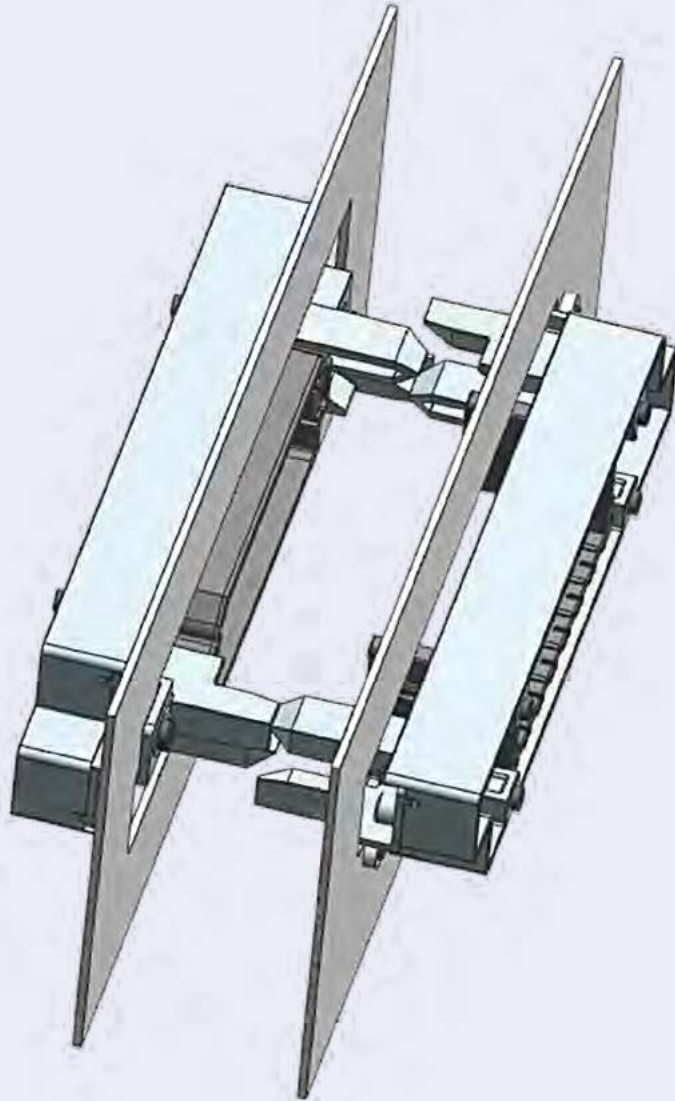
**Characteristics**

- heavy|mate® inserts can be used in blind mate applications
- tolerance compensation of 3 mm in any direction possible
- can be used with module frame & monoblocs
- very good price-performance ratio

**Applications**

- Motor control centers
- Modular UPS
- Inverter
- Charging stations
- Slip rings

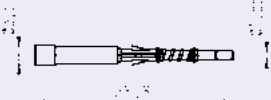

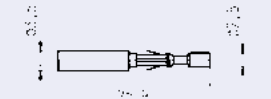
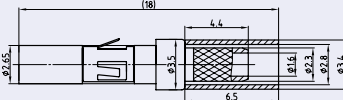

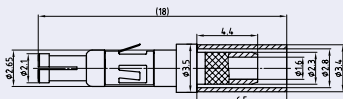
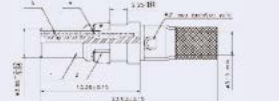
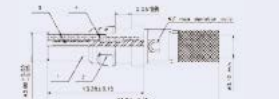
**Figure**





Series	Drawing single contact	Drawing contacts on reel	Figure
heavy mate® D, M	.N01 016 0003 1 .N02 016 0003 1 		
	.N01 016 0002 1 .N02 016 0002 1 .N01 016 0015 1 <sup>1)</sup> .N02 016 0015 1 <sup>1)</sup> 		
	.N01 016 0005 1 .N02 016 0005 1 .N01 016 0016 1 <sup>1)</sup> .N02 016 0016 1 <sup>1)</sup> 		
heavy mate® E, M	.N01 025 0001 1 .N02 025 0001 1 		
	.N01 025 0010 1 .N02 025 0010 1 		
	.N01 025 0043 1 .N02 025 0043 1 		
heavy mate® M	.N01 010 0130 2 .N02 010 0130 2 		
	.N01 010 0131 2 .N02 010 0131 2 		



