THE DATASHEET OF

C146B10001E8

INDUSTRIAL@AMPHENOL
TRUSTED GLOBALLY

Amphenol
Amphenol-Tuchel Industrial GmbH

heavy|mate®

Heavy Duty Connectors









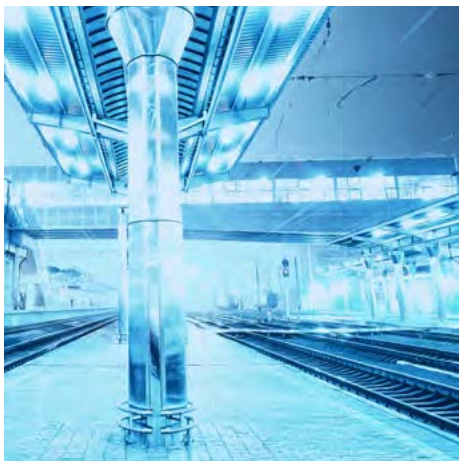












Note from the CEO



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.



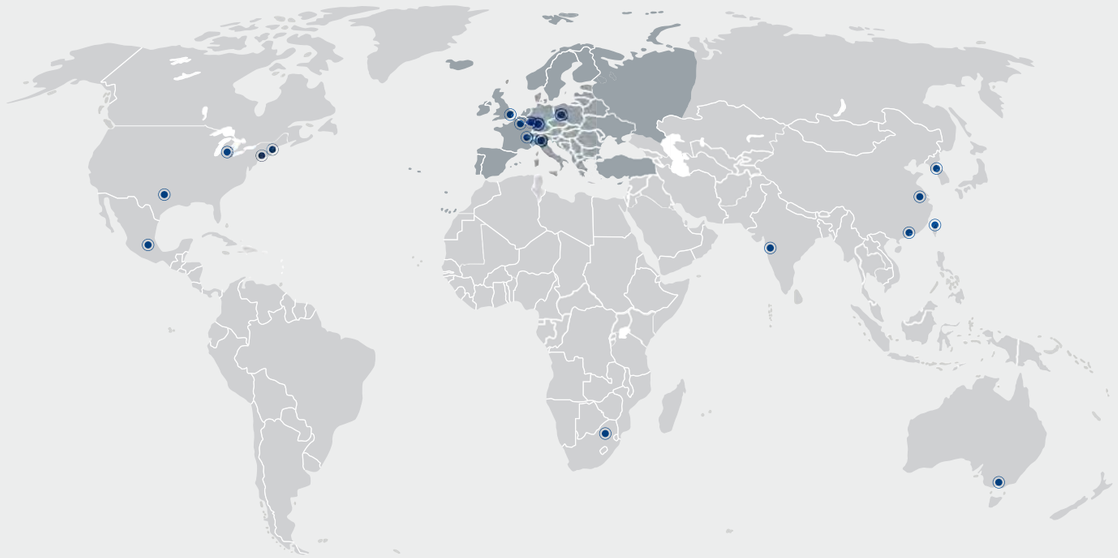
R. Adam Norwitt
President and CEO, Amphenol Corporation

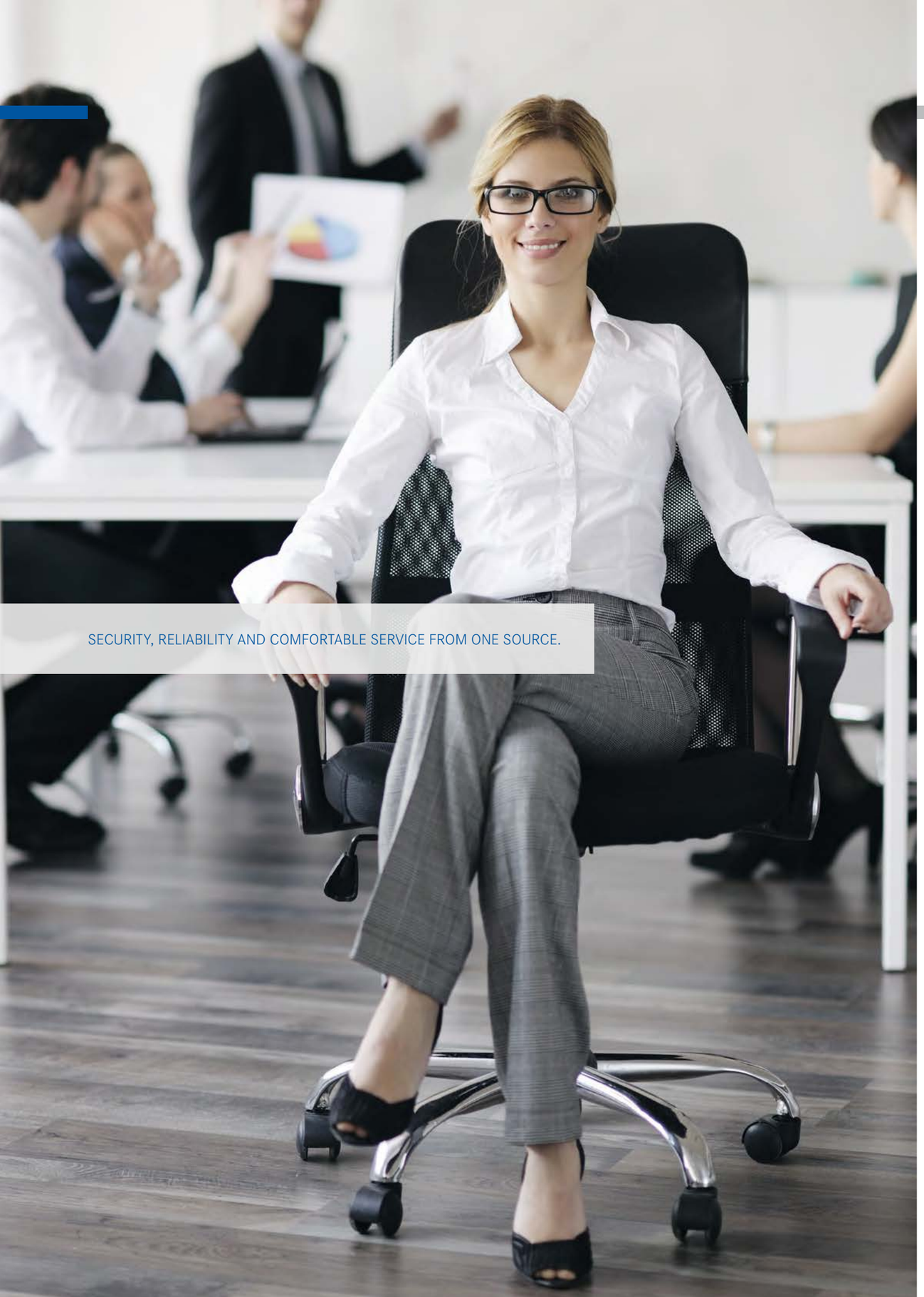
Make use of the best
Use our global resources

"Think global, act local!" Independently from where you are in Europe, we offer you our global expertise and great variety of products and technologies. And in comfort with your personal contact. Our numerous European offices are your access to our global resources.

OUR OFFICES IN EUROPE AND WORLDWIDE

FRANCE	CHINA	AUSTRALIA	SOUTH AFRICA
GERMANY	KOREA	MEXICO	INDIA
UNITED KINGDOM	TAIWAN	USA	ITALY





More time for important things: benefit from our service and diversity

Enjoy security, reliability and comfortable service from one source. INDUSTRIAL@AMPHENOL offers one of the most individual and most diversified service programmes in the market – exclusively for industrial customers. Access all possibilities of the Amphenol group through your personal expert adviser.

WIDE PRODUCT RANGE

Take advantage of a choice of Amphenol products. Our broad product portfolio offers individual solutions from more than 85 member companies in the global Amphenol group.

EXCLUSIVENESS AND FLEXIBILITY

One face to the customer: every inquiry is handled on an individual service level by your personal key account service partner. This ensures maximum transparency and best-in-class flexibility in the whole process.

QUALITY

Interconnect systems need reliability, speed and flawless data transmission. We continuously test and guarantee the required standard in our products – and also in our personal services.

INDIVIDUAL SOLUTIONS

Your project requires an individual solution that is not available off-the-shelf? As your think tank and discussion partner we provide engineering support and solution-oriented development for your tailor-made Amphenol product.

SPEED AND AVAILABILITY

Smart and intelligent processes are the secret behind our service programme. Flexible planning and distribution, perfect logistics and highest availability are our key factors for best customer service.

GLOBAL KEY ACCOUNT SERVICE

Our key account service is your individual entrance to global know-how, products and services. More than 85 Amphenol companies around the world offer an extensive range of technologies and products. We offer access to our worldwide resources through one individual contact person.

heavy|mate® is a Modular Metal Connector Line

What is heavy|mate®?

heavy|mate® is a modular connector line, consisting of:
- Hoods & Housings
- Inserts
- Contacts

Why heavy|mate®?

- 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

for Applications in Industrial Environments.

Major product features

- Interconnections for power, signal and data
- Good costs
- Voltage up to 1000V
- VDE, UL, CSA approvals
- Vibration proof
- High pole sizes
- IP65 to IP69K
- Corrosion resistance
- Robust

What can heavy|mate® offer?

- Connectors for industrial applications indoor & outdoor
- A wide range of inserts for signal, data and power transmission
- A large variety in pole sizes from 3 up to 280 poles per connector
- Current ratings up to 250A per contacts and voltages up to 1000V
- A modular connector system to configure customized solutions

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

Practice 2

Requirements
- 3 x 400V; 50A; 6mm² wire gauge
- 8 x 250V; 8A; 1.5mm² wire gauge
- 5 x 400V; 15A; 4mm² wire gauge

Solution
- Check: Make a pre-selection on the overview page of the series, see pages 10/11
  Possible series: heavy|mate® M
- Check: How 16 contacts can be realized, see modules overview on page 130
  Possible selection: a) 1 x 20 contacts
  b) 2 x 10 contacts
  c) 1 x 10 contacts + 2 x 5 contacts
  d) 1 x 3 contacts + 1 x 5 contacts + 1 x 10 contacts
- Check: Technical parameters / solution, see detail pages of the modules on page 166
  Possible selection: a) not possible due to voltage
  b) not possible due to voltage
  c) not possible due to current
  d) POSSIBLE
- Check: Choose matching contact, see detail page of the modules on page 166
  Possible selection: a) C146 A03 001 E8 – VN01 036 0002 1C
  b) C146 A05 001 E8 – VN01 025 0033 1C
  c) C146 A10 001 E8 – VN01 016 0027 1C
- Check: Choose matching frame, see frames on page 166
  Solution: C146 P10 001 G8
- Check: Choose matching housing, see housings on page 214
  Solution: C146 21R010 600 8

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)	●	●	●	●			●	●	●			

Number of contacts	Termination				Characteristic / Series	
	Crimp	Screw	Tension spring	Push in		
3 / 4 / 10 / 16		●			A (page 14)	A
7 / 8 / 15 / 25 / 40 / 64	●				D (page 22)	D
24 / 42 / 72 / 108	●				DD (page 38)	DD
6 / 10 / 16 / 24	●	●	●	●	E (page 44)	E
10 / 18 / 32 / 46	●				EE (page 62)	EE
40 / 64	●				EEE (page 68)	EEE
6 / 10 / 16 / 24		●			E / FE / KO (page 74)	E / FE / KO
1 / 2 / 3 / 4 / 6 / 7 / 2x4 / 8 / 12 / 17 / 20 / 36	●				F (page 80)	F
6		●			HSE (page 132)	HSE
3+2 / 6+2 / 10+2 / 16+2		●			HvE (page 136)	HvE
4/0 / 4/2 / 6/36 / 4/8 / 8/24	●	●			K (page 144)	K
1 / 2 / 3 / 4 / 5 / 10 / 20 / 2x4	●			●	M (page 154)	M
5 / 4/2 / 7 / 8 / 12 / 17	●				Q (page 198)	Q

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.

Tightness classes in IP65, IP67 or IP68 or IP69K!

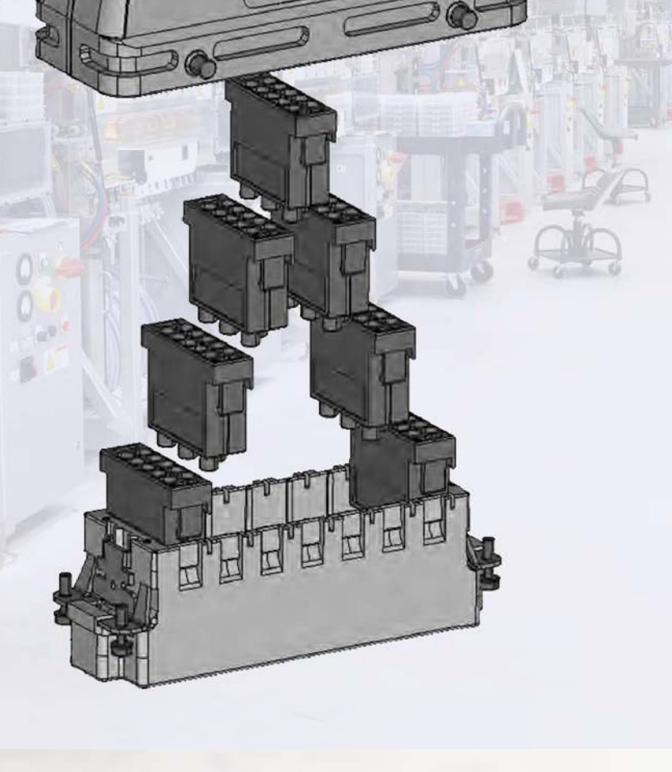
Robust metal levers in 1 and 2 locking-lever-system.

Quality EMC solutions.

Modular system

With the new series heavy|mate® F Amphenol offers a new modular system that is compatible with the market leader. With the series heavy|mate® M Amphenol offers a system with many benefits:

- More module slots in the connector.
- Large selection of contact-safe male contacts
- Stamped contacts and the Radsok contact technology
- Great cost savings potential



heavy | mate® A

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













Approvals, Testhouse	Characteristics	Approval-Number
UL	600 V	E 63093

General information

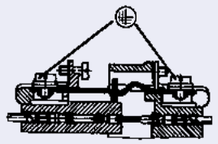
- For series heavy | mate® A connectors may be engaged or disengaged when live but without electrical load. If these connectors are used as plug and socket device, the load shall be reduced to 10 % of the rated current.
- Low and high profile housing for heavy | mate® A series inserts for 10 and 16 contacts.

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

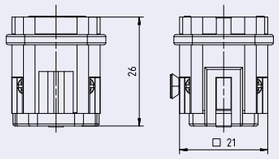
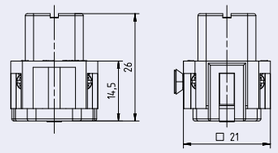


Range of housings

Size A3/4	Size A10	Size A16
		

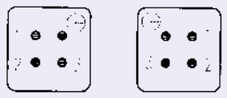
General Characteristics	Standard	Value			
Number of contacts		3/4 + ⏚	10 + ⏚	16 + ⏚	32 + ⏚
Termination technique		screw			
Wire gauge		0.5 - 1.5 mm² (AWG 20 - 16)[1)]	0.5-2.5 mm² (AWG 20 - 14)		
Tightening torque		0.3 Nm	0.5 Nm		
Max. wire diameter		3.6 mm	4.6 mm		
Flammability	UL 94	V-0			
Electrical Characteristics					
Rated voltage	IEC 60664-1	230 V (L-E) 400 V (E-E) (UL 600 V)	250 V (UL 600 V)		
Rated impulse withstand voltage	IEC 60664-1	4 KV			
Rated Current T_{amp} = 40 °C		10 A	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 m Ω			
Insulation resistance	IEC 60512-3-1	≥ 10^{10} 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[2)]	IEC 60529	unmated IP00, mated IP20			
IP-degree of protection socket insert[2)]	IEC 60529	unmated IP20, mated IP20			
Weight pin insert		13 g	48 g	68 g	136 g
Weight socket insert		13 g	52 g	73 g	146 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles			
Materials					
Insert		PA			
Colour insert		Grey			
Contacts		CuZn (brass)			
Contact plating		Ag (silver)			

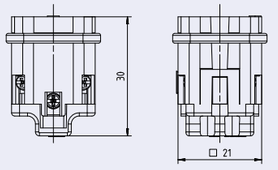
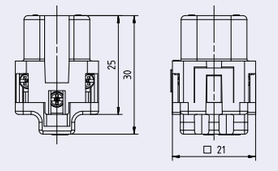
[1)] up to 2.5 mm² without wire end sleeve
[2)] IP-degree of protection on termination side of screw version IP10

Description	Part Number	Drawing	Figure
Contact insert 3 + ⏚			
Pin insert for screw termination	C146 10A003 002 4		
Socket insert for screw termination	C146 10B003 002 4		

Pin layout

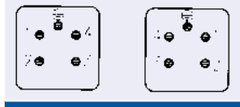
Pin insert Socket insert



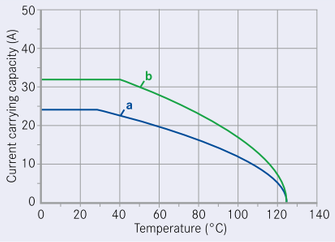
Description	Part Number	Drawing	Figure
Contact insert 4 + ⏚			
Pin insert for screw termination	C146 10A004 002 4		
Socket insert for screw termination	C146 10B004 002 4		

Pin layout

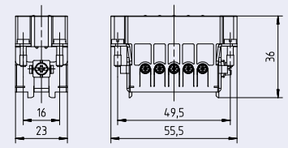
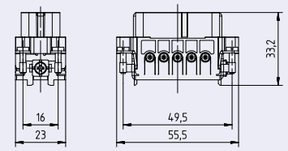
Pin insert Socket insert



Derating curves

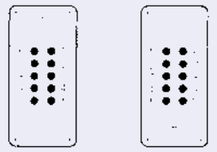


Curve	Wire gauge
a	1.5 mm²
b	2.5 mm²

Description	Part Number	Drawing	Figure
Contact insert 10 + ⏚			
Pin insert for screw termination	C146 10A010 002 4		
Pin insert with wire protection for screw termination	C146 10A010 102 4		
Socket insert for screw termination	C146 10B010 002 4		
Socket insert with wire protection for screw termination	C146 10B010 102 4		

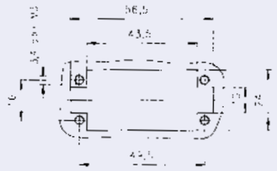
Pin layout

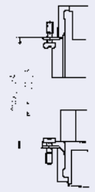
Pin insert Socket insert



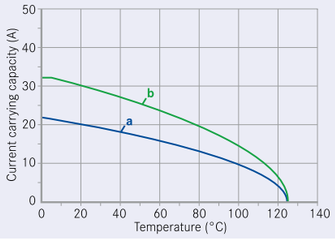
Assembly instruction

Panel cut out (insert)

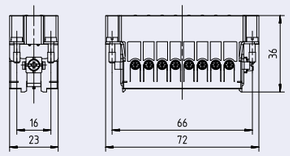
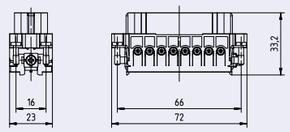




Derating curves

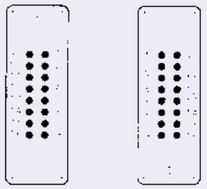


Curve	Wire gauge
a	1.5 mm²
b	2.5 mm²

Description	Part Number	Drawing	Figure
Contact insert 16 + ⏚			
Pin insert for screw termination	C146 10A016 002 4		
Pin insert with wire protection for screw termination	C146 10A016 102 4		
Socket insert for screw termination	C146 10B016 002 4		
Socket insert with wire protection for screw termination	C146 10B016 102 4		

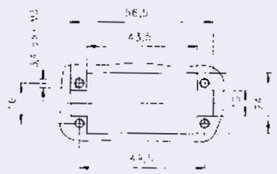
Pin layout

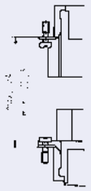
Pin insert Socket insert



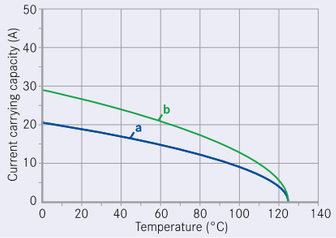
Assembly instruction

Panel cut out (insert)

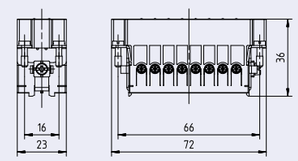
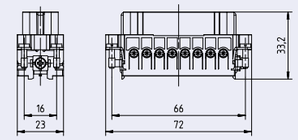




Derating curves

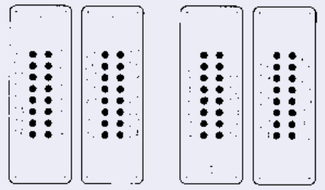


Curve	Wire gauge
a	1.5 mm²
b	2.5 mm²

Description	Part Number	Drawing	Figure
Contact insert 32 + ⏚			
Pin insert for screw termination	C146 10A016 002 4 (1 - 16) + C146 10A016 004 4 (17 - 32)		
Pin insert with wire protection for screw termination	C146 10A016 102 4 (1 - 16) + C146 10A016 104 4 (17 - 32)		
Socket insert for screw termination	C146 10B016 002 4 (1 - 16) + C146 10B016 004 4 (17 - 32)		
Socket insert with wire protection for screw termination	C146 10B016 102 4 (1 - 16) + C146 10B016 104 4 (17 - 32)		

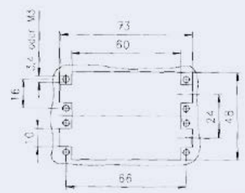
Pin layout

Pin insert Socket insert



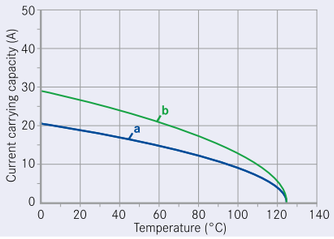
Assembly instruction

Panel cut out (insert)

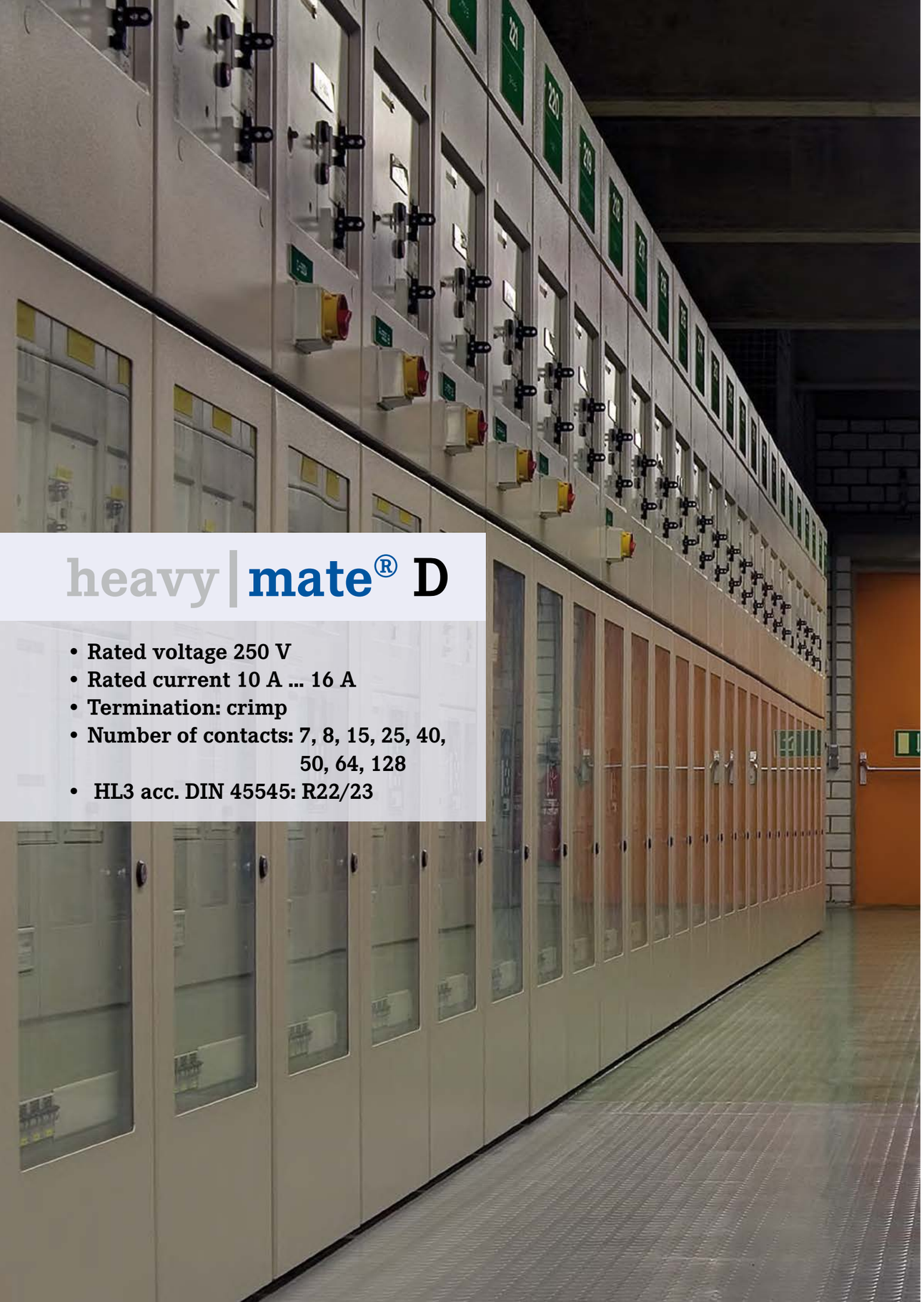




Derating curves



Curve	Wire gauge
a	1.5 mm²
b	2.5 mm²



heavy | mate® 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



Approvals, Testhouse	Characteristics	Approval-Number
UL	600 V	E 63093
CSA	600 V	48932

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 connectorsaccording to DIN EN 175 301 - 801 (DIN 43652)

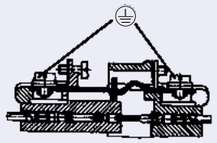
Interchangeable with all other products which are according to the standard.
a) Contact insert to contact insert 15-, 25-, 40-, 64- way
b) Contact insert to housing 15-, 25-, 40-, 64- way

High protection against mismating

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



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



Contact inserts for stamped contacts and for turned contacts



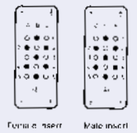


Range of housings

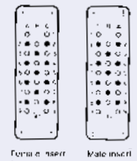
Size A3/4	Size A10	Size A16
		
Size E16	**Size E24**	**Size E48**
		

Modified contact arrangement for rated voltages of 400 V

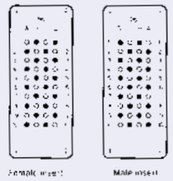
(15) ➛ 7 +⏚



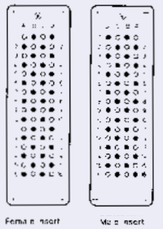
(25) ➛ 11 +⏚



(40) ➛ 20 +⏚



(64) ➛ 32 +⏚



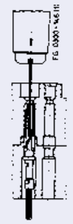
● full load contact
○ unoccupied

Removal of contacts, front releas

stamped pin contacts
all turned contacts

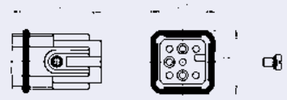
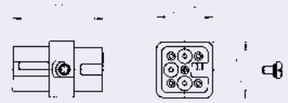


stamped socket contacts

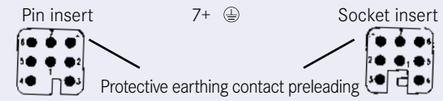


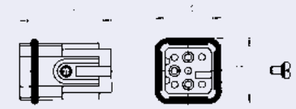
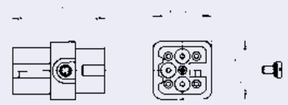
General Characteristics	Standard	Value						
Number of contacts		7+⏚ 8-Pol	15 +⏚	25 +⏚	40 +⏚	50+⏚ 2x25	64 +⏚	128 +⏚ 2x64
Contact arrangement	DIN EN 175 301-801 (DIN 43652)		•	•	•		•	
Termination technique		crimp						
Wire gauge		0.14 mm^2 - 2.5 mm^2 (AWG 26 - 14)						
Max. wire diameter		4.1 mm						
Flammability	UL 94	V-0						
Electrical Characteristics								
Rated voltage [1]	IEC 60664-1	250 V (400 V~[2]) (UL/CSA 600V)[1]						
Rated impulse withstand voltage	IEC60664-1	4 kV						
Rated Current T_u = 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^{10} 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)						

[1] Restriction for 8 contacts in metal housing see page 27 [2] Modified contact arrangement, see page 25

Description	Part Number	Drawing	Figure
Contact insert 7 + ⏚			
Pin insert for stamped crimp contacts	C146 10A007 000 2		
Socket insert for turned crimp contacts	C146 10A007 500 2		
Socket insert for stamped crimp contacts	C146 10B007 000 2		
Socket insert for turned crimp contacts	C146 10B007 500 2		

Pin layout



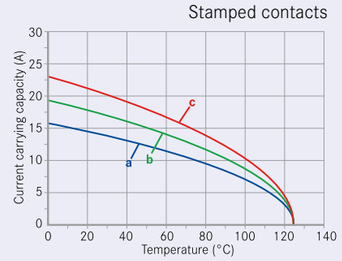
Description	Part Number	Drawing	Figure
Contact insert 8 contacts, 42 V~ in metal housings/250 V in thermoplastic housings (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A008 000 2		
Pin insert for turned crimp contacts	C146 10A008 500 2		
Socket insert for stamped crimp contacts	C146 10B008 000 2		
Socket insert for turned crimp contacts	C146 10B008 500 2		

Pin layout (Note: For use up to 42 V~, the PE contact can be used as regular contact.)



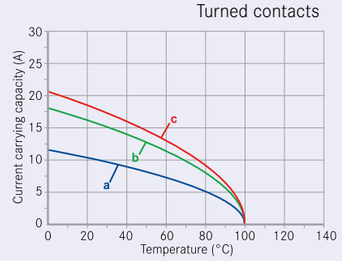
Derating curves

Stamped contacts

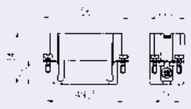
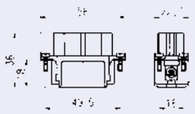
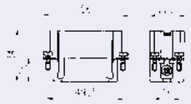
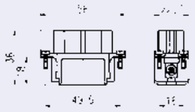


Curve	Wire gauge
a	0.5 mm^2
b	1.5 mm^2 & 2.5 mm^2
c	1.5 mm^2 - 2.5 mm^2 (High current)

Turned contacts

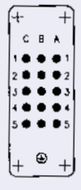


Curve	Wire gauge
a	0.5 mm^2
b	1.5 mm^2
c	2.5 mm^2

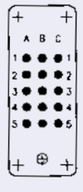
Description	Part Number	Drawing	Figure
Contact insert 15 + ⏚ (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A015 000 2		
Pin insert for turned crimp contacts	C146 10A015 500 2		
Socket insert for stamped crimp contacts	C146 10B015 000 2		
Socket insert 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

Pin insert

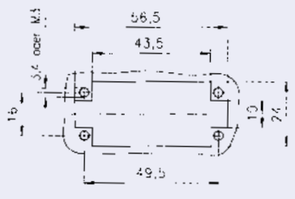


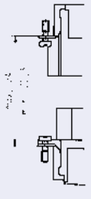
Socket insert



Assembly instruction

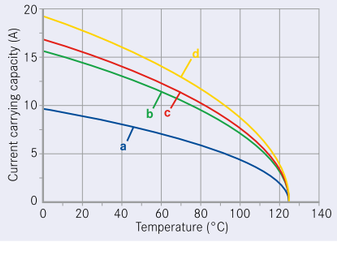
Panel cut out (insert)





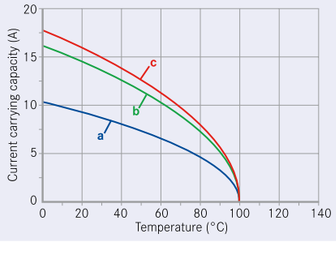
Derating curves

Stamped contacts

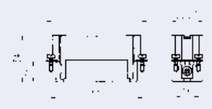
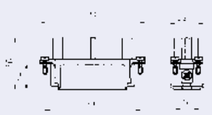
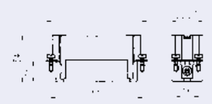
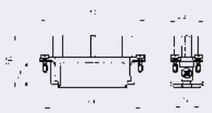


Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²
d	1.5 mm² - 2.5 mm² (High current)

Turned contacts



Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²

Description	Part Number	Drawing	Figure
Contact insert 25 + ⏚ (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A025 000 2		
Pin insert for turned crimp contacts	C146 10A025 500 2		
Socket insert for stamped crimp contacts	C146 10B025 000 2		
Socket insert for turned crimp contacts	C146 10B025 500 2		
Contact insert 25 + ⏚, 2 x PE-termination (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A025 060 2		
Socket insert for stamped crimp contacts	C146 10B025 060 2		

Pin layout

Pin insert

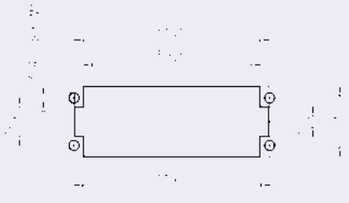


Socket insert



Assembly instruction

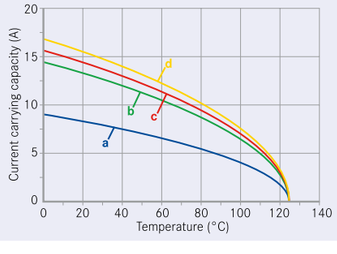
Panel cut out (insert)





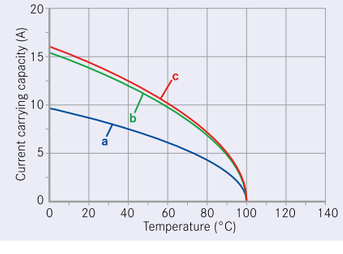
Derating curves

Stamped contacts



Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²
d	1.5 mm² - 2.5 mm² (High current)

Turned contacts

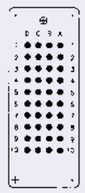


Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²

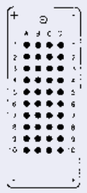
Description	Part Number	Drawing	Figure
Contact insert 40 + ⏚ (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A040 000 2		
Pin insert for turned crimp contacts	C146 10A040 500 2		
Socket insert for stamped crimp contacts	C146 10B040 000 2		
Socket insert for turned crimp contacts	C146 10B040 500 2		
Contact insert 40 + ⏚, 2 x PE-termination (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A040 060 2		
Socket insert for stamped crimp contacts	C146 10B040 060 2		

Pin layout

Pin insert



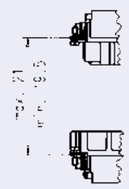
Socket insert



Assembly instruction

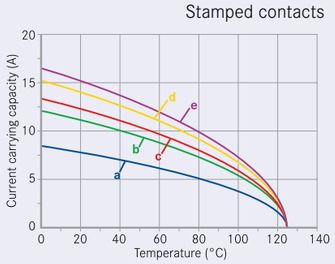
Panel cut out (insert)





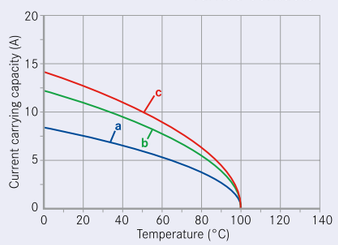
Derating curves

Stamped contacts

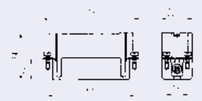
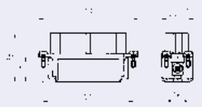


Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²
d	1.5 mm² (High current)
e	2.5 mm² (High current)

Turned contacts

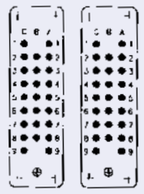


Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²

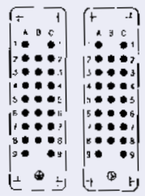
Description	Part Number	Drawing	Figure
Contact insert 50 + ⏚ (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A025 000 2 + C146 10A025 005 2		
Pin insert for turned crimp contacts	C146 10A025 500 2 + C146 10A025 505 2		
Socket insert for stamped crimp contacts	C146 10B025 000 2 + C146 10B025 005 2		
Socket insert for turned crimp contacts	C146 10B025 500 2 + C146 10B025 505 2		

Pin layout

Pin insert

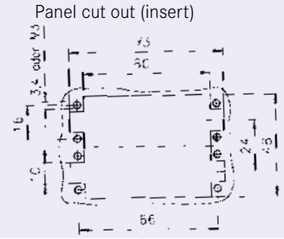


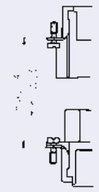
Socket insert



Assembly instruction

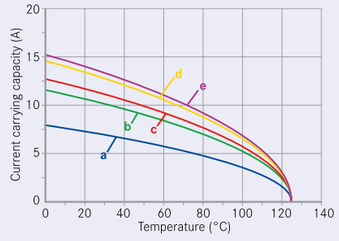
Panel cut out (insert)





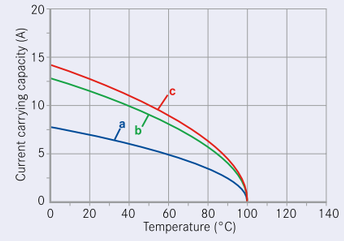
Derating curves

Stamped contacts

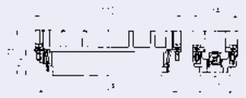
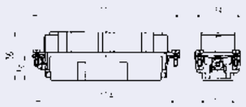
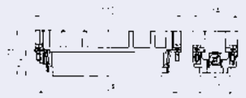
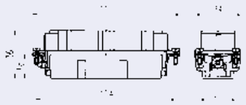


Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²
d	1.5 mm² (High current)
e	2.5 mm² (High current)

Turned contacts



Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²

Description	Part Number	Drawing	Figure
Contact insert 64 + ⏚ (Please order contacts separately, see page 34)			
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		
Contact insert 64 + ⏚, 2 x PE-termination (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A064 060 2		
Socket insert for stamped crimp contacts	C146 10B064 060 2		

Pin layout

Pin insert

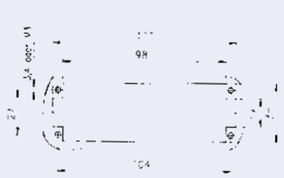


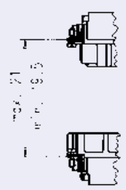
Socket insert



Assembly instruction

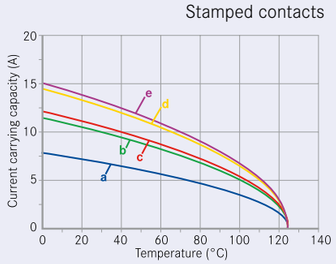
Panel cut out (insert)





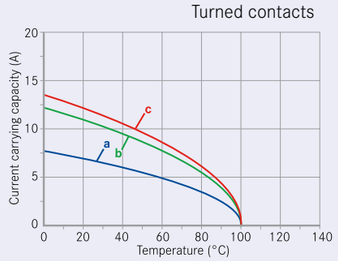
Derating curves

Stamped contacts

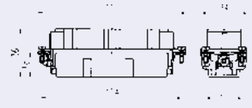


Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²
d	1.5 mm² (High current)
e	2.5 mm² (High current)

Turned contacts



Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²

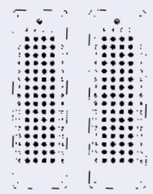
Description	Part Number	Drawing	Figure
Contact insert 128 + ⏚ (Please order contacts separately, see page 34)			
Pin insert for stamped crimp contacts	C146 10A064 000 2 + C146 10A064 005 2		
Pin insert for turned crimp contacts	C146 10A064 500 2 + C146 10A064 505 2		
Socket insert for stamped crimp contacts	C146 10B064 000 2 + C146 10B064 005 2		
Socket insert for turned crimp contacts	C146 10B064 500 2 + C146 10B064 505 2		

Pin layout

Pin insert

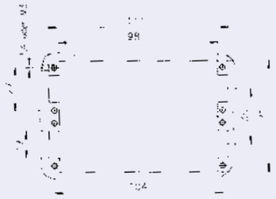


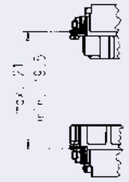
Socket insert



Assembly instruction

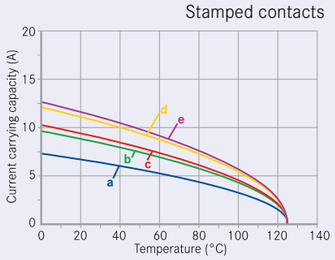
Panel cut out (insert)





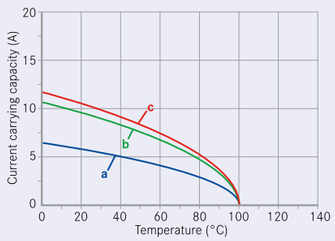
Derating curves

Stamped contacts



Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²
d	1.5 mm² (High current)
e	2.5 mm² (High current)

Turned contacts



Curve	Wire gauge
a	0.5 mm²
b	1.5 mm²
c	2.5 mm²

Large range of wire gauges

VN01 016 0003 1C



VN01 016 0002 1C

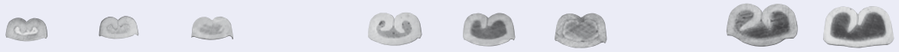


VN01 016 0005 1C



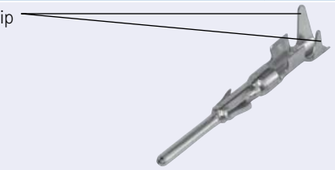
Gas-tight (coldwelding)

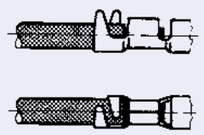
0.14 0.25 0.5 0.5 1.0 1.5 1.5 2.5



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

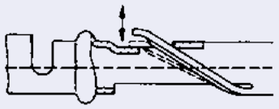
Insulation grip



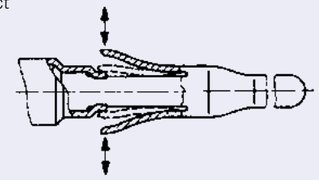


Mechanical retention spring stop on Socket and Pin contact

Socket contact

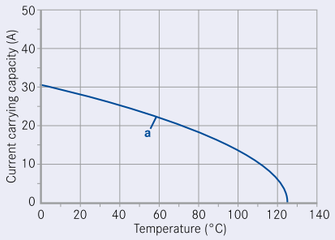


Pin contact

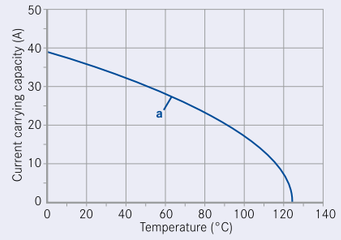


High current carrying capacity

Example single contact



Curve a: 2.5 mm² Standard contact. wire gauge



Curve a: 2.5 mm2 High current contact, wire gauge

Stamped crimp contacts		
Electrical Characteristics		
Contact resistance	IEC 60512-2-1	≤ 5 m Ω
Climatical Characteristics		
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		
Pin contact		CuZn (brass)
Socket contact		CuSn (tin bronce)
Contact plating		Ag (silver) / Au (gold)

Turned crimp contacts		
Electrical Characteristics		
Contact resistance	IEC 60512-2-1	≤ 5 m Ω
Climatical Characteristics		
Upper temperature	IEC 60512-11-9	+ 100 °C
Lower temperature	IEC 60512-11-10	- 40 °C
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Pin contact		CuZn (brass)
Socket contact		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

Stamped crimp contacts

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Stamped single contacts						
silver plating standard	0.14 - 0.5 mm²	26 - 20	100	VN01 016 0003 1	VN02 016 0003 1	
	0.5 - 1.5 mm²	20 - 16	100	VN01 016 0002 1	VN02 016 0002 1	
	1.5 - 2.5 mm²	16 - 14	100	VN01 016 0005 1	VN02 016 0005 1	
silver plating high current	0.5 - 1.5 mm²	20 - 16	100	VN01 016 0015 1	VN02 016 0015 1	
	1.5 - 2.5 mm²	16 - 14	100	VN01 016 0016 1	VN02 016 0016 1	
gold plating standard	0.14 - 0.5 mm²	26 - 20	100	VN01 016 0003 2	VN02 016 0003 2	
	0.5 - 1.5 mm²	20 - 16	100	VN01 016 0002 2	VN02 016 0002 2	
	1.5 - 2.5 mm²	16 - 14	100	VN01 016 0005 2	VN02 016 0005 2	
Stamped Contacts on reel for hand crimp tools						
silver plating standard	0.14 - 0.5 mm²	26 - 20	200	ZN01 016 0003 1	ZN02 016 0003 1	
	0.5 - 1.5 mm²	20 - 16	200	ZN01 016 0002 1	ZN02 016 0002 1	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 016 0005 1	ZN02 016 0005 1	
silver plating high current	0.5 - 1.5 mm²	20 - 16	200	ZN01 016 0015 1	ZN02 016 0015 1	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 016 0016 1	ZN02 016 0016 1	
gold plating standard	0.14 - 0.5 mm²	26 - 20	200	ZN01 016 0003 2	ZN02 016 0003 2	
	0.5 - 1.5 mm²	20 - 16	200	ZN01 016 0002 2	ZN02 016 0002 2	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 016 0005 2	ZN02 016 0005 2	
Stamped contacts on reel for crimp machines contact feeding left hand side						
silver plating standard	0.14 - 0.5 mm²	26 - 20	2000	TN01 016 0003 1	TN02 016 0003 1	
	0.5 - 1.5 mm²	20 - 16	2000	TN01 016 0002 1	TN02 016 0002 1	
	1.5 - 2.5 mm²	16 - 14	2000	TN01 016 0005 1	TN02 016 0005 1	
silver plating high current	0.5 - 1.5 mm²	20 - 16	2000	TN01 016 0015 1	TN02 016 0015 1	
	1.5 - 2.5 mm²	18 - 14	2000	TN01 016 0016 1	TN02 016 0016 1	
gold plating standard	0.14 - 0.5 mm²	26 - 20	2000	TN01 016 0003 2	TN02 016 0003 2	
	0.5 - 1.5 mm²	20 - 16	2000	TN01 016 0002 2	TN02 016 0002 2	
	1.5 - 2.5 mm²	16 - 14	2000	TN01 016 0005 2	TN02 016 0005 2	