Series	Part Number	Drawing single contact	Figure
heavy mate® M, FO	N01 016 0040 8		
	N02 016 0040 8		
heavy mate® M, Coax	17 DM 537 421		
	17 DM 537 401		
	17 DM 537 425		
	17 DM 537 405		

Style	enclosed	unenclosed	earthing contact	cable clamp	finger safety mated
Hood with pin insert	●		●		●
Pin insert		●	●		
Hood with socket insert	●		●		●
Socket insert		●	●		
Coupling housing with pin insert	●		●		●
Coupling housing with socket insert	●		●		●
Housing with pin insert	●		●		●
Housing with socket insert	●		●		●

If not otherwise stated the contact inserts have to be mounted in metallic conductive housings resp. on bars or mounting boards to complete the protective earth grounding.

**General technical information**

- The safety of connectors/connectors with braking capacity (CBC) depends on the right selection of products, the correct installation and a proper assembly.
- Decisions for the application of connectors are the requirements of the equipment specifications. This is especially the case for the definition of the rated voltage and the related clearances and creepage distances.
- All rated data for the connectors listed in this catalogue is based on overvoltage category III and pollution degree 3 (machine tool application).
- All technical data is specified for connectors, which are not under load when mated or disconnected. If in special cases connectors can be used in the sense of plug and socket devices (connector with breaking capacity), this is mentioned in the brief information of the particular section.
- Correct mounting will protect against electrical shock when mating the connectors.
- If connectors are mounted in non conductive housings both protective earthing terminals shall be mounted.
- A detailed connector glossary can be found at the end of this catalogue.
- All mentioned excerpts of standards are for general information only. For specific cases the valid original standards have to be consulted.
- Test methods acc. IEC 60512 comply with test methods acc. DIN EN 60512 or DIN IEC 60512. IEC 60664-1 complies with DIN VDE 0110-1
- On screw terminations with wire protection as well as on protective earth contacts the usage of wire end sleeves are recommended.
- Tightening torque of mounting screws (M3 screws on PE contact): 1.2 – 1.8 Nm
- For mounting the housings size A10, A16 and E xx a M4 cheese head screw acc. to DIN xx (class min. 8.8) is recommended, tightening torque of the M4 screw 1.0 Nm.
- Recommended tightening torque for PE connection screw: 1.8 Nm
- Termination cross-section for PE contact max. 6 mm<sup>2</sup> (AWG10), for bigger cross-sections (10-16 mm<sup>2</sup> / AWG8-6) use cable lug N 15 043 0003 003
- Heavy|mate D, DD, E, EE, EEE, F, K and Q are according EN45545 class R22/R23:HL3
- The max. allowed insulation diameter depends on the contacts insert, for the specific limit see customer drawing/catalogue page
- When connecting the PE you have to pay attention that the PE is connected properly
- Requirements on panel cut outs on customer machine:
  - Flatness: max. 0.2mm
  - no sharp edges allowed
  - chamfer on sharp edges 0.2 x 45°
  - general tolerance ISO 2768-fH



**Termination methods: Screw connection**

Screw clamps are designed acc. to EN 60999-1/VDE 0609. Chart 1 below shows the screw size depending on wire size and the required clamping and testing torque.

**Chart 1**

Wire size (mm <sup>2</sup> )	1	1.5	2.5	4	6	10
Screw size	M 2.6	M 3	M 3	M 3.5	M 4	M 4
Test torque (Ncm)	40	50	50	80	120	120

Diagram 1 below shows the range of tensile strength for a screw connection with a clamp screw M3, fastened with a torque of 50 Ncm, depending on the wire size.