Tools for stamped crimp contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0,14 - 2.5 mm²	-	-	FG 0300 146 1
Service crimping tool	0.14 - 0.5 mm² 0.5 - 1.5 mm²	-	-	TA 0100 146
Crimping tool for single contacts	0.14 - 0.5 mm² 0.5 - 1.5 mm² 1.5 - 2.5 mm²	TA 0001 146 000 1 TA 0002 146 000 1 TA 0007 146 000 3	TA 0000 202 TA 0000 163 TA 0000 141	TA 0000 or TA 0500

Further tools see catalogue "Tools"

Turned crimp contacts

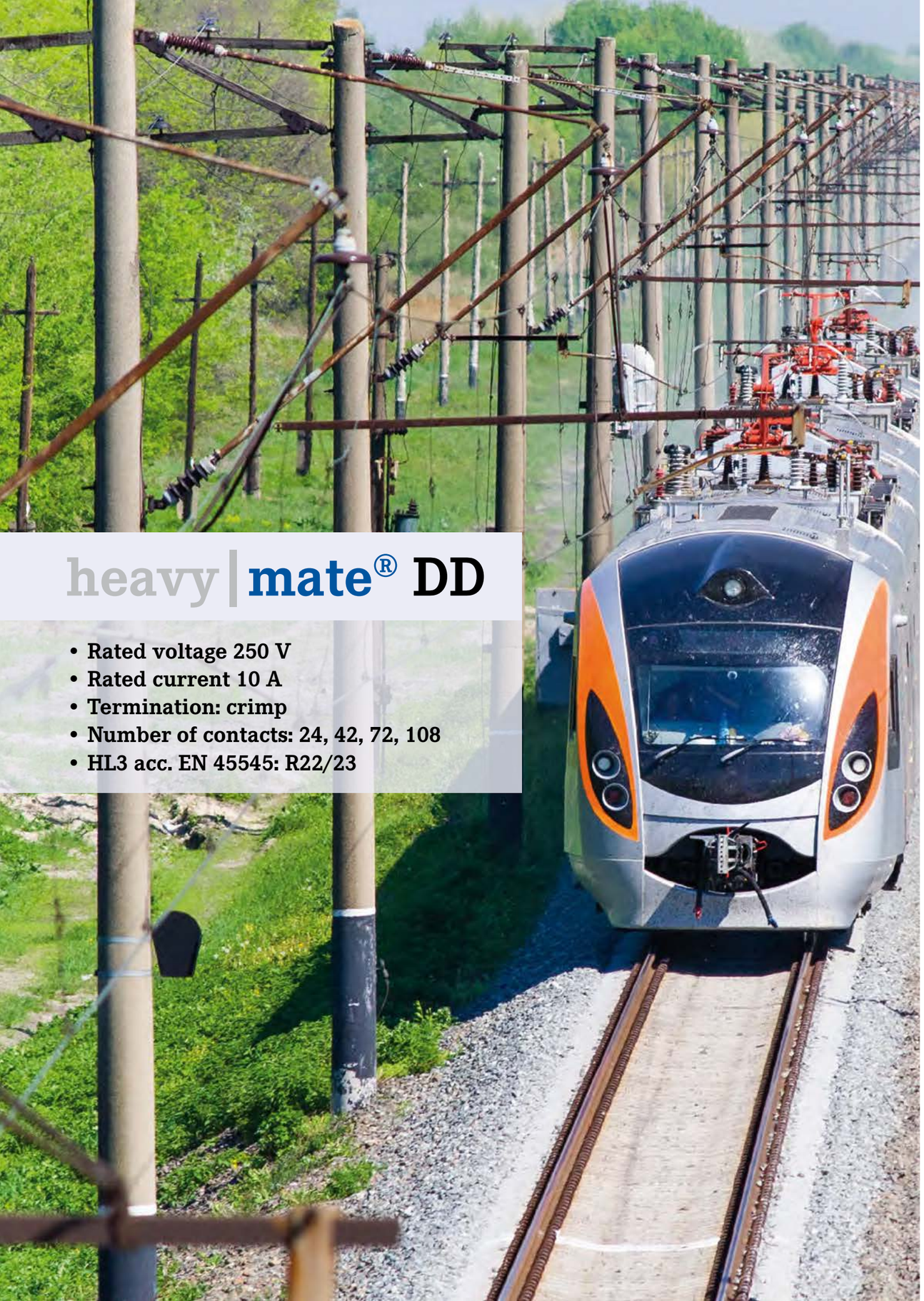
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16 - 15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16 - 15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Tools

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	-	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 000 1	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146

Further tools see catalogue “Tools”

D



heavy | mate® DD

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





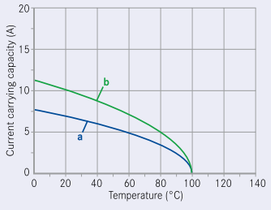



Approvals, Testhouse	Characteristics	Approval-Number
UL	600 V, 8,5 A	E 63093
CSA	600 V	E 63093

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^2 - 2.5 mm^2 (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_u = 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^{10} 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[1)]	IEC 60529	unmated IP00, matedIP20			
IP-degree of protection socket insert[1)]	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			

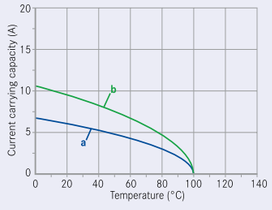
Derating curves

24 + ⏚



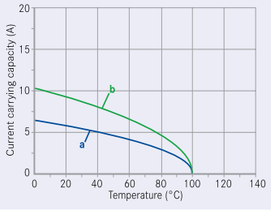
Curve	Wire gauge
a	0.75 mm^2
b	1.5 mm^2

42 + ⏚



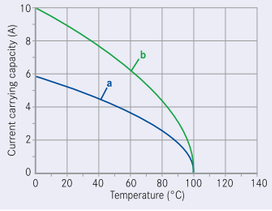
Curve	Wire gauge
a	0.75 mm^2
b	1.5 mm^2

72 + ⏚

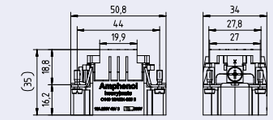
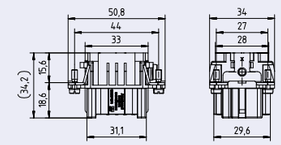
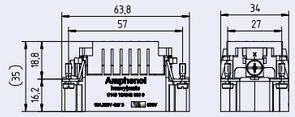
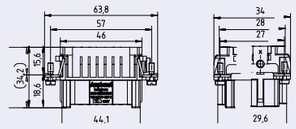
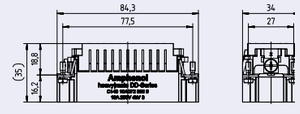
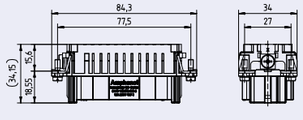


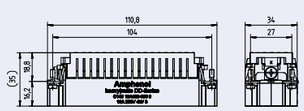
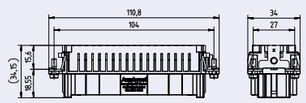
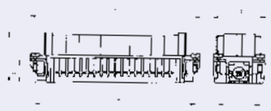
Curve	Wire gauge
a	0.75 mm^2
b	1.5 mm^2

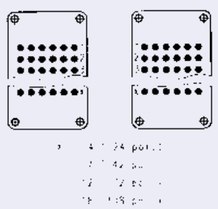
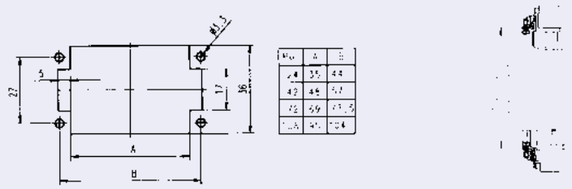
108 + ⏚



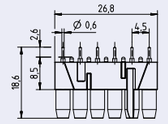
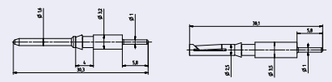
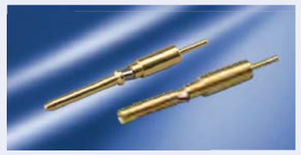
Curve	Wire gauge
a	0.75 mm^2
b	1.5 mm^2

Description	Part Number	Drawing	Figure
Contact insert 24 + ⏚ I Size E 6 (Please order contacts separately, see page 43) Housings from page 226			
Pin insert 24 + ⏚	C146 10A024 000 9		
Socket insert 24 + ⏚	C146 10B024 000 9		
Contact insert 42 + ⏚ I Size E 10 (Please order contacts separately, see page 43) Housings from page 228			
Pin insert 42 + ⏚	C146 10A042 000 9		
Socket insert 42 + ⏚	C146 10B042 000 9		
Contact insert 72 + ⏚ I E 16 (Please order contacts separately, see page 43) Housings from page 235			
Pin insert 72 + ⏚*	C146 10A072 000 9		
Socket insert 72 + ⏚*	C146 10B072 000 9		

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
Pin insert Socket insert	Panel cut out (insert)
	

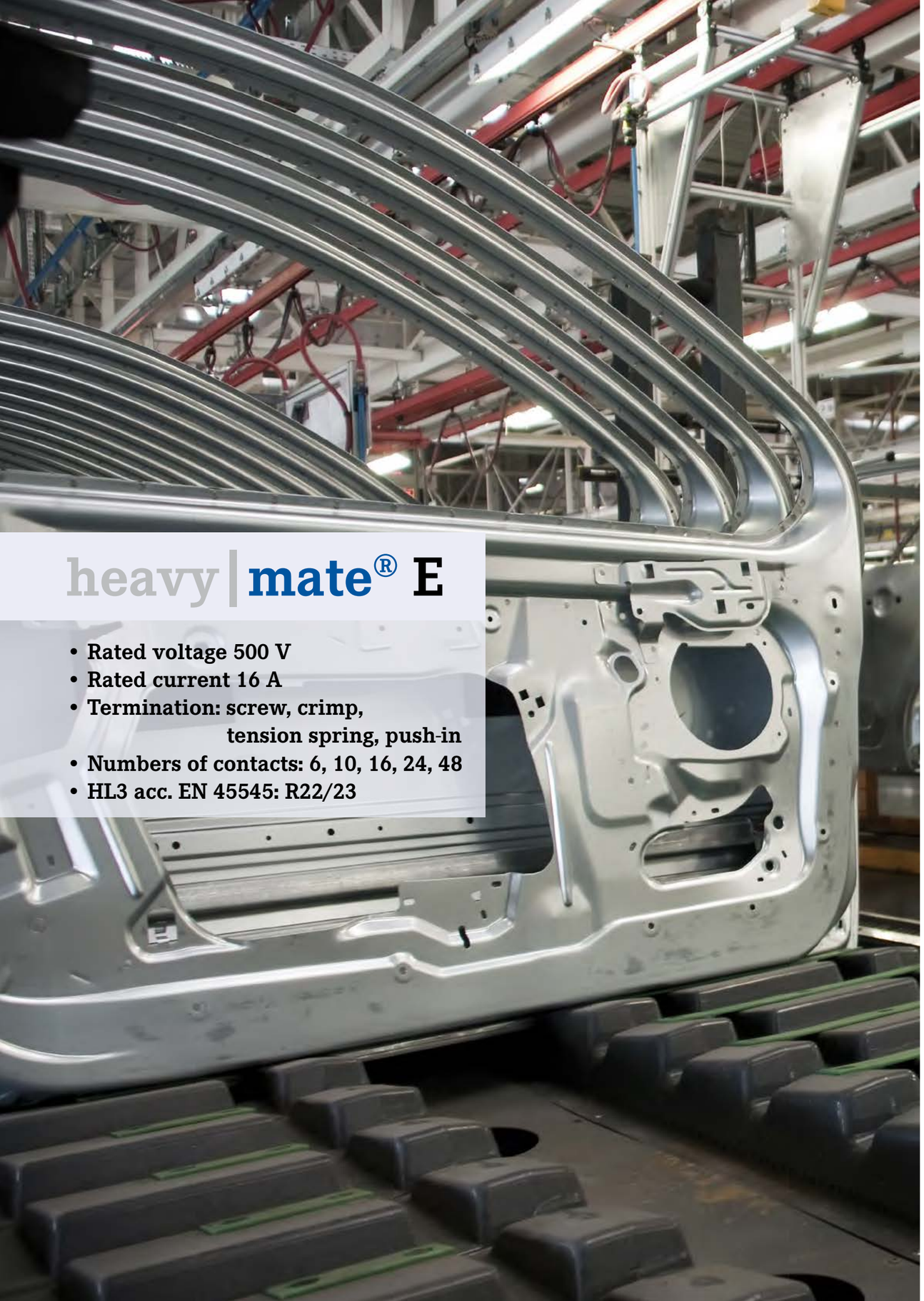
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact 1.6mm						
silver plating	0.14 - 0,37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1,0 mm²	20 - 16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16 - 15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16 - 15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Description	Part number	Dawing	Figure
PCB adaptor 6 pole (for all inserts DD series)	C146 10B006 300 15		
PCB-contact gold plating (100 Pieces)	VN01 016 0057 3C VN02 016 0057 3C		

Tools for turned crimp contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue “Tools”				

DD



heavy | mate® 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








Approvals, Testhouse	Characteristics	Approval-Number
UL	600 V	E 63093
CSA	600 V	48932

General information

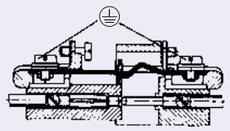
- Contact inserts without crimp contacts (Contact inserts with crimp termination).
- Connectors series heavy | mate® E may be engaged or disengaged when live but without electrical load. If these connectors are mated or unmated under load, the load shall be reduced to 10 % of the rated current.
- Crimping 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:

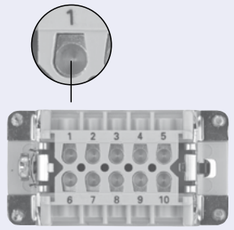
Interchangeable with other products
a) contact insert to contact insert 6-, 10-, 16-, 24- way
b) contact insert to housing 6-, 10- ,16-, 24- way

Housings are designed according to DIN EN 175 301 - 801

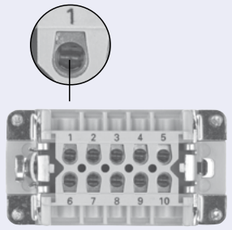
First-to-mate last-to-break protective ground contact



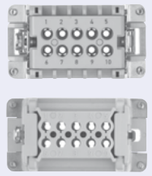
Contact inserts for screw termination, screw termination with wire protection and for crimp termination



Screw termination



Screw termination with wire protection



Crimp termination

Range of housings

Size E6



Size E10



Size E16



Size E24

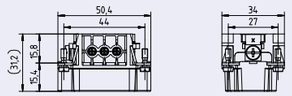
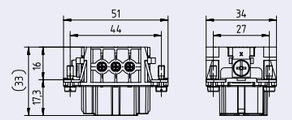
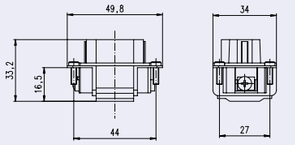
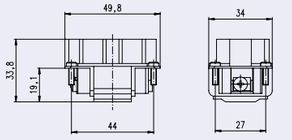
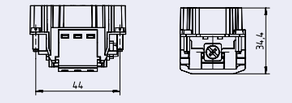
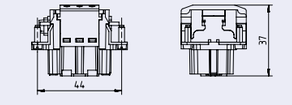


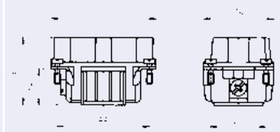
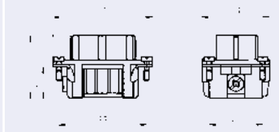
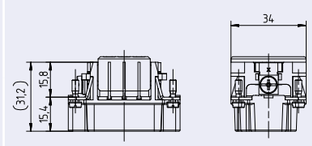
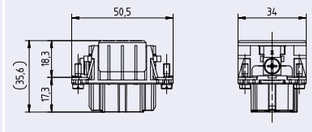
Size E48



General Characteristics	Standard	Value				
Number of contacts		6 + ⏚	10 + ⏚	16 + ⏚	24 + ⏚	48 + ⏚
Termination technique		crimp / screw / tension spring / push-in				
Wire gauge		0.14 - 4 mm² / push-in 0.14 - 2.5 mm² (AWG 26 - 12) / (AWG 26 - 14)				
Tightening torque		0.5 Nm				
Max. wire diameter		4.6 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	6 kV				
Rated current T_{amp} = 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^{10} 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[1)]	IEC 60529	unmated IP00, mated IP20				
IP-degree of protection socket insert[1)]	IEC 60529	unmatedIP20, mated IP20				
Weight: Pin insert crimp (for stamped contacts) Socket insert crimp (for stamped contacts) Pin insert screw Socket insert screw		 33 g 33 g 43 g 43 g	 39 g 39 g 57 g 57 g	 45 g 49 g 78 g 78 g	 55 g 62 g 105 g 106 g	 110 g 124 g 210 g 212 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)				

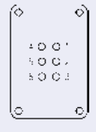
[1)] IP-degree of protection on termination side of screw version IP10

Description	Part Number	Drawing	Figure
Screw termination			
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		
Tension spring			
Pin insert with Tension spring	C146 10A006 400 1		
Socket insert with Tension spring	C146 10B006 400 1		
Push-in			
Pin insert with push-in connection	C146 10A006 600 1		
Socket insert with push-in connection	C146 10B006 600 1		

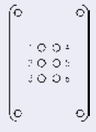
Description	Part Number	Drawing	Figure
Stamped crimp contacts (Please order contacts separately, see page 58)			
Pin insert for stamped crimp contacts	C146 10A006 000 1		
Socket insert for stamped crimp contacts	C146 10B006 000 1		
Turned crimp contacts (Please order contacts separately, see page 58)			
Pin insert for turned crimp contacts	C146 10A006 500 1		
Socket insert for turned crimp contacts	C146 10B006 500 1		

Pin layout

Pin insert

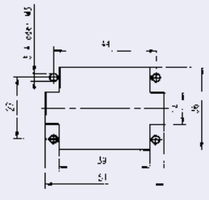


Socket insert



Assembly instruction

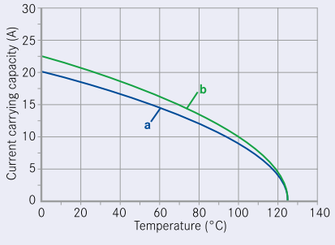
Panel cut out (insert)



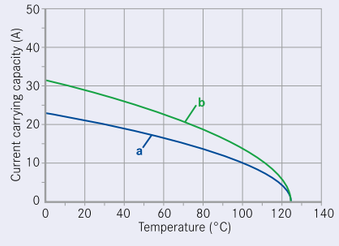


Derating curves

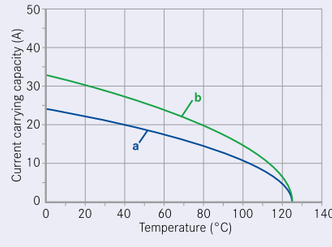
Stamped contacts



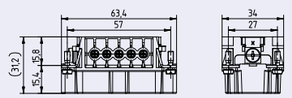
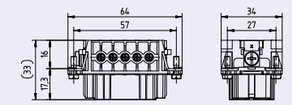
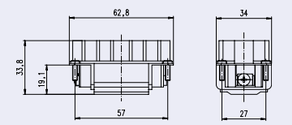
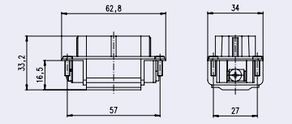
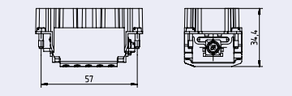
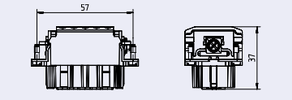
Turned contacts

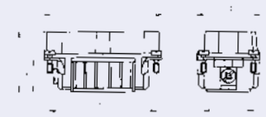
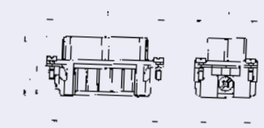
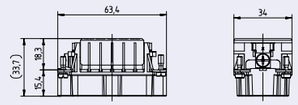
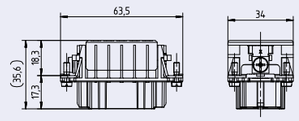


Screw termination



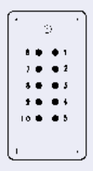
Curve a: 1.5 mm² wire gauge Curve b: 2.5 mm² wire gauge

Description	Part Number	Drawing	Figure
Screw termination			
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		
Tension spring			
Pin insert with Tension spring	C146 10A010 400 1		
Socket insert with Tension spring	C146 10B010 400 1		
Push-in			
Pin insert with push-in connection	C146 10A010 600 1		
Socket insert with push-in connection	C146 10B010 600 1		

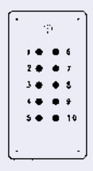
Description	Part Number	Drawing	Figure
Stamped crimp contacts (Please order contacts separately, see page 58)			
Pin insert for stamped crimp contacts	C146 10A010 000 1		
Socket insert for stamped crimp contacts	C146 10B010 000 1		
Turned crimp contacts (Please order contacts separately, see page 58)			
Pin insert for turned crimp contacts	C146 10A010 500 1		
Socket insert for turned crimp contacts	C146 10B010 500 1		

Pin layout

Pin insert

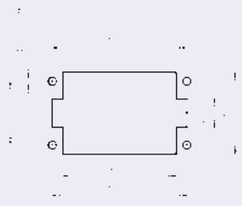


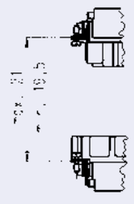
Socket insert



Assembly instruction

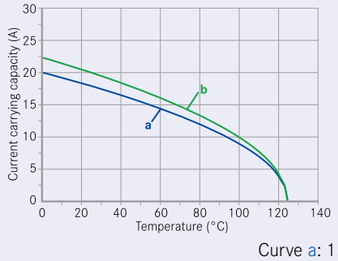
Panel cut out (insert)



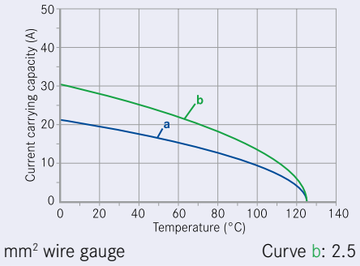


Derating curves

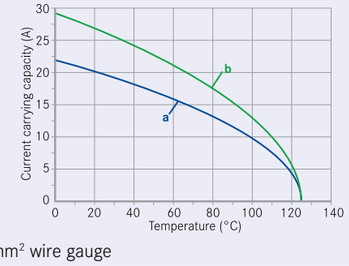
Stamped contacts



Turned contacts

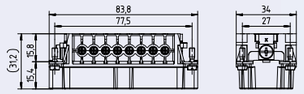
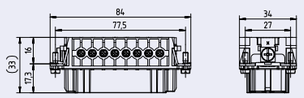
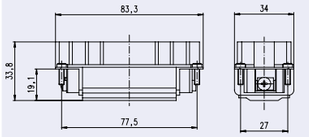
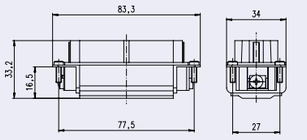
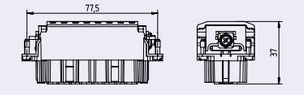
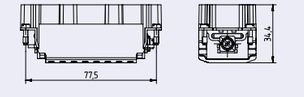


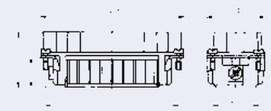
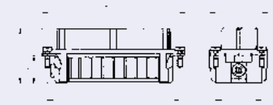
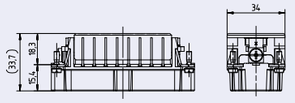
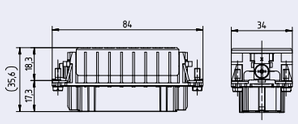
Screw termination



Curve a: 1.5 mm² wire gauge Curve b: 2.5 mm² wire gauge

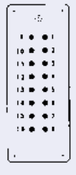
E

Description	Part Number	Drawing	Figure
Screw termination			
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		
Tension spring			
Pin insert with Tension spring	C146 10A016 400 1		
Socket insert with Tension spring	C146 10B016 400 1		
Push-in			
Pin insert with push-in connection	C146 10A016 600 1		
Socket insert with push-in connection	C146 10B016 600 1		

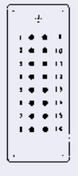
Description	Part Number	Drawing	Figure
Stamped crimp contacts (Please order contacts separately, see page 58)			
Pin insert for stamped crimp contacts	C146 10A016 000 1		
Socket insert for stamped crimp contacts	C146 10B016 000 1		
Turned crimp contacts (Please order contacts separately, see page 58)			
Pin insert for turned crimp contacts	C146 10A016 500 1		
Socket insert for turned crimp contacts	C146 10B016 500 1		

Pin layout

Pin insert

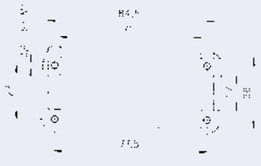


Socket insert



Assembly instruction

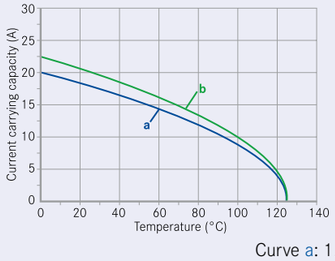
Panel cut out (insert)



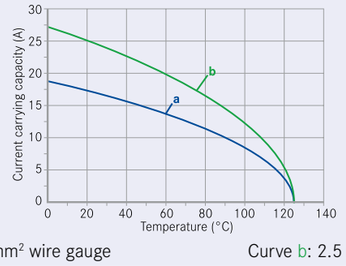


Derating curves

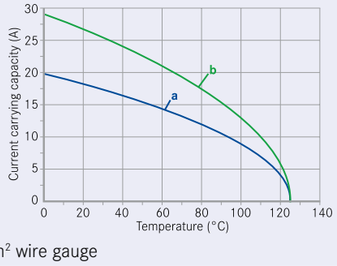
Stamped contacts



Turned contacts

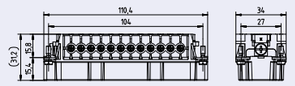
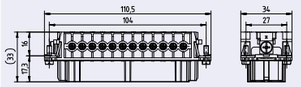
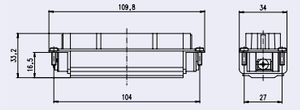
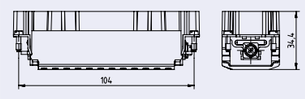
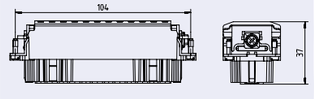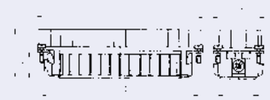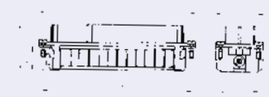


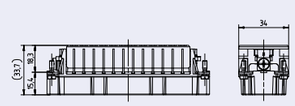
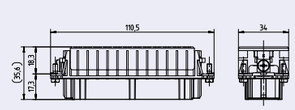
Screw termination



Curve a: 1.5 mm² wire gauge

Curve b: 2.5 mm² wire gauge

Description	Part Number	Drawing	Figure
Screw termination			
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		
Tension spring			
Pin insert with Tension spring	C146 10A024 400 1		
Socket insert with Tension spring	C146 10B024 400 1		
Push-in			
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
Stamped crimp contacts (Please order contacts separately, see page 58)			
Pin insert for stamped crimp contacts	C146 10A024 000 1		
Socket insert for stamped crimp contacts	C146 10B024 000 1		
Turned crimp contacts (Please order contacts separately, see page 58)			
Pin insert for turned crimp contacts	C146 10A024 500 1		
Socket insert for turned crimp contacts	C146 10B024 500 1		

Pin layout

Pin insert



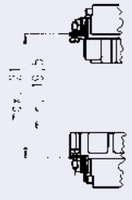
Socket insert



Assembly instruction

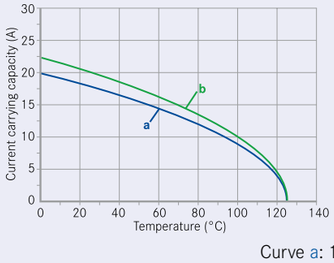
Panel cut out (insert)



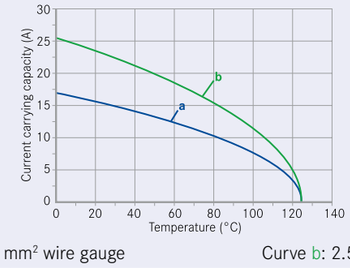


Derating curves

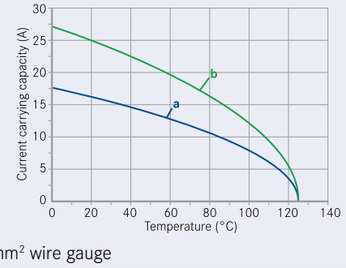
Stamped contacts



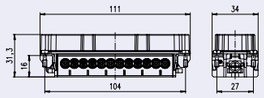
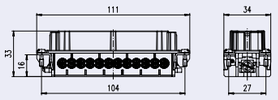
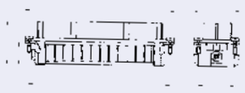
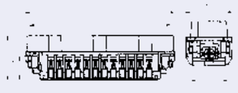
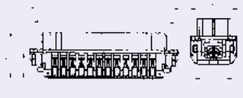
Turned contacts



Screw termination

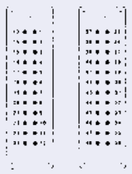


Curve a: 1.5 mm² wire gauge Curve b: 2.5 mm² wire gauge

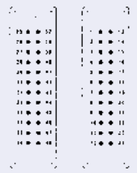
Description	Part Number	Drawing	Figure
Screw termination			
Pin insert for screw termination	C146 10A024 002 1 + C146 10A024 002 1		
Pin insert with wire protection for screw termination	C146 10A024 102 1 + C146 10A024 102 1		
Socket insert for screw termination	C146 10B024 002 1 + C146 10B024 002 1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

Pin layout

Pin insert



Socket insert



Assembly instruction

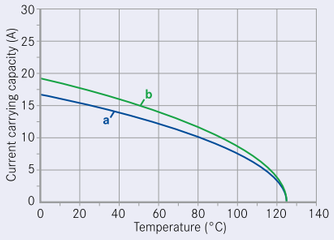
Panel cut out (insert)



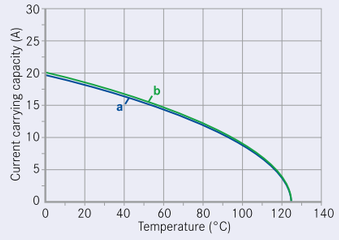


Derating curves

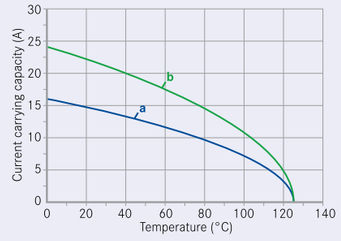
Stamped contacts



Turned contacts



Screw termination



Curve a: 1.5 mm² wire gauge Curve b: 2.5 mm² wire gauge

E

Large range of wire gauges

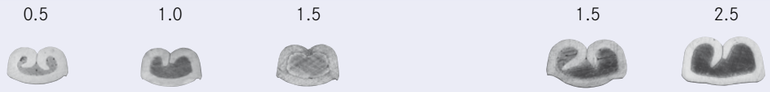
VN01 025 0001 1C



VN01 025 0010 1C



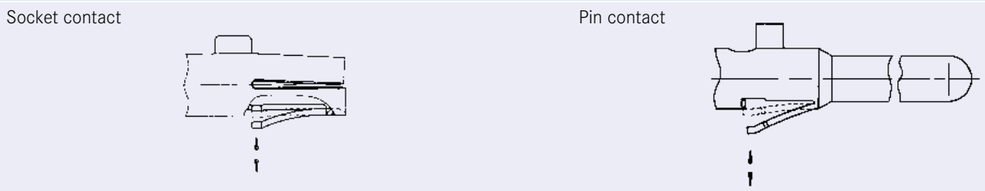
Gas-tight (coldwelding)



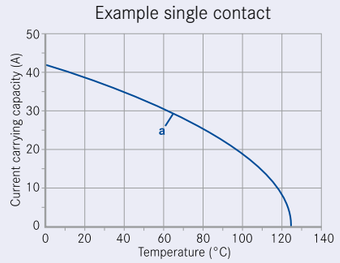
Stamped crimp contacts with insulation crimp, to absorbe mechanical stress from the crimped connection



Mechanical retention spring stop on socket and pin contact



High current carrying capacity



Curve a: 2.5 mm² wire gauge

Stamped crimp contacts		
Electrical Characteristics		
Contact resistance	IEC 60512-2-1	< 5 m Ω
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Pin contact		CuZn (brass)
Socket contact		CuSn (tin bronce)
Contact plating		Ag (silver) / Au (gold)
Turned crimp contacts		
Electrical Characteristics		
Contact resistance	IEC 60512-2-1	≤ 5 m Ω
Climatical Characteristics		
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		
Pin contact		CuZn (brass)
Socket contact		CuZn (brass)
Contact plating		Ag (silver) / Au (gold)

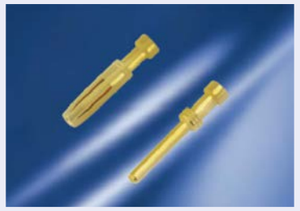
Stamped crimp contacts

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Stamped single contacts						
silver plating	0.5 - 1.5 mm²	20 - 16	100	VN01 025 0001 101	VN02 025 0001 101	
	1.5 - 2.5 mm²	16- 14	100	VN01 025 0010 101	VN02 025 0010 101	
	2.5 - 4 mm²	14 - 12	100	VN01 025 0043 1	VN02 025 0043 1	
gold plating	0.5 - 1.5 mm²	20 - 16	100	VN01 025 0001 102	VN02 025 0001 102	
	1.5 - 2.5 mm²	16- 14	100	VN01 025 0010 102	VN02 025 0010 102	
	2.5 - 4 mm²	14 - 12	100	VN01 025 0043 2	VN02 025 0043 2	
Stamped Contacts on reel for hand crimp tools						
silver plating	0.5 - 1.5 mm²	20 - 16	200	ZN01 025 0001 1	ZN02 025 0001 1	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 025 0010 1	ZN02 025 0010 1	
gold plating	0.5 - 1.5 mm²	20 - 16	200	ZN01 025 0001 2	ZN02 025 0001 2	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 025 0010 2	ZN02 025 0010 2	
Stamped contacts on reel for crimp machines contact feeding left hand side						
silver plating	0.5 - 1.5 mm²	20 - 16	2000	TN01 025 0001 1	TN02 025 0001 1	
	1.5 - 2.5 mm²	16 - 14	2000	TN01 025 0010 1	TN02 025 0010 1	
	2.5 - 4 mm²	14 - 12	2000	TN01 025 0043 1	TN02 025 0043 1	

Tools for turned crimp contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.5 - 4.0 mm²	-	-	FG 0200 146 1
Crimping tool for stamped single contacts	0.5 - 1.5 mm² 1.5 - 2.5 mm² 2.5 - 4.0 mm²	TA 0004 146 0001 TA 0005 146 0003 TA 0003 146 0001	TA 0000 163 TA 0000 141 TA 0000 121	TA 0000 or TA 0500
Further tools see catalogue “Tools”				

Turned crimp contacts

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	22 - 26	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 - 0.37 mm²	22 - 26	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

Tools for turned crimp contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146
Further tools see catalogue “Tools”				



heavy | mate® EE

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







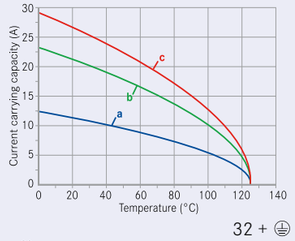

Approvals, Testhouse	Characteristics	Approval-Number
UL	600 V	E 63093
CSA	600 V	E 63093

Characteristics contact inserts

General Characteristics	Standard	Value			
Number of contacts		10 + ⏚	18 + ⏚	32 + ⏚	46 + ⏚
Termination technique		crimp			
Wire gauge		0.14 mm² - 4.0 mm² (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_u = 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 m Ω			
Insulation resistance	IEC 60512-3-1	≥ 10^{10} 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)			

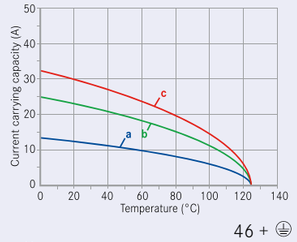
Derating-Kurven

10 + ⏚



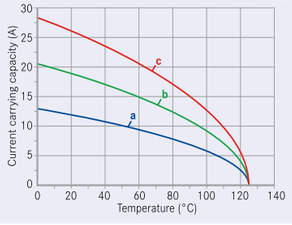
Curve	Wire gauge
a	0.5 mm²
b	2.5 mm²
c	4.0 mm²

18 + ⏚



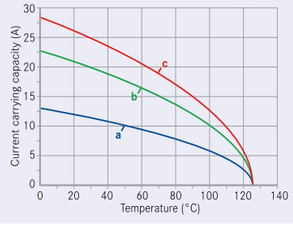
Curve	Wire gauge
a	0.5 mm²
b	2.5 mm²
c	4.0 mm²

32 + ⏚



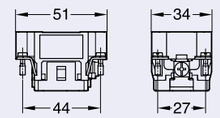
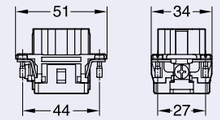
Curve	Wire gauge
a	0.5 mm²
b	2.5 mm²
c	4.0 mm²

46 + ⏚



Curve	Wire gauge
a	0.5 mm²
b	2.5 mm²
c	4.0 mm²

Contact inserts 10 - 18 + ⏚ | 500 V/15 A

Description	Part Number	Drawing	Figure
Contact insert10 + ⏚ I Size E 6 (Please order contacts separately, see page 67) Housings from page 226			
Pin insert 10 + ⏚	C146 10A010 500 10		
Socket insert 10 + ⏚	C146 10B010 500 10		

Pin layout

Pin insert

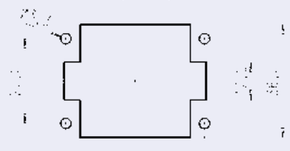


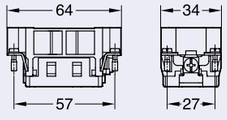
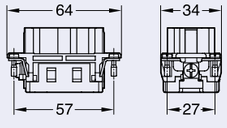
Socket insert



Assembly instruction

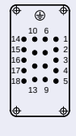
Panel cut out (insert)



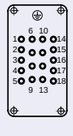
Description	Part Number	Drawing	Figure
Contact insert 18 + ⏚ I Size E 10 (Please order contacts separately, see page 67) Housings from page 228			
Pin insert 18 + ⏚	C146 10A018 500 10		
Socket insert 18 + ⏚	C146 10B018 500 10		

Pin layout

Pin insert

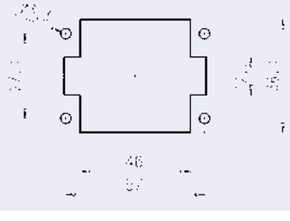


Socket insert

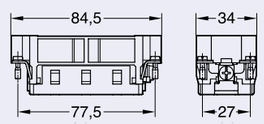
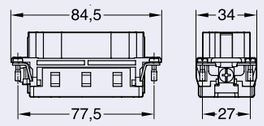


Assembly instruction

Panel cut out (insert)

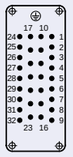


Contact inserts 32 - 46 + ⏚ | 500 V/16 A

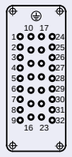
Description	Part Number	Drawing	Figure
Contact insert 32 + ⏚ I Size E 16 (Please order contacts separately, see page 67) Housings from page 235			
Pin insert 32 + ⏚	C146 10A032 500 10		
Socket insert 32 + ⏚	C146 10B032 500 10		

Pin layout

Pin insert

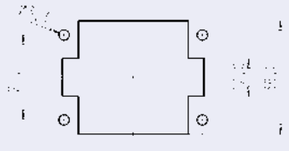


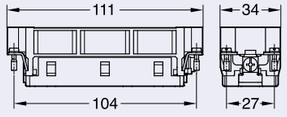
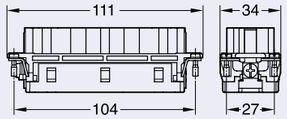
Socket insert



Assembly instruction

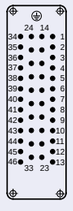
Panel cut out (insert)



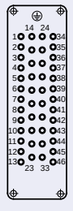
Description	Part Number	Drawing	Figure
Contact insert 46 + ⏚ I Size E 24 (Please order contacts separately, see page 67) Housings from page 235			
Pin insert 46 + ⏚	C146 10A046 500 10		
Socket insert 46 + ⏚	C146 10B046 500 10		

Pin layout

Pin insert

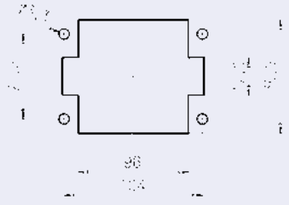


Socket insert

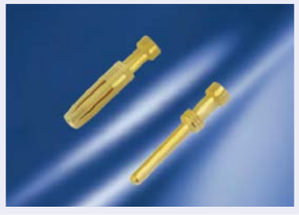


Assembly instruction

Panel cut out (insert)



Crimp contacts

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact 2.5mm						
silver plating	0.14 mm² - 0.37 mm²	26-22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 mm² - 0.37 mm²	26-22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

Tools for turned crimp contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for	0.14 - 0.37 mm² 0.5 - 2.5 mm²	TA 0010 146 000 6 TA 0010 146 000 7	TA 0000 144 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping	3.0 - 4.0 mm²	TA 0010 146 000 7	TA 0000 124	
4-Indent crimping tool	0.14 - 4.0 mm²			TB 0600 146
Further tools see catalogue “Tools”				

Stripping length see page 319 - 320



heavy | mate® EEE

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





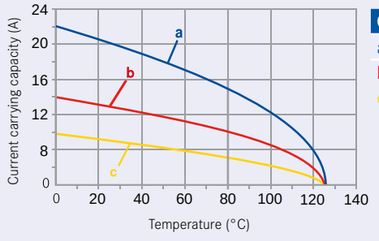



Approvals, Testhouse	Characteristics	Approval-Number
UL	in preparation	in preparation
CSA	in preparation	in preparation

General Characteristics	Standard	Value	
Number of contacts		40 + ⏚	64 + ⏚
Termination technique		crimp	
Wire gauge		0.14 mm² - 4.0 mm² (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_u = 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 m Ω	
Insulation resistance	IEC 60512-3-1	≥ 10^{10} 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)	

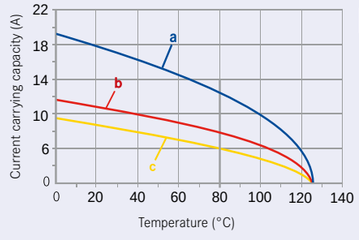
Derating curves

40 + ⏚

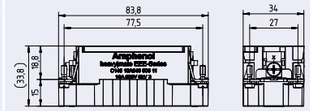
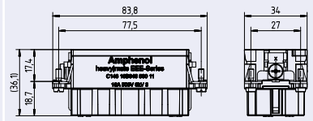
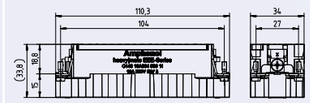
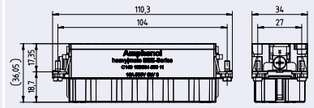


Curve	Wire gauge
a	4.0 mm²
b	1.5 mm²
c	0.75mm²

64 + ⏚



Curve	Wire gauge
a	4.0 mm²
b	1.5 mm²
c	0.75mm²

Description	Part Number	Drawing	Figure
Contact insert 40 + ⏚ I Size E 16 (Please order contacts separately, see page 72) Housings from page 235			
Pin insert 40 + ⏚	C146 10A040 500 11		
Socket insert 40 + ⏚	C146 10B040 500 11		
Description	**Part Number**	**Drawing**	**Figure**
Contact insert 64 + ⏚ I Size E 24 (Please order contacts separately, see page 72) Housings from page 241			
Pin insert 64 + ⏚	C146 10A064 500 11		
Socket insert 64 + ⏚	C146 10B064 500 11		

EEE

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact						
silver plating	0.14 mm² - 0.37 mm²	26-22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 mm² - 0.37 mm²	26-22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

Tools for turned crimp contacts				
Description	**for wire gauge**	**Part Number**		
		Contact locator	**Crimping dies**	**Tool**
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for	0.14 - 0.37 mm² 0.5 - 2.5 mm²	TA 0010 146 000 6 TA 0010 146 000 7	TA 0000 144 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping	3.0 - 4 mm²	TA 0010 146 000 7	TA 0000 124	
4-Indent crimping tool	0.14 - 0.37 mm²	-	-	TB 0600 146
Further tools see catalogue “Tools”				



heavy | mate® 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 Industial Connectors with iron (FE) an Contantan (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 mesuring circuit caused by the flow from iron wire to the brass contact or by temperature changes at the contact elements.