**Diagram 1**

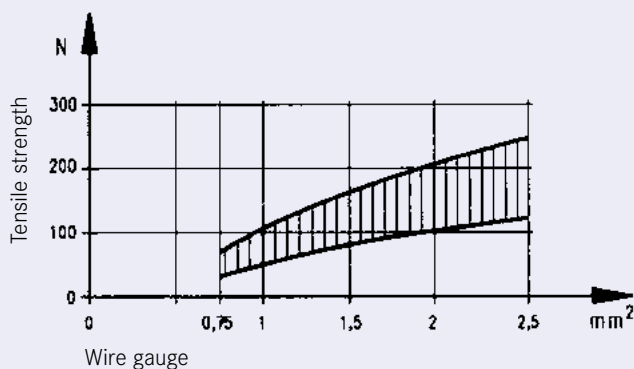


Chart 4: Composition and Dimensions of Copper Wires

Wire Size	Wire Composition	Wire diameter
0.09 mm <sup>2</sup>	12 x 0.10	0.48 mm
0.14 mm <sup>2</sup>	18 x 0.10	0.50 mm
0.25 mm <sup>2</sup>	14 x 0.15	0.70 mm
0.34 mm <sup>2</sup>	7 x 0.25	0.78 mm
0.5 mm <sup>2</sup>	16 x 0.20	1.0 mm
0.75 mm <sup>2</sup>	24 x 0.20	1.2 mm
1.0 mm <sup>2</sup>	32 x 0.20	1.4 mm
1.5 mm <sup>2</sup>	30 x 0.25	1.6 mm
2.5 mm <sup>2</sup>	35 x 0.30	2.2 mm
4.0 mm <sup>2</sup>	56 x 0.30	2.8 mm
6.0 mm <sup>2</sup>	19 x 0.64	3.4 mm
10 mm <sup>2</sup>	19 x 0.80	4.3 mm

**Current carrying capacity**

The current carrying capacity of a connector is shown by a derating curve. The curve shows the currents that the connector can carry continuously and simultaneously through all its contacts. The curve is determined by testing following the standard DIN EN 60512. The upper temperature is limited by the contact and insulation material used. The sum of the ambient temperature and the temperature created by the current flow may not exceed the upper temperature. This means that the current carrying capacity has no fixed value but decreases with increasing ambient temperatures.

As a general example it can be said that a given connector which can carry 16A through all its contacts at 40°C ambient temperature can carry less, e.g. 12A, at an ambient temperature of 80°C. On the other hand it is often the case that not all contacts carry the whole rated current, which means that some single contacts may carry a higher current than that according to the derating curve. These currents have to be defined by testing.

Diagram 3: Typical derating curve

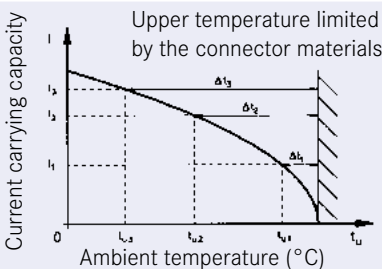
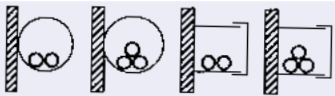
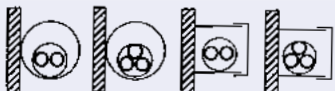




Chart 5: Current carrying capacity of copper wires in (A)

Installation type	Wire size (mm <sup>2</sup> )	0.25	0.34	0.5	0.75	1	1.5	2.5	4	6	10
 B1 Wires in conduits and installation channels		-	-	-	7.6	10.4	13.5	18.3	25	32	44
 B2 Cables and conductors in conduits or installation channels		-	-	-	-	9.6	12	16.5	23	29	40
 C Cables and conductors along walls		4.0	5.0	7.1	9.1	11.7	15.2	21	28	36	50
 E Cables and conductors on plank		4.0	5.0	7.1	9.1	11.5	16.1	22	30	37	52

Description according to DIN EN 60204 for PVC insulated copper wires with a working temperature of +40C. For other requirements,

such as for other temperatures, mountings, or wires corresponding correction factors are used (see next page).

**Voltage grading of connectors**

**General**

Clearances and creepage distances are the base for voltage grading of connectors. Valuation and dimensioning of clearances and creepage distances have changed since the introduction of insulation coordination.

Insulation coordination comprises the selection of the electrical insulation performances of the equipment, taking into account the expected use and its environment.

The following standards apply for this:

IEC 60664-1/10.92  
Insulation coordination for equipment within low-voltage systems

DIN VDE 0110-1/4.97  
Isolationskoordination für elektrische Betriebsmittel in Niederspannungsanlagen

**Clearances**

The clearance is the shortest distance in air between two conductive parts. An important point for the dimensioning of clearances is the determination of the overvoltage category. The above standard specifies the possible overvoltages into the four following categories:

**Overvoltage category I**

Equipment intended for the use in appliances or parts of installations in which no overvoltage can occur. Examples are low-voltage equipments.

**Overvoltage category II**

Equipment intended for the use in installations or parts of it in which lightning overvoltages do not need to be considered, but switching overvoltages generated by the equipment do need to be considered. Examples are household appliances.

**Overvoltage category III**

Equipment intended for the use in installations or parts of it in which lightning overvoltages do not need to be considered, however switching overvoltages generated by the equipment, and for cases where the reliability and the availability of the equipment or its dependent circuits are subject to special requirements. Examples are protecting means, switches and sockets.

**Overvoltage category IV**

Equipment intended for the use in installations or parts of it in which lightning overvoltage has to be considered. Examples are electricity meters, overcurrent protection switches.

Once the overvoltage category has been defined the rated impulse withstand voltage can be selected for the equipment based on the nominal voltage of the supply system and the overvoltage category using chart 9 below:

**Chart 9**

Nominal voltage of the supply system in V (based on IEC 60038)	Rated impulse voltage in kV for overvoltage category			
	IV	III	II	I
Three phase systems				
230/400 277/480	6	4	2.5	1.5
400/690	8	6	4	2.5
1000	12	8	6	4

After the rated impulse withstand voltage has been selected the pollution degree must be defined taking the expected pollution around the equipment into account.

The following four degrees of pollution are established:

**Pollution degree 1**

No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.

**Pollution degree 2**

Only non-conductive pollution occurs except occasionally a temporary conductivity caused by condensation is to be expected.

**Pollution degree 3**

Conductive pollution occurs or dry non-conductive pollution occurs which becomes conductive due to condensation which is to be expected.

**Pollution degree 4**

The pollution generates persistent conductivity caused by conductive dust or by rain or snow.



It has to be noted that for a connector or plug and socket device with a degree of protection of min. IP54 the parts inside the enclosure may be dimensioned for a lower pollution degree. This also applies to mated connectors which enclosure is ensured through the connector housing and which may only be disengaged for test and maintenance purposes.

When impulse withstand voltage and the pollution degree are defined the minimum clearances can be selected from chart 10.

Chart 11

U-eff Rated vol- tage U in V	Min. creepage distance in mm														
	Printed circuits			Other devices											
	Pollution degree			Pollution degree 2				Pollution degree 3				Pollution degree 4			
	1		2	1	2			3	3			4	4		
	2)		3)	2)	I	II	IIIa	IIIb	I	II	IIIa	IIIb	I	II	IIIa
10	0.025	0.04	0.08	0.4	0.4	0.4		1	1	1		1.6	1.6	1.6	
12.5	0.025	0.04	0.09	0.42	0.42	0.42		1.05	1.05	1.05		1.6	1.6	1.6	
16	0.025	0.04	0.1	0.45	0.45	0.45		1.1	1.1	1,1		1.6	1.6	1.6	
20	0,025	0.04	0.11	0.48	0.48	0.48		1.2	1.2	1.2		1.6	1.6	1.6	
25	0,025	0.04	0.125	0.5	0.5	0.5		1.25	1.25	1.25		1.7	1.7	1.7	
32	0.025	0.04	0.14	0.53	0.53	0.53		1.3	1.3	1.3		1.8	1.8	1.8	
40	0.025	0.04	0.16	0.56	0.8	1.1		1.4	1.6	1.8		1.9	2.4	3	
50	0.025	0.04	0.18	0.6	0.85	1.2		1.5	1.7	1.9		2	2.5	3.2	
63	0.04	0.063	0.2	0.63	0.9	1.25		1,6	1.8	2		2.1	2.6	3.4	
80	0.063	0.1	0.22	0.67	0.95	1.3		1.7	1.9	2.1		2.2	2.8	3.6	
100	0.1	0.16	0.25	0.71	1	1.4		1.8	2	2.2		2.4	3.0	3.8	
125	0.16	0.25	0.28	0.75	1.05	1.5		1.9	2.1	2.4		2.5	3.2	4	
160	0.25	0.4	0.32	0.8	1.1	1.6		2	2.2	2.5		3.2	4	5	
200	0.4	0.63	0.42	1	1.4	2		2.5	2.8	3.2		4	5	6.3	
250	0.56	1	0.56	1.25	1.8	2.5		3.2	3.6	4		5	6.3	8	
320	0.75	1.6	0.75	1.6	2.2	3.2		4	4.5	5		6.3	8	10	
400	1	2	1	2	2.8	4		5	5.6	6.3		8	10	12.5	
500	1.3	2.5	1.3	2.5	3.6	5		6.3	7.1	8.0		10	12.5	16	
630	1.8	3.2	1.8	3.2	4.5	6.3		8	9	10		12.5	16	20	
800	2.4	4	2.4	4	5.6	8		10	11	12.5		16	20	25	
1000	3.2	5	3.2	5	7.1	10		12.5	14	16		20	25	32	
1250			4.2	6.3	9	12.5		16	18	20		25	32	40	
1600			5.6	8	11	16		20	22	25		32	40	50	
2000			7.5	10	14	20		25	28	32		40	50	63	
2500			10	12.5	18	25		32	36	40		50	63	80	
3200			12.5	16	22	32		40	45	50		63	80	100	
4000			16	20	28	40		50	56	63		80	100	125	
5000			20	25	36	50		63	71	80		100	125	160	
6300			25	32	45	63		80	90	100		125	160	200	
8000			32	40	56	80		100	110	125		160	200	250	
10000			40	50	71	100		125	140	160		200	250	320	