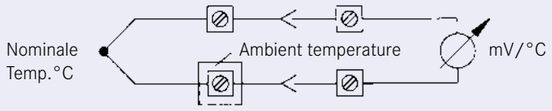
Contact Material / Nominal Temp.	without Thermo Contacts		with Thermo Contacts	
	MS/FE	MS/KO	FE/FE	KO/KO
100 °C	+ 4 %	- 16 %	- 4 %	- 2 %
200 °C	+ 2.5 %	- 8 %	- 3 %	- 1.5 %
300 °C	+ 1.3 %	- 12.7 %	- 1.3 %	0 %
400 °C	+ 1.5 %	- 4.5 %	- 1.0 %	0 %

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

Material / Temperature Range

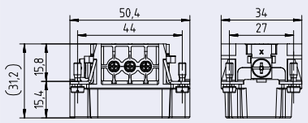
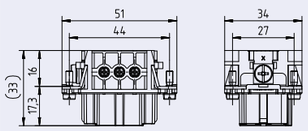
Temperatur range	Material/measurement procedure
< 150 °C	any/Resistance measurement
150 °C - 450 °C	FE-CO (iron/Constantan)
450 °C - approx. 1000 °C	Ni/Cr-Ni (Nickel/Chrome/Nickel)

Temperature changes cause errors



General Characteristics	Standard	Value			
Number of contacts		6 + ⏚	10 + ⏚	16 + ⏚	24 + ⏚
Termination technique		screw			
Wire gauge		0.5 mm² - 2.5 mm² (AWG 20 - 14)			
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_{amp} = 40 °C		10 A			
Installation (overvoltage) category	IEC 60664-1	III			
Material group	IEC 60664-1	III b			
Contact resistance	IEC 60512-2-1	≤ 10 m Ω			
Insulation resistance	IEC 60512-3-1	≥ 10^{10} Ω			
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 pin insert[1)]	IEC 60529	unmated IP00, mated IP20			
IP-degree of protection socket insert[1)]	IEC 60529	unmated IP20, mated IP20			
Weight pin insert		45 g	60 g	78 g	105 g
Weight socket insert		45 g	60 g	78 g	105 g
Mechanical operation	IEC 60512-9-1	≥ 100 mating cycles			
Materials					
Insert		PC			
Colour insert		grey			
Contacts		iron; gal cd 4 constantan = without plating			
Contact plating					

[1)] IP-degree of protection on termination side of screw version IP10

Description	Part Number	Drawing	Figure
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

Pin insert

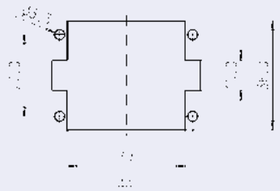


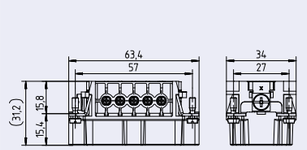
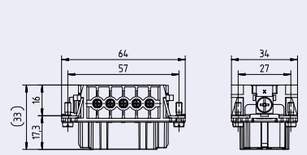
Socket insert



Assembly instruction

Panel cut out (insert)



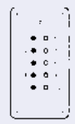
Description	Part Number	Drawing	Figure
Contact insert 10 + ⏚ with iron-constantan contacts I Size E10, Housings from page 228			
Pin insert with wire protection	C146 10A010 810 1		
Socket insert with wire protection	C146 10B010 810 1		

Pin layout

Pin insert

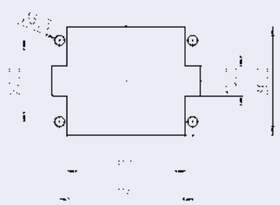


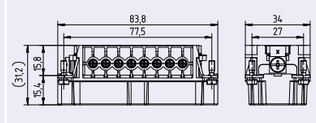
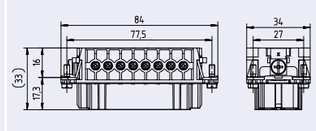
Socket insert



Assembly instruction

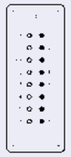
Panel cut out (insert)



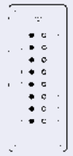
Description	Part Number	Drawing	Figure
Contact insert 16 + ⏚ with iron-constantan contacts I Size E16, from page 235			
Pin insert with wire protection	C146 10A016 810 1		
Socket insert with wire protection	C146 10B016 810 1		

Pin layout

Pin insert

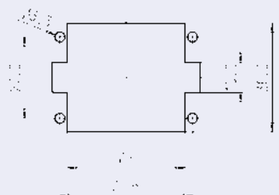


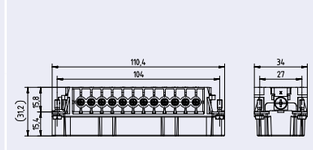
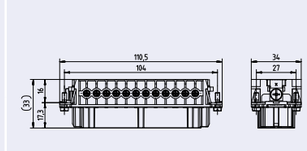
Socket insert



Assembly instruction

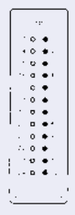
Panel cut out (insert)



Description	Part Number	Drawing	Figure
Contact insert 24 + ⏚ with iron-constantan contacts I Size E24, Housings from page 241			
Pin insert with wire protection	C146 10A024 810 1		
Socket insert with wire protection	C146 10B024 810 1		

Pin layout

Pin insert

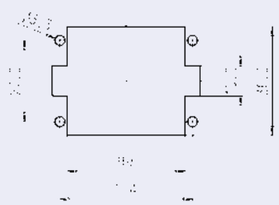


Socket insert



Assembly instruction

Panel cut out (insert)





heavy | mate® 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








Approvals, Testhouse	Characteristics	Approval-Number
UL	see technical characteristics	E 63093
CSA	see technical characteristics	E 63093

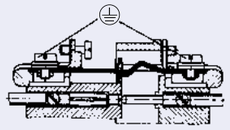
General information

- 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



Requirements

- 3 x 400V; 50A; 6mm² wire gauge
- 8 x 250V; 8A; 1.5mm² wire gauge
- 5 x 400V; 15A; 4mm² wire gauge

Solution

1. Check how 16 contacts can be realized; see modules overview on page 84

Possible selection:
a) 1 x 17 contacts
b) 2 x 12 contacts
c) 1 x 6 contacts + 1 x 12 contacts
d) 1 x 3 contacts + 1 x 6 contacts + 1 x 12 contacts

2. Check technical parameters / solution, see detail pages of the modules from page 96

Possible selection:
a) not possible due to voltage
b) not possible due to voltage
c) not possible due to current
d) POSSIBLE

3. Choose matching contact, see detail page of the modules on page 96

Possible selection:
a) 3 contacts = C146 10A003 600 15 → contacts = VN01 040 0013 1C
b) 6 contacts = C146 10A006 600 15 → contacts = VN01 025 0039 1C
c) 12 contacts = C146 10A012 600 15 → contacts = VN01 016 0027 1C

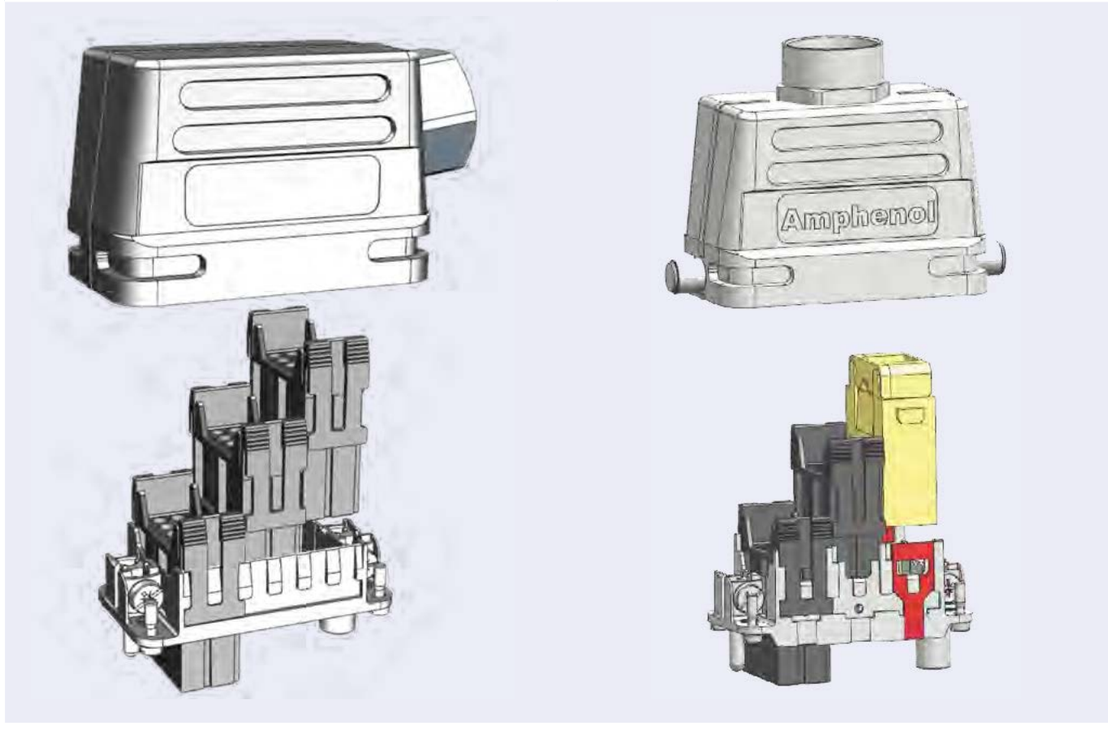
4. Choose matching frame, see frames on page 92

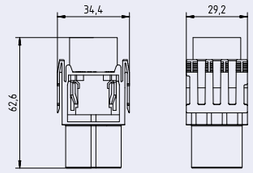
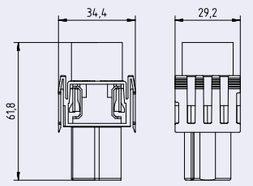
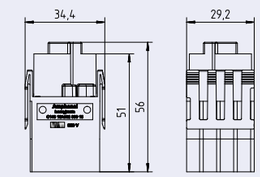
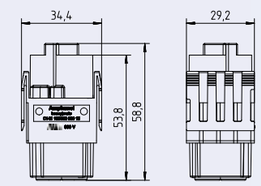
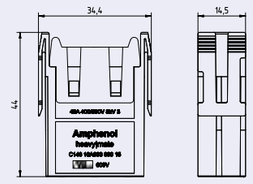
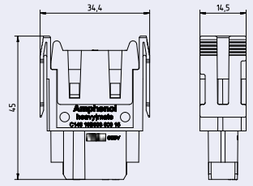
Solution: C146 10P10 000 15

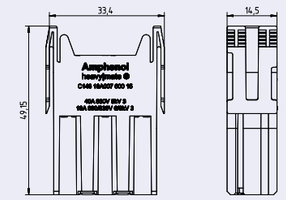
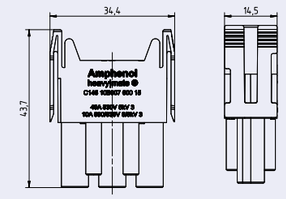
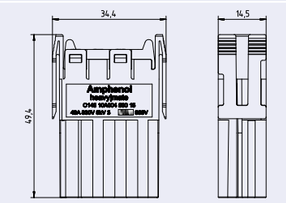
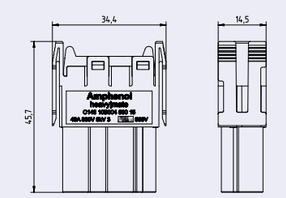
5. Choose matching housing, see housings on page 228

Solution: C146 21R010 600 8

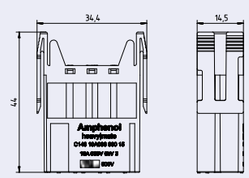
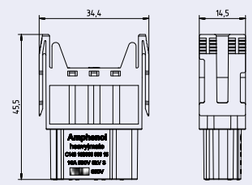
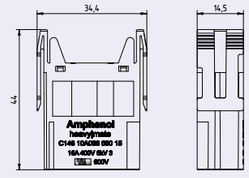
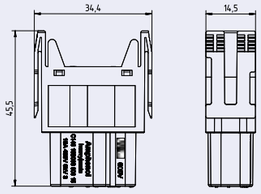
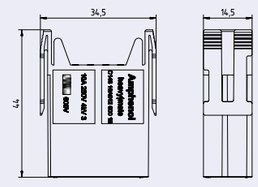
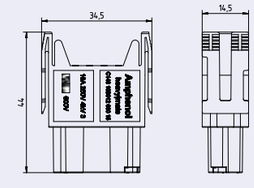
Schematic construction



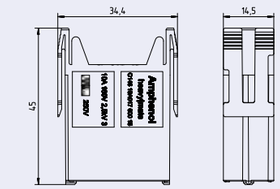
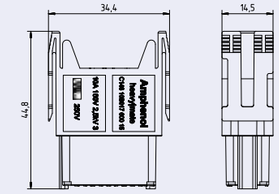
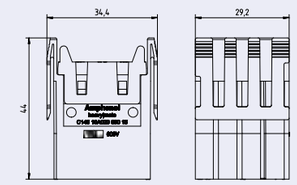
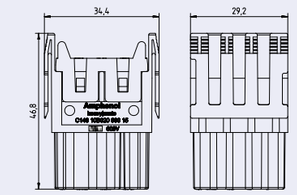
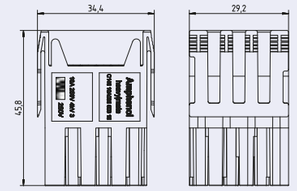
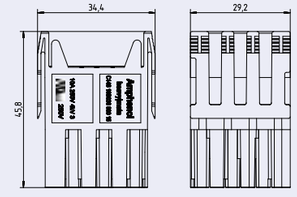
Description	Part Number	Drawing	Figure
1 contacts module, 1000V, details see page 96*			
Pin module 1 contact	C146 10A001 600 15		
Socket module 1 contact	C146 10B001 600 15		
2 contacts module, 1000V, details see page 98			
Pin module 2 contacts	C146 10A002 600 15		
Socket module 2 contacts	C146 10B002 600 15		
3 contacts module, details see page 100			
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
3+4 contacts module, 830 V, details see page 102*			
Pin module 3+4 contacts	C146 10A007 600 15		
Socket module 3+4 contacts	C146 10B007 600 15		
4 contacts module, 830 V, details see page XXX			
Pin module 4 contacts	C146 10A004 600 15		
Socket module 4 contacts	C146 10B004 600 15		

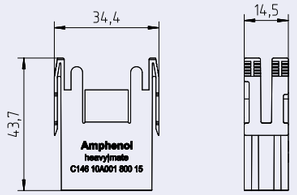
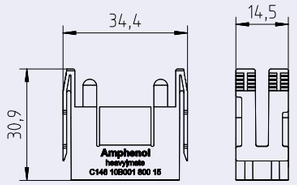
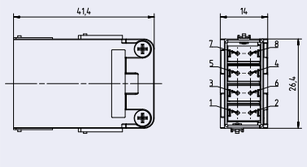
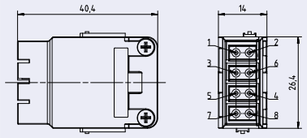
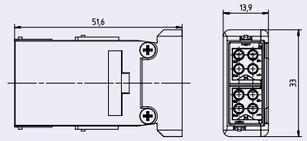
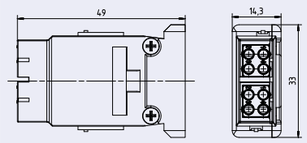
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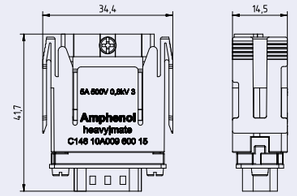
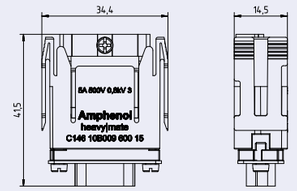
Description	Part Number	Drawing	Figure
6 contacts module, 500 V, details see page 106			
Pin module 6 contacts	C146 10A006 600 15		
Socket module 6 contacts	C146 10B006 600 15		
8 contacts module, 400 V, details see page 108			
Pin module 8 contacts	C146 10A008 600 15		
Socket modules 8 contacts	C146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

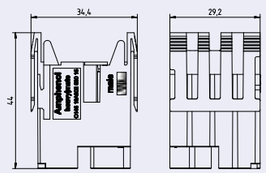
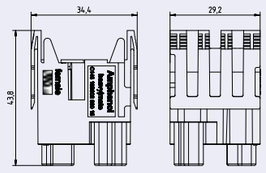
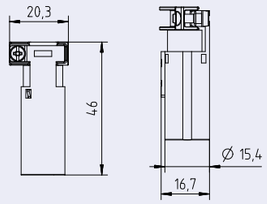
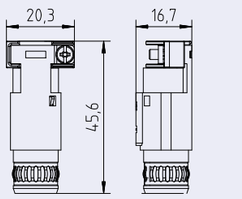
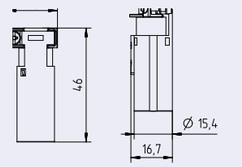
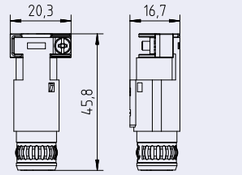
heavy | mate® F Modules Overview

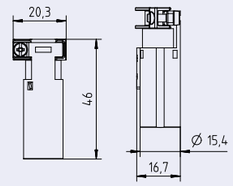
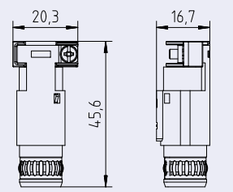
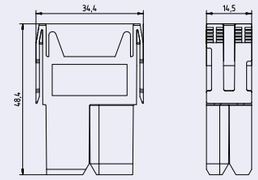
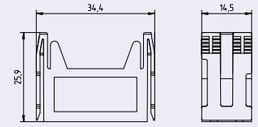
Description	Part Number	Drawing	Figure
17 contacts module, 160 V, details see page 112			
Pin module 17 contacts	C146 10A017 600 15		
Socket module 17 contacts	C146 10B017 600 15		
20 contacts module, 500 V, details see page 114			
Pin module 20 contacts	C146 10A020 600 15		
Socket module 20 contacts	C146 10B020 600 15		
36 contacts module, 250 V, details see page 120			
Pin module 36 contacts	C146 10A036 600 15		
Socket module 36 contacts	C146 10B036 600 15		

F

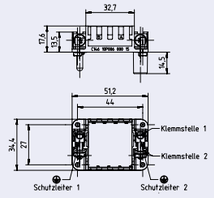
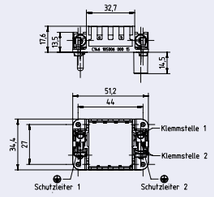
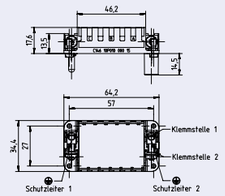
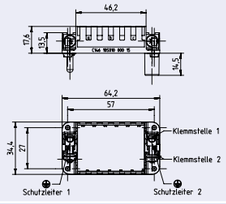
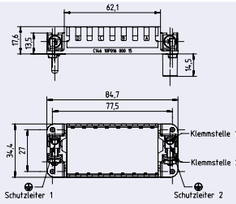
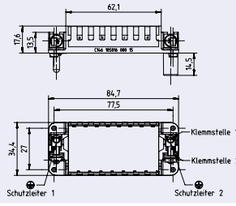
Description	Part Number	Drawing	Figure
Adaptor modules, details see page 122			
Adaptor modules for Gigabit- and Megabit pin contact carrier	C146 10A001 800 15		
Adaptor modules for Gigabit- and Megabit socket contact carrier 8 pole	C146 10B001 800 15		
Gigabit contact carrier 8 pole, CAT7, details see page 123*			
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		
Megabit contact carrier 8 pole, CAT5e, details see page 124 *			
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		

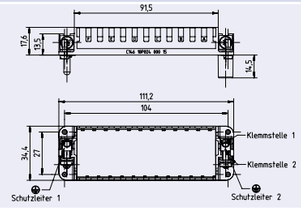
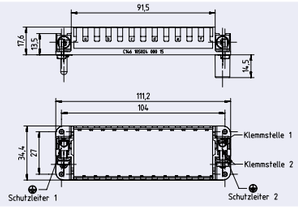
Description	Part Number	Drawing	Figure
D-Sub module, details see page 128*			
Pin module D-Sub 9 contacts	C146 10A009 600 15		
Socket module D-Sub 9 contacts	C146 10B009 600 15		

Description	Part Number	Drawing	Figure
Adaptor modules, details see page 116			
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		
Quintax contact carrier, CAT5e, 50 V, details see page 116			
Pin contact carrier 4 pole	C146 10A004 901 15		
Socket contact carrier 4 pole	C146 10B004 901 15		
Coax contact carrier, 50 Ω, details see page 118			
Pin contact carrier 1 pole	C146 10A001 902 15		
Socket contact carrier 1 pole	C146 10B001 902 15		

Description	Part Number	Drawing	Figure
Coax contact carrier 75 Ω, details see page 118			
Pin contact carrier 1 pole	C146 10A001 901 15		
Socket contact carrier 1 pole	C146 10B001 901 15		
Blind modules, details see page 130*			
Blind module with centering function**	C146 10H000 600 15		
Blind module standard	C146 10H000 601 15		

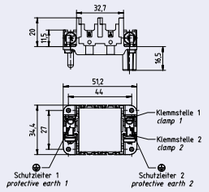
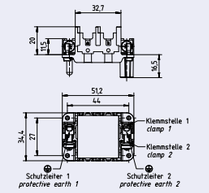
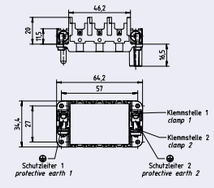
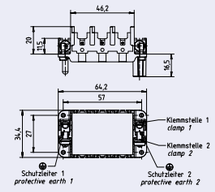
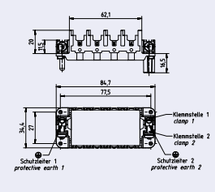
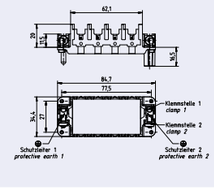
* no UL/CSA - Certification
** not compatible with the market standard

Description	Part Number	Drawing	Figure
Frame for 2 modules | Size E6 | Housings from page 226			
Frame for 2 pin modules	C146 10P006 000 15		
Frame for 2 socket modules	C146 10S006 000 15		
Frame for 3 modules | Size E10 | Housings from page 228			
Frame for 3 pin modules	C146 10P010 000 15		
Frame for 3 socket modules	C146 10S010 000 15		
Frame for 4 modules | Size E16 | Housings from page 235			
Frame for 4 pin modules	C146 10P016 000 15		
Frame for 4 socket modules	C146 10S016 000 15		

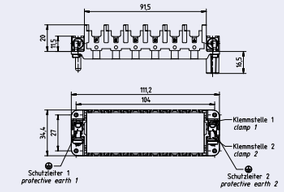
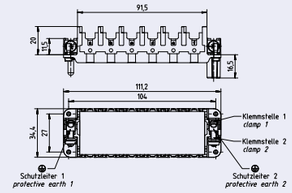
Description	Part Number	Drawing	Figure
Frame for 6 modules | Size E24 | Housings from page 241			
Frame for 6 pin modules	C146 10P024 000 15		
Frame for 6 socket modules	C146 10S024 000 15		

Delivery form	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Cable lug for earth connection						
Cable lug	10 - 16 mm²	8 - 6	1	N15 043 0003 003		

Clamp 1 under screw is approved for wires up to 6 mm2 (with wire end sleeve). For wires 10 - 16 mm² please use clamp 2 with cable lug.

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

heavy | mate® F Multiframes: can also be assembled with competitors modules

Description	Part number	Drawing	Figure
Multiframes for 6 modules | Size E24 | Housings from page 241			
Multiframe for 6 pin modules	C146 10P024 100 15		
Multiframe for 6 socket modules	C146 10S024 100 15		
Locking device | used for modules from competitors			
Locking device 10 Pieces	VN 09 146 0019 X		

Supplied as	for wire gauge	AWG	Pieces	Part Number	Figure
Cable lug for earth connection					
Cable lug	10 - 16 mm²	8 - 6	1	N 15 043 0003 003	

Clamp 1 under screw is approved for wires up to 6 mm2 (with wire end sleeve). For wires 10 - 16 mm2 please use clamp 2 with cable lug.