Connectors in this catalogue are allocated to fixed rated voltages which apply to the machine building industry. In case of other applications the above chart can be used to determine other rated voltages.

**Degree of protection**

Electrical connector devices have to be protected for safety reasons from outside influences like dust, foreign objects, direct contact, moisture and water. This protection is provided on industrial connectors by the housing latching devices and sealed cable entries. The degree of protection depends on the type of intended use. The standard IEC 60529 and/or DIN EN 60529 has specified the degree of protection and divided them into several classes.

The degree of protection is indicated in the following way: IP65  
 Code letters (Internat. Protection) \_\_\_\_\_  
 1st charact. numeral (degree of protection against access to hazardous parts and against solid foreign objects)  
 2nd charact. numeral (degree of protection against ingress of water)  
 The following charts 12 an13 give an overview about all protection degrees.

**Cable**

For the termination of all Amphenol-industrial connectors we recommend the use of commercially available high flexible cable acc. to VDE or other local specifications. Our connectors are designed to fit these cables especially as far as number of conductors and cable diameters are concerned.

When selecting cables care must be taken that the cables do not affect (solvent) the connector or preserve an existing fire resistance.

**Sealing**

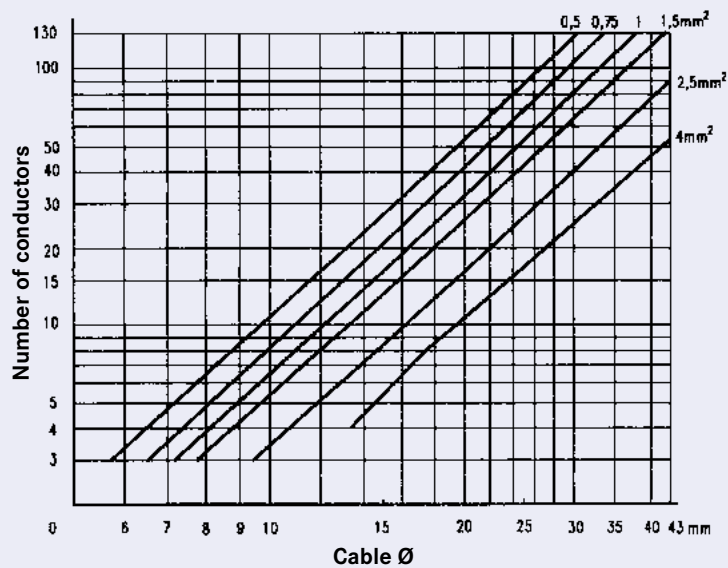
The sealing of the cable entries of all Amphenol-industrial connectors is with gland bushings. All sealings are made from Neoprene which has a good resistance against grease, oil and gasoline.

**Selection of gland bushings**

Beside glands with a fixed inside diameter which equals the number, there are also glands with variable inside diameters available (so-called onion glands). The inside diameter of these glands can be adjusted to the outside cable diameter by cutting out the smaller rings.

The selection of the appropriate gland bushing depends on the cable diameter (cable composition) can be made using the following diagram 5 (see page 309).