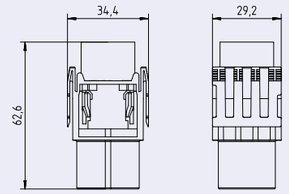
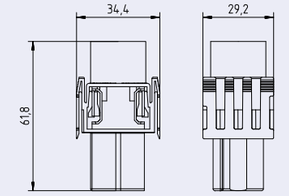
It is possible to mount socket modules in frames for pin modules (possibility of inverse configuration).

Characteristics 1 contacts module

General Characteristics	Standard	Value
Number of contacts		1
Termination technique		crimp
Wire gauge		25 - 95 mm² (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_u = 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^{10} 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		

- Due to reduced cross sectios 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!

1 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
1 contacts module (Please order contacts separately)			
Pin module	C146 10A001 600 15		
Socket module	C146 10B001 600 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 10 mm crimp contacts						
Single contact	25 mm²	4	1	N01 100 5099 001	N02 100 6119 002	
	35 mm²	2	1	N01 100 6000 001	N02 100 6120 002	
	50 mm²	1	1	N01 100 6001 001	N02 100 6121 002	
	70 mm²	0	1	N01 100 6002 001	N02 100 6122 002	
	95 mm²	0	1	N01 100 6003 001	N02 100 6123 002	
Cable lug for earth connection						
Single contact	16 mm²	6	1	N15 043 0003 003		

Tools

Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Crimping dies	25 mm²	-	TE 0600 042	**
	35 mm²	-	TE 0600 022	**
	50 mm²	-	TE 0500 103	**
	70 mm²	-	TE 0500 201	**
	95 mm²	-	TE 0500 301	**

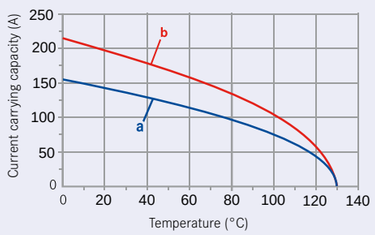
* = For use in pneumatic crimping tool EK12042L by Klauke or AHPW 400C by Neko.
Further tools see catalogue “Tools”.

* UL/CSA - Certification in preparation

Characteristics 2 contacts module

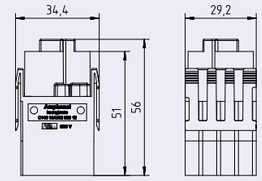
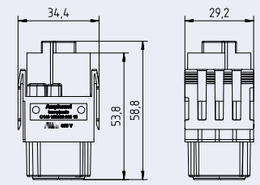
General Characteristics	Standard	Value
Number of contacts		2
Termination technique		crimp
Wire gauge		10 - 35 mm² (AWG 8-2)
Max. wire diameter		13 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	1000 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T_u = 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^{10} 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 mm²
b	35 mm²

2 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
2 contacts module (Please order contacts separately)			
Pin module 2 contacts	C146 10A002 600 15		
Socket module 2 contacts	C146 10A002 600 15		

Supplied as	for wire gauge	AWG	Part Number		Figure
			Pin contact	Socket contact	
Turned 8 mm crimp contact single contact					
silver plating	10 mm²	8	N 01 080 0003 1	N 02 080 0003 1	
	16 mm²	6	N 01 080 0004 1	N 02 080 0004 1	
	25 mm²	4	N 01 080 0005 1	N 02 080 0005 1	
	35 mm²	2	N 01 080 0006 1	N 02 080 0006 1	
Cable lug for earth connection					
Single contact	10 - 16 mm²	8 - 6	N15 043 0003 003		

Tools

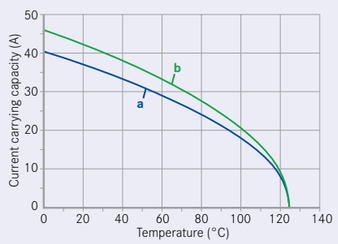
Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	10 - 35 mm²	-	-	FG 03000 146 6000
Crimping tool	10 mm²	-	-	TB0002
	16 mm²	-	TE 0600 062	*
	25 mm²	-	TE 0600 042	*
	35 mm²	-	TE 0600 022	*

* = For use in pneumatic crimping tool EK12042L by Klauke or AHPW 400C by Neko.
Further tools see catalogue “Tools”.

Characteristics 3 contacts module

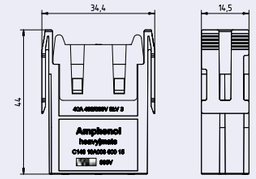
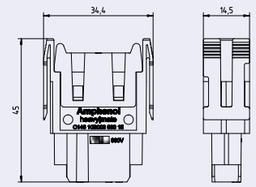
General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp
Wire gauge		1.5 - 10.0 mm² (AWG 16 - 8)
Max. wire diameter		5.2 / 6.4 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (conductor – earth) 690 V (conductor – conductor)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T_u = 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^{10} 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 mm²
b	6 mm²
c	10 mm²

3 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
3 contacts module (Please order contacts separately)			
Pin module 3 contacts			
for wire gauge 1.5 - 6 mm²	C146 10A003 600 15		
for wire gauge 1.5 -10 mm²	C146 10A003 601 15		
Socket module 3 contacts			
for wire gauge 1.5 - 6 mm²	C146 10B003 600 15		
for wire gauge 1.5 - 10 mm²	C146 10B003 601 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 4 mm crimp contacts single contact						
silver plating	1.5 mm²	16	100	VN01 040 0010 1C	VN02 040 0010 1C	
	2.5 mm²	14	100	VN01 040 0011 1C	VN02 040 0011 1C	
	4 mm²	12	100	VN01 040 0012 1C	VN02 040 0012 1C	
	6 mm²	10	100	VN01 040 0013 1C	VN02 040 0013 1C	
	10 mm²	8	100	VN01 040 0015 1C	VN02 040 0015 1C	

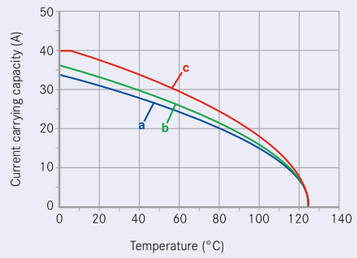
Tools for 4 mm² turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	1.5 - 10 mm²	-	-	FG 0300 146 5000
4-Indent crimping tool	1.5 - 10 mm²	-	-	TB 0700 146
Further tools see catalogue “Tools”				

Characteristics 3+4 contacts module

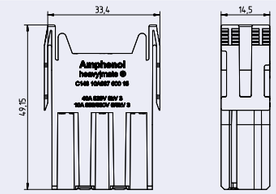
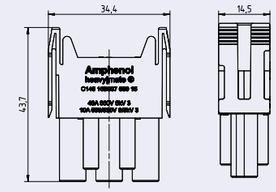
Brief information		
High contact density, receptable- and cable side finger proof.		
General Characteristics	**Standard**	**Value**
Number of contacts		3 + 4
Termination technique		crimp
Wire gauge		Power: 1.5 - 6 mm² (AWG 16 - 10) Signal: 0.14 - 2.5 mm² (AWG 26 - 14)
Max. wire diameter		Power: 6.4 mm, 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_u = 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^{10} 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 mm²
b	6 mm²
c	10 mm²

3+4 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
GigaBit module			
Pin module 3+4 contacts	C146 10A007 600 15		
Socket module 3+4 contacts	C146 10B007 600 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 4 mm crimp contacts single contact						
silver plating	1.5 mm²	16	100	VN01 040 0010 1C	VN02 040 0010 1C	
	2.5 mm²	14	100	VN01 040 0011 1C	VN02 040 0011 1C	
	4 mm²	12	100	VN01 040 0012 1C	VN02 040 0012 1C	
	6 mm²	10	100	VN01 040 0013 1C	VN02 040 0013 1C	
	10 mm²	8	100	VN01 040 0015 1C	VN02 040 0015 1C	
Turned 1.6 mm crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

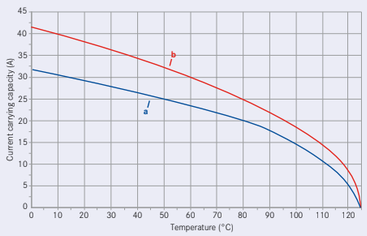
Tools for 4 mm² turned contacts

Description	for wire gauge	Part number		
		Contact locator	Test pin	Tool
Removal tools for signal contacts	0.14 - 2,5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2,5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2,5 mm²	-	-	TB 0400 146
4-Indent crimping tool	1.5 - 10 mm²	-	-	TB 0700 146
Further tools see catalogue "Tools"				

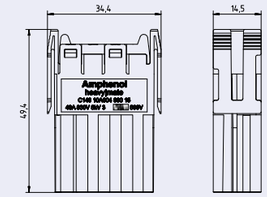
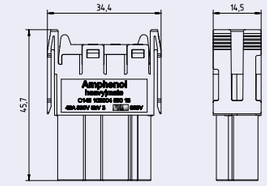
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General Characteristics	Standard	Value
Number of contacts		4
Termination technique		crimp
Wire gauge		1.5 - 6.0 mm² (AWG 16-10)
Max. wire diameter		5.2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	830 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	8 kV
Rated Current T_u = 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^{10} 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 mm²
b	6.0 mm²

Description	Part Number	Drawing	Figure
4 contacts module (Please order contacts separately)			
Pin module 4 contacts	C146 10A004 600 15		
Socket module 4 contacts	C146 10B004 600 15		

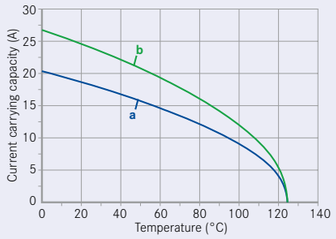
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 4 mm crimp contacts single contact						
silver plating	1.5 mm²	16	100	VN01 040 0010 1C	VN02 040 0010 1C	
	2.5 mm²	14	100	VN01 040 0011 1C	VN02 040 0011 1C	
	4 mm²	12	100	VN01 040 0012 1C	VN02 040 0012 1C	
	6 mm²	10	100	VN01 040 0013 1C	VN02 040 0013 1C	

Tools for 4 mm² turned contacts

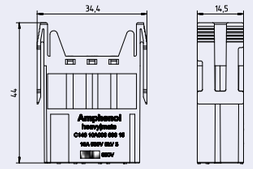
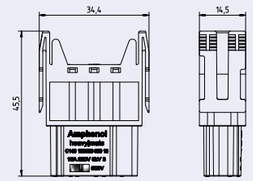
Description	for wire gauge	Part Number		
		Contact locator	Test pin	Tool
Removal tool for contacts	1.5 - 6mm²	-	-	FG 0300 146 5000
4-Indent crimping tool [1)]	1.5 - 6mm²	-	-	TB 0700 146
Further tools see catalogue “Tools”				

General Characteristics	Standard	Value
Number of contacts		6
Termination technique		crimp
Wire gauge		0.14 - 4.0 mm² (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_u = 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^{10} 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 mm²
b	2.5 mm²

Description	Part Number	Drawing	Figure
6 contacts module (Please order contacts separately)			
Pin module 6 contacts	C146 10A006 600 15		
Socket module 6 contacts	C146 10B006 600 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

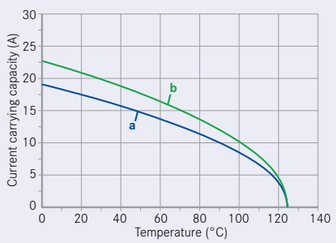
Tools for turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146
Further tools see catalogue “Tools”				

Characteristics 8 contacts module

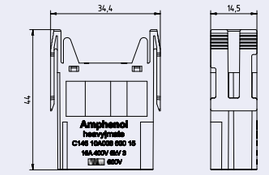
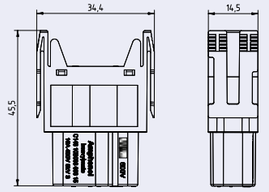
General Characteristics	Standard	Value
Number of contacts		8
Termination technique		crimp
Wire gauge		0.14 - 4.0 mm² (AWG 26-12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T_u = 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^{10} 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 mm²
b	2.5 mm²

8 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
8 contacts module (Please order contacts separately)			
Pin module 8 contacts	C146 10A008 600 15		
Socket module 8 contacts	C146 10B008 600 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

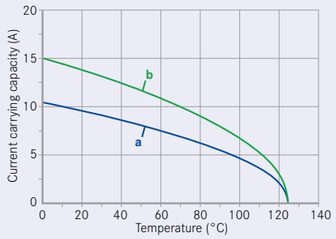
Tools for turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146
Further tools see catalogue “Tools”				

Characteristics 12 contacts module

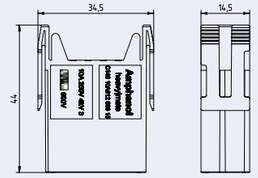
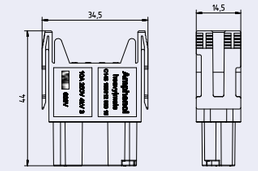
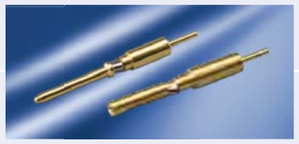
General Characteristics	Standard	Value
Number of contacts		12
Termination technique		crimp, PCB (in combination with PCB adaptor)
Wire gauge		0.14 - 2.5 mm² (AWG 26-14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (conductor – earth) 400 V (conductor – conductor) (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	4 kV
Rated Current T_u = 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^{10} 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 mm²
b	1.5 mm²

12 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
12 contacts module (Please order contacts separately)			
Pin module 12 contacts	C146 10A012 600 15		
Socket module 12 contacts	C146 10B012 600 15		
6 contacts PCB adaptor			
PCB Adaptor 6 contacts	C146 10B006 300 15		
PCB contact gold plating (100 Pieces)	VN01 016 0057 3C VN02 016 0057 3C		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

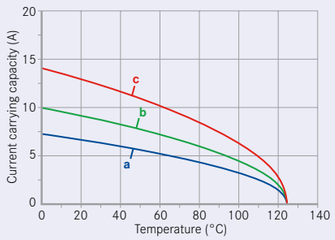
Tools for turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 00100 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	—	-	TB 0400 146
Further tools see catalogue “Tools”				

Characteristics 17 contacts module

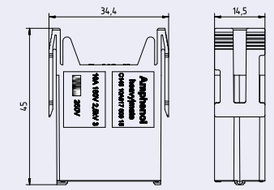
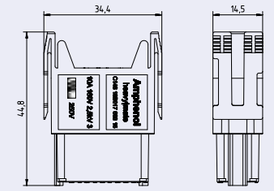
General Characteristics	Standard	Value
Number of contacts		17
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm² (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	160 V (UL/CSA 250 V)
Rated impulse withstand voltage	IEC 60664-1	2.5 kV
Rated Current T_u = 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^{10} 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 mm²
b	1.0 mm²
c	1.5 mm²

17 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
17 contacts module (Please order contacts separately)			
Pin module 17 contacts	C146 10A017 600 15		
Socket module 17 contacts	C146 10B017 600 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

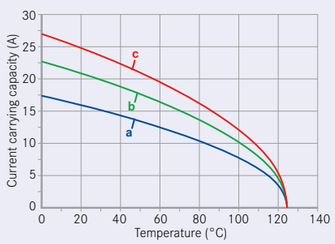
Tools for turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.5 mm²	TA 00100 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 0.5 mm²	-	-	TB 0400 146
Further tools see catalogue “Tools”				

Characteristics 20 contacts module

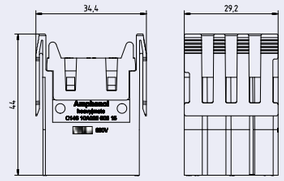
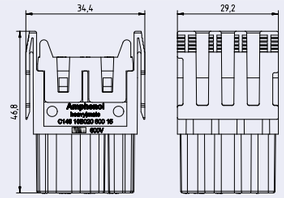
General Characteristics	Standard	Value
Number of contacts		20
Termination technique		crimp
Wire gauge		0.14 - 4.0 mm² (AWG 26 - 12)
Max. wire diameter		4.6 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	500 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T_u = 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^{10} 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 mm²
b	2.5 mm²
c	4.0 mm²

20 contacts module + crimp contacts

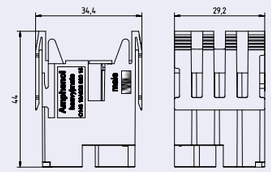
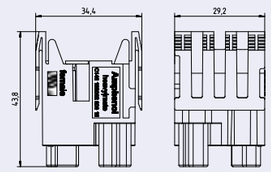
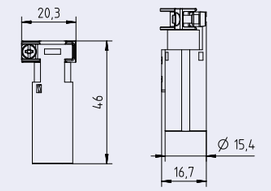
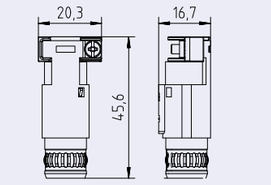
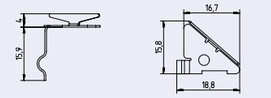
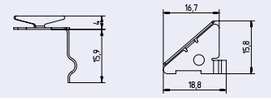
Description	Part Number	Drawing	Figure
20 contacts module (Please order contacts separately)			
Pin module 20 contacts	C146 10A020 600 15		
Socket module 20 contacts	C146 10B020 600 15		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

Tools for turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146
Further tools see catalogue “Tools”				

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 mm² (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_u=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^{10} 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

Description	Part number	Drawing	Figure
Adaptor modules			
Pin module	C146 10A002 800 15		
Socket module	C146 10B002 800 15		
Quintax contact carrier 4-contacts (Please order contacts separately)			
Pin contact carriers 4 contacts	C146 10A004 901 15		
Socket contact carriers 4 contacts	C146 10B004 901 15		
Potential balance spring Pin module (2 Pieces)	for standard frames: N 18 146 0011 for multi frames: N 18 146 0021		
Potential balance spring Socket module (2 Pieces)	for standard frames: N 18 146 0012 for multi frames: N 18 146 0022		

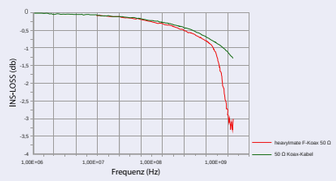
Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm crimp contacts						
Single contact	0.14 – 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	18	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	
Further tools see catalogue "Tools"						

Characteristics Adaptor modules + Coax contact carrier

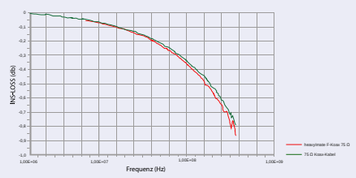
General Characteristics	Standard	Value
Number of contacts		1 + shielding
Termination technique		crimp
Wire gauge		0.14 - 4.5mm² (AWG 26 - 12)
Max. wire diameter		3 - 9.5 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	50 V (UL/CSA 50 V)
Rated impulse withstand voltage	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^{10} 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

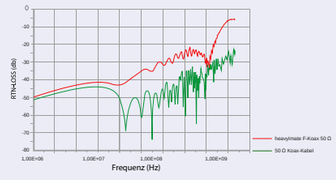
50 Ω INS



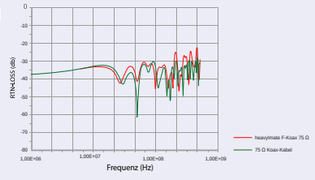
75 Ω INS



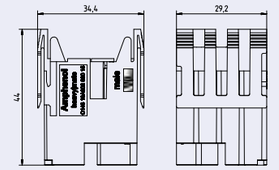
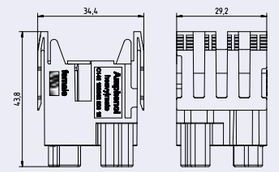
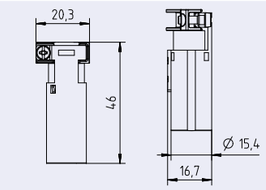
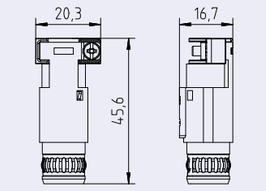
50 Ω RTN



75 Ω RTN



Adaptor modules + Coax contact carrier + crimp contacts

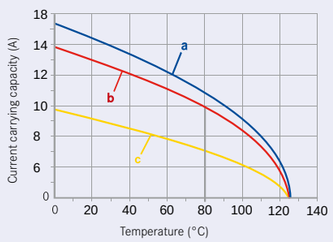
Description	Part number	Drawing	Figure
Adaptor modules			
Pin module	C146 10A002 800 15		
Socket module	C146 10B002 800 15		
Coax - contact carrier (Please order contacts separately)			
Pin contact carrier 1 contact 50 Ω Pin contact carrier 1 contact 75 Ω	C146 10A001 902 15 C146 10A001 901 15		
Socket contact carrier 1 contact 50 Ω Socket contact carrier 1-Pol 75 Ω	C146 10B001 902 15 C146 10B001 901 15		

Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts (for Coax - contact carrier 1 contact 50 Ω)						
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	
Turned 2.5 mm crimp contacts (for Coax - contact carrier 1 contact 75 Ω)						
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	18	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Characteristics 36 contacts module

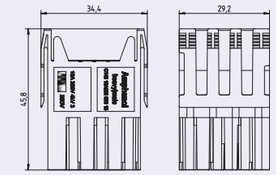
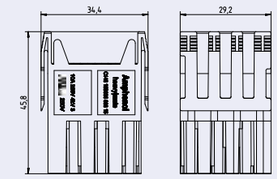
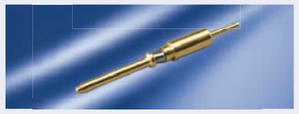
Brief information		
High contact density, receptable- and cable side finger proof.		
General Characteristics	**Standard**	**Value**
Number of contacts		36 (18 x Pin, 18 x Socket)
Termination technique		crimp, PCB (in combination with PCB Adaptor)
Wire gauge		0.14 - 2.5mm² (AWG 26 - 14)
Max. wire diameter		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_u = 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^{10} 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 mm²
b	1.0 mm²
c	0.5 mm²

36 contacts module + crimp contacts

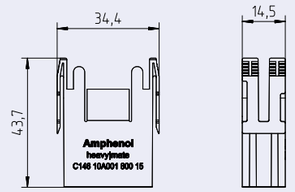
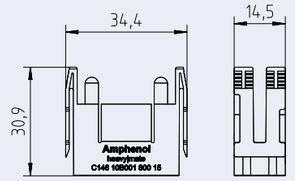
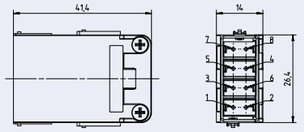
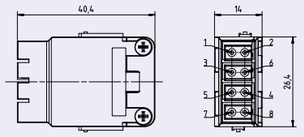
Description	Part number	Drawing	Figure
36 contacts module (Please order contacts separately)			
Pin module 36 contacts	C146 10A036 600 15		
Socket module 36 contacts	C146 10B036 600 15		
PCB Adaptor 6 contacts			
PCB Adaptor 6 contacts	C146 10B006 300 15		
PCB contact	VN01 016 0057 3C		
	VN02 016 0057 3C		

Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16 - 15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16 - 15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Tools for turned contacts

Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue "Tools"				

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 mm² (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_u = 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^{10} 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

Description	Part Number	Drawing	Figure
Adaptor modules			
Pin module	C146 10A001 800 15		
Socket module	C146 10B001 800 15		
GigaBit-contact carrier* (contacts & cable clamps please order separately)			
Pin contact carrier - without shield connection to the frame - with shield connection to the frame	C146 10A008 901 15 C146 10A008 902 15		
Socket contact carrier - without shield connection to the frame - with shield connection to the frame	C146 10B008 901 15 C146 10B008 902 15		

Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 1.0 mm crimp contacts						
gold plating	0.09 - 0.25 mm²	28 - 24	100	VN01 010 0066 2C	VN02 010 0066 2C	
	0.13 - 0.33 mm²	26 - 22	100	VN01 010 0067 2C	VN02 010 0067 2C	
	0.25 - 0.52 mm²	24 - 20	100	VN01 010 0068 2C	VN02 010 0068 2C	

Tools for turned contacts				
Description	**for wire gauge**	**Part number**		
		Contact locator	**Crimping dies**	**Tool**
Removal tool for contacts	0.09 mm² - 0.52 mm²	-	-	17 D 438 SP
4-Indent crimping tool for turned contacts	0.09 mm² - 0.52 mm²	-	-	TB 0300 146
Further tools see catalogue "Tools"				

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* UL/CSA - Certification in preparation.