**Diagram 5**



<p><b>Insertion or withdrawal force</b></p> <p>The force required to fully insert or withdraw a set of mated connectors without the effect of coupling, locking or similar devices. The insertion force is usually greater than the withdrawal force.</p>	<p><b>Material group</b></p> <p>Classification of insulation materials according to their CTI values (CTI = Comparative Tracking Index)</p>
<p><b>Insulation grip</b></p> <p>The area of a crimp contact that has been reshaped around the insulation of the conductor by compression during the crimping operation.</p>	<p><b>Overvoltage category</b></p> <p>A numeral defining a transient overvoltage condition. Overvoltage categories I, II, III and IV are used.</p>
<p><b>Insulation resistance</b></p> <p>The resistance of the insulation between two conductive elements, in particular, the resistance between two contacts or between a contact and a metallic housing or shield. Tested according to test 3a of IEC 60512-2 / DIN IEC 60512 Part 2.</p>	<p><b>Connector with braking capacity (CBC)</b></p> <p>A component which may be engaged or disengaged in normal use, when live or under load. Note: In the sense of this document the term - live- is used if contacts are under voltage not necessarily with a current flowing across the contacts. The term - load - is used if a current is flowing across the contacts.</p>
<p><b>Intermateable</b></p> <p>Two connectors are intermateable when they are capable of being connected electrically and mechanically but without regard to their performance and intermountability.</p>	<p><b>Rated current</b></p> <p>A current value assigned by the manufacturer which the connector or PSD can carry continuously (without interruption) and simultaneously through all its contacts wired with the largest conductor preferably at an ambient temperature of 40 °C without the upper temperature being exceeded.</p>
<p><b>Locator</b></p> <p>In a crimping tool the device used for positioning a crimp contact or terminal end.</p>	<p><b>Shield, shielding</b></p> <p>Shielding of internal or external electric fields by means of a plane with a uniform electric potential, formed by metal shells or metallic layers on the inside or outside of plastic shells. The shield is normally connected to the shielding braid of the cable and/or chassis ground.</p>
<p><b>Locking lever</b></p> <p>A mechanical locking device operated by actuating a lever, designed to hold two mated connectors together. Typically the lever can only be fully locked if the two connectors are correctly mated.</p>	<p><b>Terminal block</b></p> <p>An assembly of terminals in a housing or body of insulating material to facilitate interconnection between multiple conductors. Also called terminal strip or barrier blocks if the terminals are separated by an insulation barrier.</p>
<p><b>Mating cycle</b></p> <p>One mating cycle comprises one insertion and one withdrawal operation. Term used in the definition of connector life.</p>	<p><b>Wire range</b></p> <p>The range of wire cross sections which is compatible with the dimensions the terminals of the contact (wire barrel). The wire range is expressed in mm<sup>2</sup> or in AWG numbers.</p>