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 mm² (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_u = 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^{10} 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

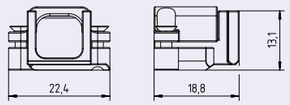
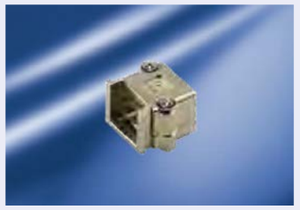
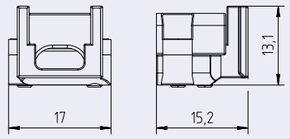
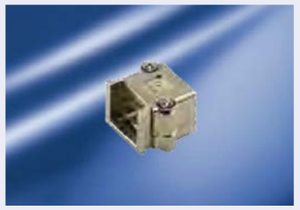
Adaptor modules + MegaBit contact carrier + crimp contacts

Description	Part number	Drawing	Figure
Adaptor modules*			
Pin module	C146 10A001 800 15		
Socket module	C146 10B001 800 15		
MegaBit-contact carrier* (contacts & cable clamps please order separately)			
Pin contact carrier - without shield connection to the frame - with shield connection to the frame	C146 10A008 905 15 C146 10A008 906 15		
Socket contact carrier - without shield connection to the frame - with shield connection to the frame	C146 10B008 905 15 C146 10B008 906 15		

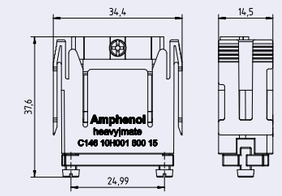
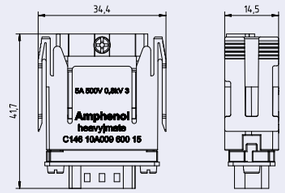
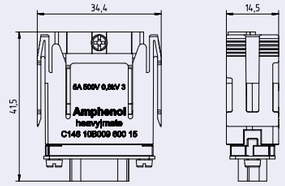
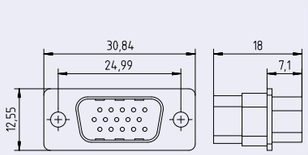
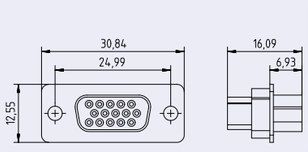
Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm crimp contacts						
gold plating	0.14 – 0.37 mm²	26-22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16-15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Tools				
Description	**for wire gauge**	**Part number**		
		Contact locator	**Crimping dies**	**Tool**
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue "Tools"				

* UL/CSA - Certification in preparation.

Description	Part number	Drawing	Figure
Cable clamps for GigaBit contact carrier			
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		
Cable clamps for MegaBit contact carrier			
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 mm² (AWG 28 - 20)	0.09 - 0.25 mm² (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_u = 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^{10} 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			

Description	Part Number	Drawing	Figure
D-Sub module			
Adaptor module (Please order contact inserts separately)	C146 10H001 800 15		
Pin module 9 contacts (Please order contact inserts separately)	C146 10A009 600 15		
Socket module 9 contacts (Please order contact inserts separately)	C146 10B009 600 15		
Contact inserts D-Sub 15 contacts* (Please order contacts separately)			
Pin insert	C146 10A015 901 15		
Socket insert	C146 10B015 901 15		

Supplied as	for wire gauge	AWG	Part Number		Figure
			Pin contact	Socket contact	
Punched crimp contacts, gold plating					
1.0 mm crimp contacts for D-Sub 9 contacts	0.09 - 0.25 mm²	28 - 24	VN01 010 0166 2 C	VN02 010 0166 2 C	
	0.25 - 0.5 mm²	24 - 20	VN01 010 0168 2 C	VN02 010 0168 2 C	
0.8 mm crimp contacts for D-Sub 15 contacts	0.09 - 0.25 mm²	28 - 24	VN01 008 0066 2 C	VN02 008 0066 2 C	

Tools for turned contacts				
Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tools
Removal tool for contacts	0.09 - 0.5 mm²	-	-	17 D 438 SP
Crimping tools	0.09 - 0.5 mm²	-	-	TA 0200 146

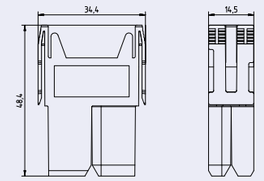
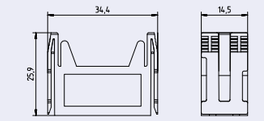
F

* UL/CSA - Certification in preparation.

Characteristics Blind module

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.		
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		
Weight blind module with centering function		9 g
Weight blind module standard		6 g
Mechanical operation	IEC 60512-9-1	≥500 mating cycles
Materials		
Contact module		PA
Colour contact module		black

Blind module

Description	Part Number	Drawing	Figure
Blind module			
Blind module with centering function	C146 10H000 600 15		
Blind module standard	C146 10H000 601 15		

heavy | mate® HSE

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

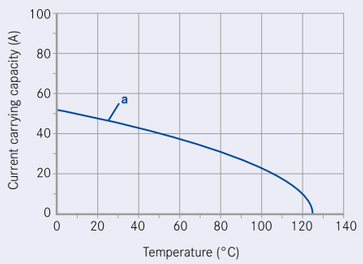






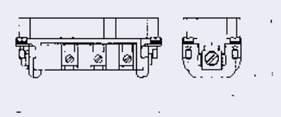
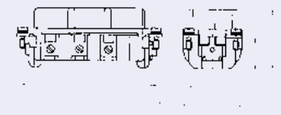

Approvals, Testhouse	Characteristics	Approval-Number
UL	600 V	E 63093
CSA	600 V	48932

General Characteristics	Standard	Value
Number of contacts		6 + ⏚
Termination technique		screw
Wire gauge		0.5 - 6.0 mm² (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_{amp} = 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 m Ω
Insulation resistance	IEC 60512-3-1	≥ 10^{10} 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 [1)]	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert [1)]	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		



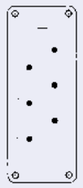
Curve a: 6 mm2 screw contact

[1)] IP-degree of protection on termination side of screw version IP10

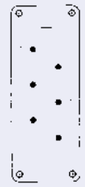
Description	Part Number	Drawing	Figure
Contact insert 6 + ⏚			
Pin insert with wire protection for screw termination	C146 10A006 102 5		
Socket insert with wire protection for screw termination	C146 10B006 102 5		

Pin layout

Pin insert

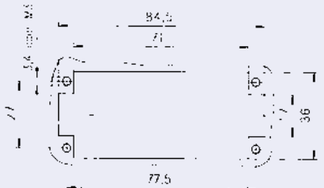


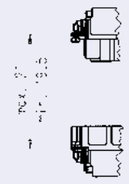
Socket insert



Assembly instruction

Panel cut out (insert)







heavy | mate® 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)








Approvals, Testhouse	Characteristics	Approval-Number
UL	see technical characteristics	E 63093
CSA	see technical characteristics	E 63093

heavy|mate® HvE General information

Construction of connectors Type HvE

Connectors of heavy|mate® HvE series only connect with counter parts of heavyImate 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
a) two empty contact holes are closed at 3, 6 and 10 contact inserts.
b) the 16 contacts HVE insert has a different contact arrangement.

Housings: (made of aluminium)

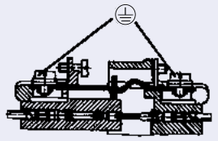
heavy|mate® E housings with an inside insulation (plastic foil) are used for the 16-contacts insert.
The inside barriers at the narrow sides preventing mounting of 660 V-inserts in 400 V housings are removed and the 16-contacts insert is now mountable.

No standard for this series, but:

Intermateable and exchangeable with other makes
a) Contact insert to contact insert
b) Contact insert to housing 6, 10 ,16, 24 pin

Housings are designed according to DIN EN 175 301-801

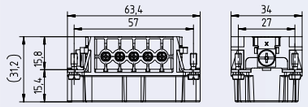
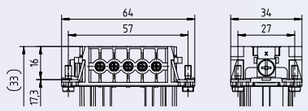
First-to-mate last-to-break protective ground contact



heavy|mate® HvE Characteristics contact inserts

General Characteristics	Standard	Value			
Number of contacts		3	6	10	16
Termination technique		screw			
Wire gauge		0.5 - 2.5 mm²			
Max. wire diameter		4.6 mm			
Flammability	UL 94	V-0			
Electrical Characteristics					
Rated voltage	IEC 60664-1	660 V			660 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV			
Rated Current T_u = 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			II
Contact resistance	IEC 60512-2-1	≤ 5 m Ω			
Insulation resistance	IEC 60512-3-1	≥ 10^{10} 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 [1)]	IEC 60529	unmated IP00, mated IP20			
IP-degree of protection socket insert [1)]	IEC 60529	unmated IP20, mated IP20			
Weight pin insert		49 g	63 g	81 g	107 g
Weight socket insert		49 g	63 g	81 g	107 g
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles			
Materials					
Insert		PC			PA
Colour insert		grey			black
Contacts		CuZn (brass)			
Contact plating		Ag (silver)			

[1)] IP-degree of protection on termination side of screw version IP10

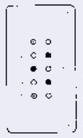
Description	Part Number	Drawing	Figure
Contact insert 3 + ⏚ + 2 (delayed mating contacts)			
Pin insert with wire protection for screw termination	C146 10A003 102 3		
Socket insert with wire protection for screw termination	C146 10B003 102 3		

Pin layout

Pin insert



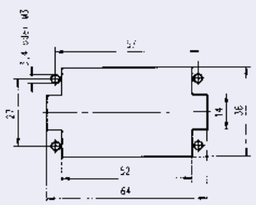
Socket insert



- Working contact
- Mating contact
- Without contact

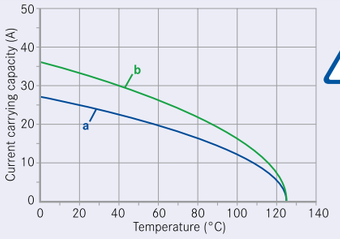
Assembly instruction

Panel cut out (insert)



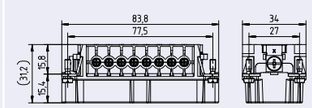
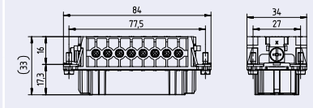


Derating curves



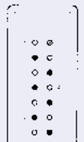
Notice restriction of wire

Curve a: 1.5 mm² screw contacts Curve b: 2.5 mm² screw contacts

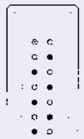
Description	Part Number	Drawing	Figure
Contact insert 6 + ⏚ + 2 (delayed mating contacts)			
Pin insert with wire protection for screw termination	C146 10A006 102 3		
Socket insert with wire protection for screw termination	C146 10B006 102 3		

Pin layout

Pin insert



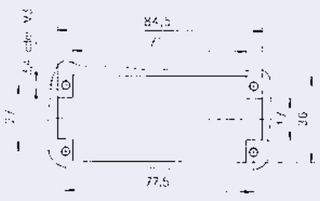
Socket insert



- Working contact
- Mating contact
- Without contact

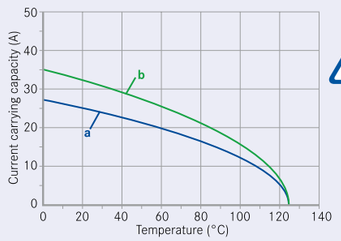
Assembly instruction

Panel cut out (insert)



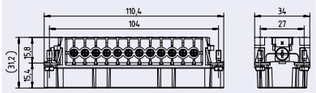
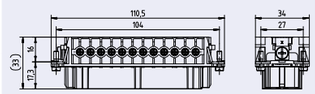


Derating-Kurven



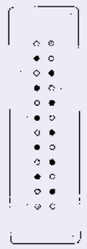
Notice restriction of wire

Curve a: 1.5 mm² screw contacts Curve b: 2.5 mm² screw contacts

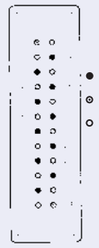
Description	Part Number	Drawing	Figure
Contact insert 10 + ⏚ + 2 (delayed mating contacts)			
Pin insert with wire protection for screw termination	C146 10A010 102 3		
Socket insert with wire protection for screw termination	C146 10B010 102 3		

Pin layout

Pin insert



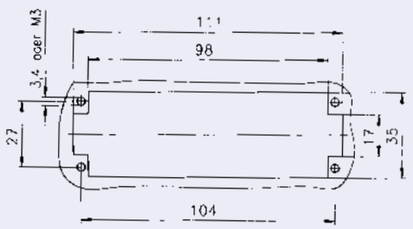
Socket insert



- Working contact
- Mating contact
- Without contact

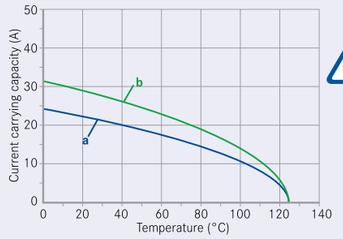
Assembly instruction

Panel cut out (insert)



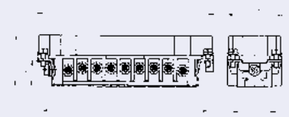
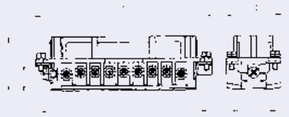


Derating curves



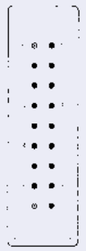
Notice restriction of wire

Curve a: 1.5 mm² screw contacts Curve b: 2.5 mm² screw contacts

Description	Part Number	Drawing	Figure
Contact insert 16 + ⏚ + 2 (delayed mating contacts)			
Pin insert with wire protection for screw termination	C146 10A016 102 3		
Pin insert without wire protection for screw termination	C146 10A016 002 3		
Socket insert with wire protection for screw termination	C146 10B016 102 3		
Socket insert without wire protection for screw termination	C146 10B016 002 3		

Pin layout

Pin insert



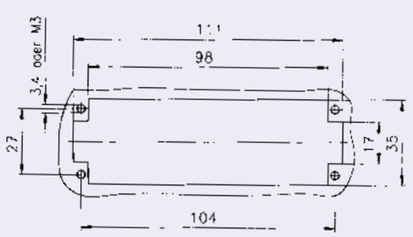
Socket insert

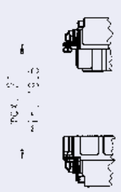


- Working contact
- Mating contact

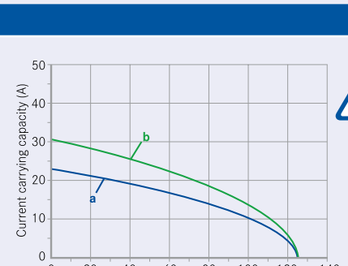
Assembly instruction

Panel cut out (insert)





Derating curves



Notice restriction of wire

Curve a: 1.5 mm² screw contacts Curve b: 2.5 mm² screw contacts

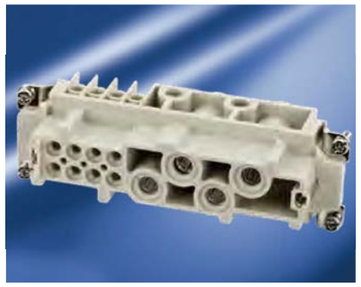


heavy | mate® K

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



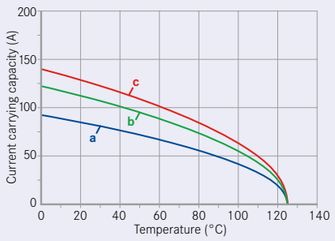


Approvals, Testhouse	Characteristics	Approval-Number
UL	see technical characteristics	E 63093
CSA	see technical characteristics	E 63093

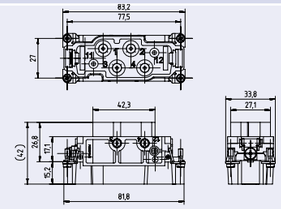
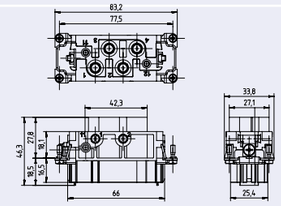
General Characteristics	Standard	Value	
Number of contacts		4+0+ ⏚ (4 Power)	4+2+ ⏚ (4 Power + 2 Signal)
Termination technique		screw	
Wire gauge		1.5 - 16 mm² (AWG 16 - 6)	Power: 1.5 - 16 mm² (AWG 16 - 6) Signal: 0.5 - 2.5 mm² (AWG 20 - 14)
Max. wire diameter		11 mm	Power: 11 mm, Signal: 4.8 mm
Flammability	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_u = 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^{10} 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 [1)]	IEC 60529	unmated IP00, mated IP20	
IP-degree of protection socket insert [1)]	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



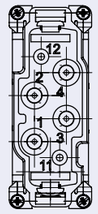
Curve	Wire gauge
a	10 mm²
b	16 mm²
c	Single contacts with 16 mm²

General requirements: Wire end ferrules must be used.
[1)] IP-degree of protection on termination side of screw version IP10

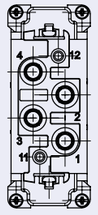
Description	Part Number	Drawing	Figure
Contact insert 4 + ⏚			
Pin insert 4 + ⏚	C146 10A004 100 13		
Socket insert 4 + ⏚	C146 10B004 100 13		

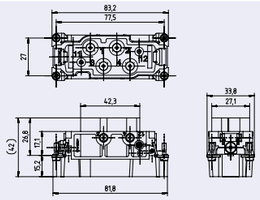
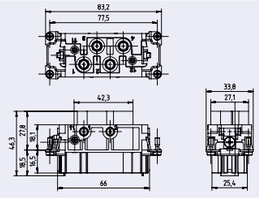
Pin layout

Pin insert



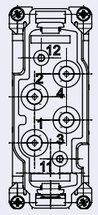
Socket insert



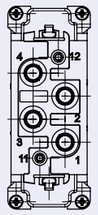
Description	Part Number	Drawing	Figure
Contact insert 4+2+ ⏚			
Pin insert 4+2+ ⏚	C146 10A006 100 13		
Socket insert 4+2+ ⏚	C146 10B006 100 13		

Pin layout

Pin insert



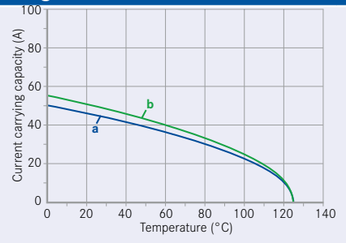
Socket insert



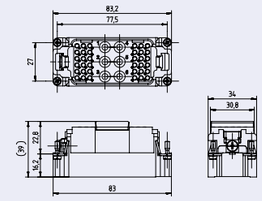
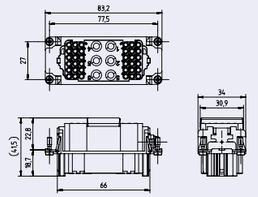
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General Characteristics	Standard	Value
Number of contacts		6 + 36 + ⏚ (6 Power + 36 Signal)
Termination technique		crimp
Wire gauge		1.5 – 6.0mm² (AWG 16 - 10) 0.14 – 2.5mm² (AWG 26 - 14)
Max. wire diameter		Power: 5.2 mm, Signal: 3.7 mm
Flammability	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_u = 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^{10} 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

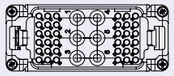


Curve	Wire gauge
a	6 mm² with signal-contacts 1.5 mm²
b	6 mm²

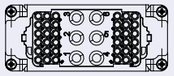
Description	Part Number	Drawing	Figure
Contact insert 6 + 36 + ⏚ (Please order contacts separately)			
Pin insert 6 + 36 + ⏚	C146 10A042 500 13		
Socket insert 6 + 36 + ⏚	C146 10B042 500 13		

Pin layout

Pin insert



Socket insert



Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 4 mm crimp contacts						
silver plating	1.5 mm²	16	100	VN01 040 0010 1C	VN02 040 0010 1C	
	2.5 mm²	14	100	VN01 040 0011 1C	VN02 040 0011 1C	
	4 mm²	12	100	VN01 040 0012 1C	VN02 040 0012 1C	
	6 mm²	10	100	VN01 040 0013 1C	VN02 040 0013 1C	
Turned 1.6 mm crimp contacts						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16-15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	

Tools for 4 mm² turned contacts

Description	for wire gauge	Part Number		
		Contact locator	Calibration pin	Tool
Removal tool for contacts	1.5 - 6 mm²	-	-	FG 0300 146 5000
4-indet crimping tool	1.5 - 6 mm²	-	-	TB 0700 146

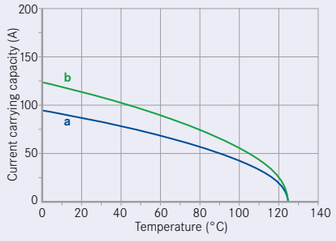
Tools for turned contacts

Description	for wire gauge	Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 000 1	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue “Tools”				

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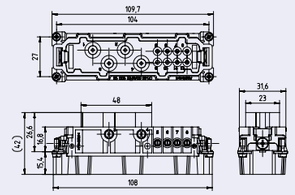
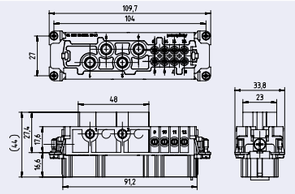
General Characteristics	Standard	Value
Number of contacts		4+8 + ⏚ (4 Power + 8 Signal)
Termination technique		screw
Wire gauge		Power: 1.5 - 16 mm² (AWG 16 - 6) Signal: 0.5 - 2.5 mm² (AWG 20 - 14)
Max. wire diameter		Power: 11 mm, Signal: 4.8 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated 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_u = 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^{10} 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[1)]	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert[1)]	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



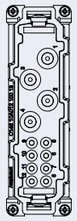
Curve	Wire gauge
a	10 mm²
b	16 mm²

General requirements: Wire end ferrules must be used.
[1)] IP-degree of protection on termination side of screw version IP10

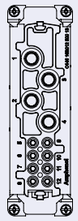
Description	Part Number	Drawing	Figure
Contact insert 4+8 + ⏚			
Pin insert 4+8+ ⏚	C146 10A012 100 13		
Socket insert 4+8+ ⏚	C146 10B012 100 13		