# heavy|mate® Summary of Part Numbers

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C146 10A001 600 15	84, 97	C146 10A016 002 4	20, 21	C146 10B004 901 15	90, 117	C146 10B024 000 1	55, 56
C146 10A001 800 15	88, 123, 125	C146 10A016 004 4	21	C146 10B005 500 12	201	C146 10B024 000 9	41
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C146 10A002 600 15	84, 99	C146 10A016 102 4	20, 21	C146 10B006 100 13	147	C146 10B024 400 1	54
C146 10A002 800 15	90, 117	C146 10A016 104 4	21	C146 10B006 102 1	48	C146 10B024 500 1	55, 56
C146 10A002 800 15	119	C146 10A016 400 1	52	C146 10B006 102 3	141	C146 10B024 600 1	54
C146 10A003 002 4	18	C146 10A016 500 1	53	C146 10B006 102 5	135	C146 10B024 810 1	79
C146 10A003 102 3	140	C146 10A016 600 1	52	C146 10B006 300 15	111, 121	C146 10B025 000 2	29, 31
C146 10A003 600 15	84, 101	C146 10A016 810 1	79	C146 10B006 400 1	48	C146 10B025 005 2	31
C146 10A003 601 15	84, 101	C146 10A017 500 12	211	C146 10B006 500 1	49	C146 10B025 060 2	29
C146 10A004 002 4	18	C146 10A017 600 15	87, 113	C146 10B006 500 12	203	C146 10B025 500 2	31
C146 10A004 100 13	147	C146 10A018 500 10	65	C146 10B006 600 1	48	C146 10B025 505 2	31
C146 10A004 600 15	85, 105	C146 10A020 600 15	87, 117	C146 10B006 600 15	86, 107	C146 10B032 500 10	66
C146 10A004 901 15	90, 117	C146 10A024 000 1	55	C146 10B006 810 1	78	C146 10B032 500 13	153
C146 10A005 500 12	201	C146 10A024 000 1	56	C146 10B007 000 2	27	C146 10B036 600 15	87, 121
C146 10A006 000 1	49	C146 10A024 000 9	41	C146 10B007 500 12	205	C146 10B040 000 2	30
C146 10A006 002 1	48	C146 10A024 002 1	54	C146 10B007 500 2	27	C146 10B040 060 2	30
C146 10A006 100 13	147	C146 10A024 002 1	56	C146 10B007 600 15	85, 103	C146 10B040 500 11	71
C146 10A006 102 1	48	C146 10A024 102 1	54, 56	C146 10B008 000 2	27	C146 10B040 500 2	30
C146 10A006 102 3	141	C146 10A024 400 1	54	C146 10B008 500 12	207	C146 10B042 000 9	41
C146 10A006 102 5	135	C146 10A024 500 1	55, 56	C146 10B008 500 2	27	C146 10B042 500 13	149
C146 10A006 400 1	48	C146 10A024 600 1	54	C146 10B008 600 15	86, 109	C146 10B046 500 10	66
C146 10A006 500 1	49	C146 10A024 810 1	79	C146 10B008 901 15	88, 123	C146 10B064 000 2	32, 33
C146 10A006 500 12	203	C146 10A025 000 2	29, 31	C146 10B008 902 15	88, 123	C146 10B064 005 2	33
C146 10A006 600 1	48	C146 10A025 005 2	31	C146 10B008 905 15	88, 125	C146 10B064 060 2	32
C146 10A006 600 15	86, 107	C146 10A025 060 2	29	C146 10B008 906 15	88, 125	C146 10B064 500 11	71
C146 10A006 810 1	78	C146 10A025 500 2	29, 31	C146 10B009 600 15	89, 129	C146 10B064 500 2	32, 33
C146 10A007 000 2	27	C146 10A025 505 2	31	C146 10B010 000 1	51	C146 10B064 505 2	33
C146 10A007 500 12	205	C146 10A032 500 10	66	C146 10B010 002 1	50	C146 10B072 000 9	41
C146 10A007 500 2	27, 85	C146 10A032 500 13	153	C146 10B010 002 4	19	C146 10B108 000 9	42
C146 10A007 600 15	103	C146 10A036 600 15	87, 121	C146 10B010 102 1	50	C146 10B108 005 9	42
C146 10A008 000 2	27	C146 10A040 000 2	30	C146 10B010 102 3	142	C146 10F002 000 15	252
C146 10A008 500 12	207	C146 10A040 060 2	30	C146 10B010 102 4	19	C146 10F003 000 4	218, 256
C146 10A008 500 2	27	C146 10A040 500 11	71	C146 10B010 400 1	50	C146 10F003 001 4	218, 256
C146 10A008 600 15	86, 109	C146 10A040 500 2	30	C146 10B010 500 1	51	C146 10F003 004 4	218
C146 10A008 901 15	88, 123	C146 10A042 000 9	41	C146 10B010 500 10	65	C146 10F006 000 1	226
C146 10A008 902 15	88, 123	C146 10A042 500 13	149	C146 10B010 600 1	50	C146 10F008 001 12	213
C146 10A008 905 15	88, 125	C146 10A046 500 10	66	C146 10B010 810 1	78	C146 10F010 000 1	228
C146 10A008 906 15	88, 125	C146 10A064 000 2	32, 33	C146 10B012 100 13	151	C146 10F010 001 1	230
C146 10A009 600 15	89, 129	C146 10A064 005 2	33	C146 10B012 500 12	209	C146 10F010 002 1	232
C146 10A010 000 1	51	C146 10A064 060 2	32	C146 10B012 600 15	86, 111	C146 10F010 003 1	230
C146 10A010 002 1	50	C146 10A064 500 11	71	C146 10B015 000 2	28	C146 10F010 090 1	228
C146 10A010 002 4	19	C146 10A064 500 2	32, 33	C146 10B015 060 2	28	C146 10F015 000 2	220
C146 10A010 102 1	50	C146 10A064 505 2	33	C146 10B015 500 2	28	C146 10F015 003 2	220
C146 10A010 102 3	142	C146 10A072 000 9	41	C146 10B015 901 15	129	C146 10F016 000 1	235
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