Pin layout

Pin insert

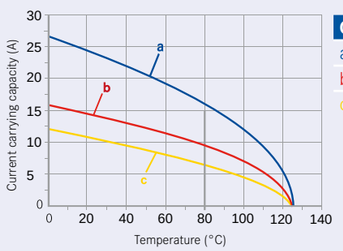


Socket insert

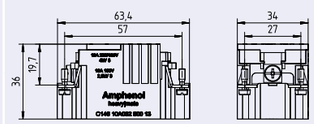
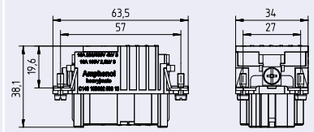


General Characteristics	Standard	Value
Number of contacts		8+24+ ⏚ (8 Power + 24 Signal)
Termination technique		crimp
Wire gauge		Power: 0.5 - 4 mm² (AWG 20 - 12) Signal: 0.14 - 2.5 mm² (AWG 26 - 14)
Max. wire diameter		Power: 4.6 mm, Signal 3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated 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_u = 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^{10} 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[1)]	IEC 60529	unmated IP00, mated IP20
IP-degree of protection socket insert[1)]	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 mm²
b	4.0 mm²
c	4.0 mm²

Description	Part Number	Drawing	Figure
Contact insert 8+24+ ⏚ (Please order contacts separately)*			
Pin insert 8+24+ ⏚	C146 10A032 500 13		
Socket insert 8+24+ ⏚	C146 10B032 500 13		

Supplied as	for wire gauge	AWG	Pieces	Part number Pin contact	Part number Socket contact	Figure
Turned 4 mm crimp contacts						
silver plating	1.5 mm²	16	100	VN01 040 0010 1C	VN02 040 0010 1C	
	2.5 mm²	14	100	VN01 040 0011 1C	VN02 040 0011 1C	
	4 mm²	12	100	VN01 040 0012 1C	VN02 040 0012 1C	
	6 mm²	10	100	VN01 040 0013 1C	VN02 040 0013 1C	
Turned 1,6 mm crimp contacts						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16-15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	

Tools for 4 mm turned contacts

Description	for wire gauge	Part number Contact locator	Part number Test pin	Part number Tool
Removal tool for contacts	1.5 - 6 mm²	-	-	FG 0300 146 5000
4-Indent crimping tool	1.5 - 6 mm²	-	-	TB 0700 146

Tools for 1.6 mm turned contacts

Description	for wire gauge	Part number Contact locator	Part number Crimping dies	Part number Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue "Tools"				

K



heavy|mate® M

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








Approvals, Testhouse	Characteristics	Approval-Number
VDE	See technical characteristics	56 79 ÜG
UL	See technical characteristics	E 63093
CSA	See technical characteristics	48932

heavy|mate® M General information

General information

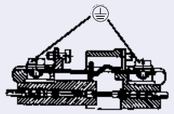
- Modules inserts without crimp contacts, crimping tools see separate catalogue “Tools”.
- Contacts must be ordered separatly, processing instructions see catalogue “Tools”.
- Connectors series heavy|mate® M may be engaged or disengaged when live but without electrical load.
  If these connectors are 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 mm²



Modules



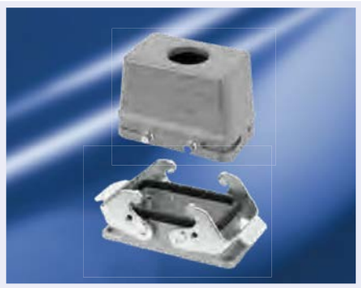


Frames





Range of housings


heavy|mate® M How to select a solution with series heavy|mate® M?

Requirements

- 3 x 400V; 50A; 6mm² wire gauge
- 8 x 250V; 8A; 1.5mm² wire gauge
- 5 x 400V; 15A; 4mm² wire gauge

Solution

1. Check how 16 contacts can be realized; see modules overview on page 158

Possible selection:
a) 1 x 20 contacts
b) 2 x 10 contacts
c) 1 x 10 contacts+ 2 x 5 contacts
d) 1 x 3 contacts + 1 x 5 contacts + 1 x 10 contacts

2. Check technical parameters / solution, see detail pages of the modules on page 166

Possible selection:
a) not possible due to voltage
b) not possible due to voltage
c) not possible due to current
d) POSSIBLE

3. Choose matching contact, see detail page of the modules on page 166

Possible selection:
a) 3 contacts = C146 A03 001 E8 → contacts = VN01 036 0002 1C
b) 5 contacts = C146 A05 001 E8 → contacts = VN01 025 0033 1C
c) 10 contacts = C146 A10 001 E8 → contacts = VN01 016 0027 1C

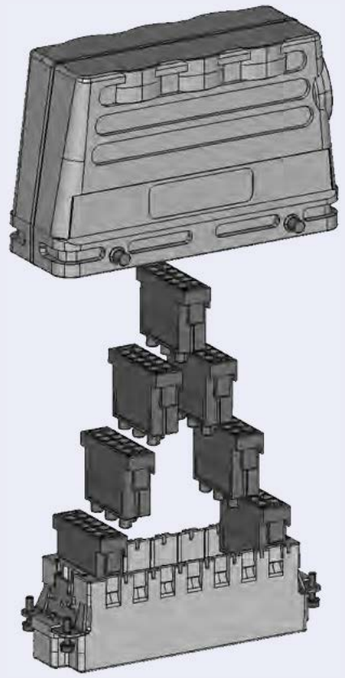
4. Choose matching frame, see frames on page 166

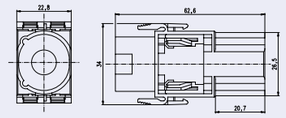
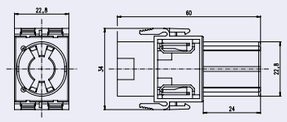
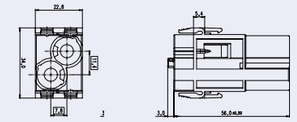
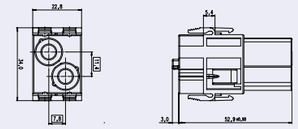
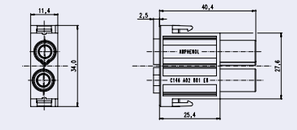
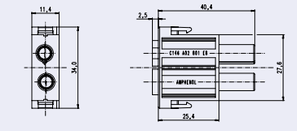
Solution: C146 P10 001 G8

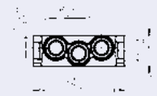
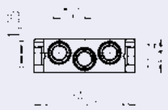
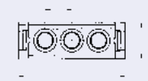
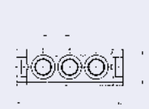
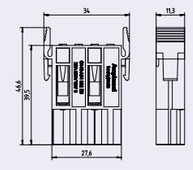
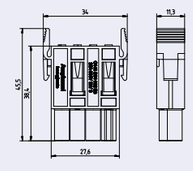
5. Choose matching housing, see housings from page 228

Solution: C146 21R010 600 8

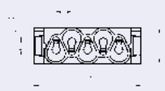
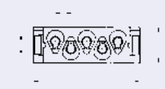
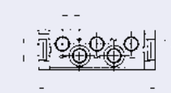
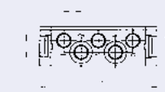
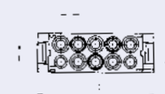
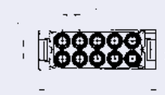
Schematic construction

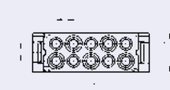
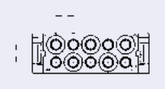
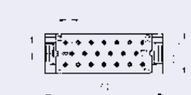
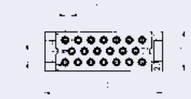
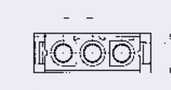
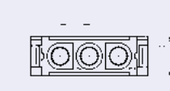


Description	Part Number	Drawing	Figure
1 contact module, 1000 V, Details see page 166			
Pin module 1 contact	C146 A01 001 E8		
Socket module 1 contact	C146 B01 004 E8		
2 contacts module, 1000 V, Details see page 168			
Pin module 2 contacts	C146 A02 001 E8		
Socket module 2 contacts	C146 B02 001 E8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

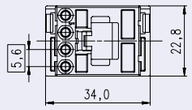
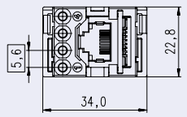
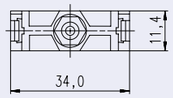
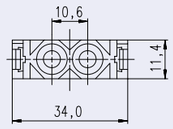
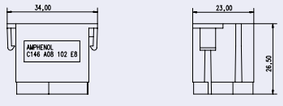
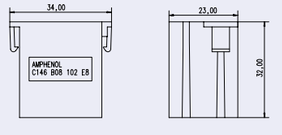
Description	Part Number	Drawing	Figure
3 contacts module, 1000 V, Details see page 172			
Pin module 3 contacts	C146 A03 801 E8		
Socket module 3 contacts	C146 B03 801 E8		
3 contacts module, 690 V, Details see page 174			
Pin module 3 contacts	C146 A03 001 E8		
Socket module 3 contacts	C146 B03 001 E8		
4 contacts module, 630 V, Details see page 176			
Pin module 4 contacts	C146 A04 002 E8		
Socket module 4 contacts	C146 B04 002 E8		

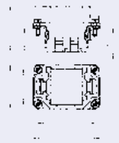
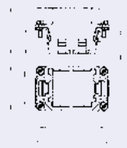
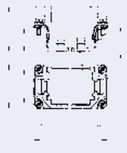
M

Description	Part number	Drawing	Figure
5 contacts module für stanced contacts, 1000 V, Details see page 178			
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)		
5 contacts module for turned contacts, 400 V, Details see page 180			
Pin module 5 contacts	C146 A05 001 E8		
Socket module 5 contacts	C146 B05 001 E8		
10 contacts module for stanced contacts, 400 V, Details see page 182			
Pin module 10 contacts	C146 D10 001 E8		
Socket module 10 contacts	C146 C10 001 G8		

Description	Part number	Drawing	Figure
10 contacts module fpr stanced contacts, 400 V, Details see page 184			
Pin module 10 contacts	C146 A10 001 E8		
Socket module 10 contacts	C146 B10 001 E8		
20 contacts module, 63 V, Details see page 186			
Pin module 20 contacts	C146 A20 001 G8		
Socket module 20 contacts	C146 B20 001 G8		
3 contacts module for Coax-contacts, Details see page 188			
Pin module 3 contacts	C146 A03 501 E8		
Socket module 3 contacts	C146 B03 501 E8		

M

Description	Part Number	Drawing	Figure
RJ45 module, Details see page 191			
Pin module RJ45	C146 E12 001 E8		
Socket module RJ45	C146 F12 001 G8		
Pneumatic module, 1 or 2 connections, Details see page 193			
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)		
Shielded Quintax - module, details see on page195			
Pin module	C146 A08 102 E8 C146 A05 100 G8		
Socket Module	C146 B08 102 E8 C146 B05 100 G8		

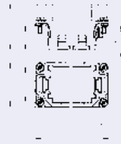
Description	Part Number	Drawing	Figure
Frame for 2 modules | Size E6 | Housings from page 226			
Frame for 2 pin modules	C146 P06 001 G8 C146 P06 002 G8 (2 x PE)		
Frame for 2 socket modules	C146 S06 001 G8 C146 S06 002 G8 (2 x PE)		
Frame for 3 modules | Size E10 | Housings from page 228			
Frame for 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)		
Frame for 5 modules | Size E16 | Housings from page 235			
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)		

It is possible to mount socket modules in frames for pin modules (possibility of inverse configuration).

[1)] If connectors are mounted in non conductive housings both protective earthing terminals shall be mounted.

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heavy | mate® M Frames

Description	Part Number	Drawing	Figure
Frame for 7 modules | Size E24 | Housings from page 241			
Frame for 7 pin modules Positions A-G	C146 P24 001 G8 C146 P24 002 G8 (2 x PE)		
Frame for 7 pin modules Positions T-Z	C146 P24 101 G8 C146 P24 102 G8 (2 x PE)		
Frame for 7 socket modules Positions A-G	C146 S24 001 G8 C146 S24 002 G8 (2 x PE)		
Frame for 7 socket modules Positions T-Z	C146 S24 101 G8 C146 S24 102 G8 (2 x PE)		

Supplied as	for wire gauge	AWG	Pieces	Part Number	Figure
Cable lug for earth connection					
Single contact	10 - 16 mm²	8 - 6	1	N15 043 0003 003	

M

INDUSTRIAL@AMPHENOL TRUSTED GLOBALLY

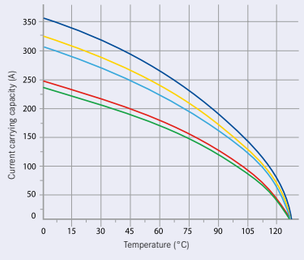
[1)] If connectors are mounted in non conductive housings both protective earthing terminals shall be mounted.

heavy|mate® M Characteristics 1 contact module

General Characteristics	Standard	Value
Number of contacts		1
Termination technique		crimp
Wire gauge		25 - 95 mm² (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_u = 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^{10} 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 mm²

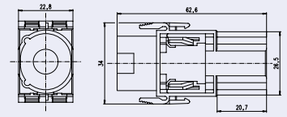
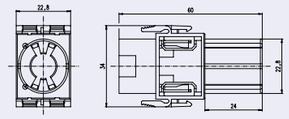


Curve	Frame
a	1 Module
b	1 Module
c	3 Modules
d	1 Module
e	3 Modules

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!

heavy|mate® M 1 contact module + crimp contacts

Description	Part Number	Drawing	Figure
1 contact module (Please order contacts separately)			
Pin module 1 contact	C146 A01 001 E8		
Socket module 1 contact	C146 B01 004 E8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 10 mm crimp contacts						
Single contact	25 mm²	4	1	N01 100 5099 001	N02 100 6119 002	
	35 mm²	2	1	N01 100 6000 001	N02 100 6120 002	
	50 mm²	1	1	N01 100 6001 001	N02 100 6121 002	
	70 mm²	00	1	N01 100 6002 001	N02 100 6122 002	
	95 mm²	000	1	N01 100 6003 001	N02 100 6123 002	
Cable lug for earth connection						
Single contact	10 - 16 mm²	8 - 6	1	N15 043 0003 003		

Tools

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Crimping dies	25 mm²	-	TE 0600 042	*
	35 mm²	-	TE 0600 22	*
	50 mm²	-	TE 0500 103	*
	70 mm²	-	TE 0500 201	*
	95 mm²	-	TE 0500 301	*

*hydraulic crimping tool EK12042 by Klauke or AHPW 400C by Neko .
Further tools see catalogue “Tools”

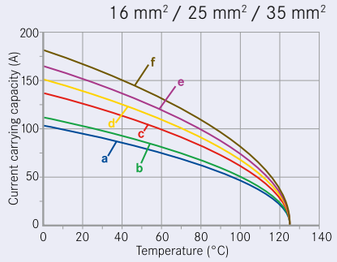
M

Characteristics 2 contacts module

General Characteristics	Standard	Value
Number of contacts		2
Termination technique		crimp
Wire gauge		16 - 35 mm² (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_u = 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^{10} 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

16 mm² / 25 mm² / 35 mm²

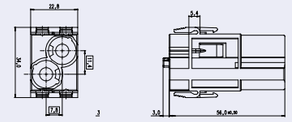
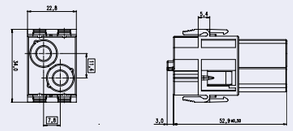


Curve	Frame
a	3 contacts 16 mm²
b	1 contacts 16 mm²
c	3 contacts 25 mm²
d	1 contacts 25 mm²
e	3 contacts 35 mm²
f	1 contacts 35 mm²

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!

2 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
2 contacts module (Please order contacts separately)			
Pin module 2 contacts	C146 A02 001 E8		
Socket module 2 contacts	C146 B02 001 E8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 6 mm crimp contacts						
Single contact	16 mm²	6	1	N01 060 0007 1	N02 060 6117 001	
	25 mm²	4		N01 060 0004 1	N02 060 6114 001	
	35 mm²	2		N01 060 0008 1	N02 060 6118 001	
Cable lug for earth connection						
Single contact	10 - 16 mm²	8 - 6	1	N15 043 0003 003		

Tools

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Crimping dies	16 mm²	-	TE 0600 062	*
	25 mm²	-	TE 0600 042	*
	35 mm²	-	TE 0600 022	*

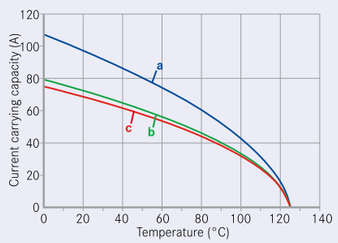
*Hydraulic crimping tool EK12042 by Klauke or AHPW 400C by Neko .
Further tools see catalogue “Tools”

Characteristics 2 contacts module

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 °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	≤ 5 mΩ
Insulation resistance	IEC 60512-3-1	≥ 10^{10} 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		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

16 mm²

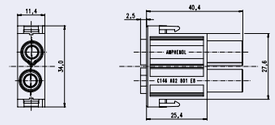
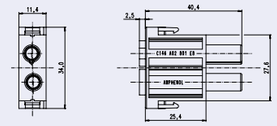


Curve	Frame
a	1 Modules
b	3 Modules
c	7 Modules

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!

2 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
2 contacts module (Please order contacts separately)			
Pin module 2 contacts	C146 A02 801 E8		
Socket module 2 contacts	C146 B02 801 E8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 3.6 mm crimp contacts						
Single contact	16 mm²	6	100	VN01 036 0021 1C	VN02 036 0021 1C	
Cable lug for earth connection						
Single contact	10 - 16 mm²	8 - 6	1	N 15 043 0003 003		

Tools

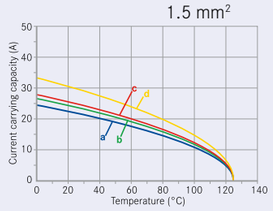
Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Crimping dies	16 mm²	-	TE 0600 063	*
Removal tool for contacts	16 mm²	-	FG 0300 146 3	*
Removal tool for modules	-	-	FG 1000 146	*

*hydraulic crimping tool EK 60/22-L by Klauke or AHPW 300 by Neko .
Further tools see catalogue “Tools”

General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp
Wire gauge		1.5 - 10 mm² (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_u = 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^{10} 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)

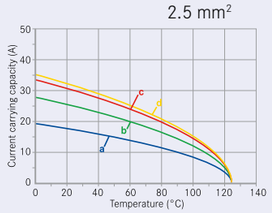
Derating Curves

1.5 mm²



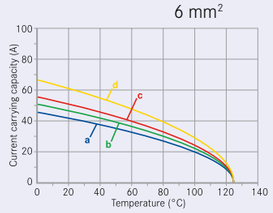
Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

2.5 mm²



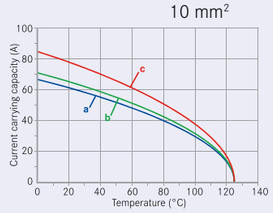
Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

6 mm²



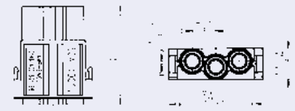
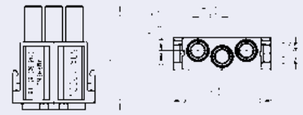
Curve	Frame
a	5-7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

10 mm²



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

heavy | mate® M Characteristics 3 contacts module

Description	Part number	Drawing	Figure
Modul 3 contacts (Please order contacts separately)			
Pin module 3 contacts	C146 A03 801 E8		
Socket module 3 contacts	C146 B03 801 E8		

Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 3.6 mm crimp contacts (All contacts 2 mm first-to-mate to other modules)						
silver plating	1.5 mm²	16	100	VN01 036 0004 1C	VN02 036 0004 1C	
	2.5 mm²	14	100	VN01 036 0005 1C	VN02 036 0005 1C	
	4.0 mm²	12	100	VN01 036 0001 1C	VN02 036 0001 1C	
	6.0 mm²	10	100	VN01 036 0002 1C	VN02 036 0002 1C	
	10.0 mm²	8	100	VN01 036 0003 1C	VN02 036 0003 1C	
Cable lug for earth connection						
Single contact	10 - 16 mm²	8 - 6	1	N 15 043 0003 003		

M

Tools

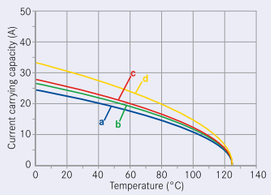
Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	1.5 - 10.0 mm²	-	-	FG 0300 146 3
Lösewerkzeug für Module	-	-	-	FG 1000 146
Standard crimping tool and accessories for 4-Indent crimping	1.5 - 2.5 mm² 4 - 6 mm²	TA 0010 146 000 5 TA 0010 146 000 4	TA 0000 144 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	1.5 - 10.0 mm²	-	-	TB 0100 148
Further tools see catalogue “Tools”				

heavy | mate® M 3 contacts module

General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp
Wire gauge		1.5 - 10 mm² (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 °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^{10} 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)

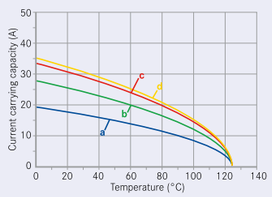
Derating Curves

1.5 mm²



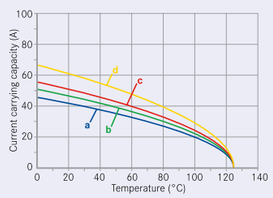
Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

2.5 mm²



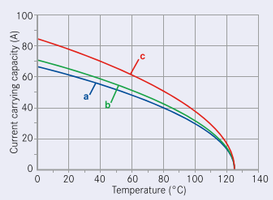
Curve	Frame
a	7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

6 mm²



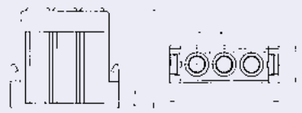
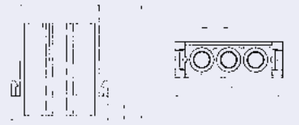
Curve	Frame
a	5-7 Modules
b	3 Modules
c	2 Modules
d	1 Modules

10 mm²



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

heavy | mate® M 3 contacts module + crimp contacts

Description	Part number	Drawing	Figure
3 contacts module (Please order contacts separately)			
Pin module 3 contacts	C146 A03 001 E8		
Socket module 3 contacts	C146 B03 001 E8		

Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 3.6 mm crimp contacts						
silver plating	1.5 mm²	16	100	VN01 036 0004 1C	VN02 036 0004 1C	
	2.5 mm²	14	100	VN01 036 0005 1C	VN02 036 0005 1C	
	4.0 mm²	12	100	VN01 036 0001 1C	VN02 036 0001 1C	
	6.0 mm²	10	100	VN01 036 0002 1C	VN02 036 0002 1C	
	10.0 mm²	8	100	VN01 036 0003 1C	VN02 036 0003 1C	
Cable lug for earth connection						
Single contact	10 - 16 mm²	8 - 6	1	N 15 043 0003 003		

Tools

Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	1.5 - 10.0 mm²	-	-	FG 0300 146 3
Removal tool for modules	-	-	-	FG 1000 146
Standard crimping tool and accessories for 4-Indent crimping	1.5 - 2.5 mm² 4 - 6 mm²	TA 0010 146 000 5 TA 0010 146 000 4	TA 0000 144 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	1.5 - 10.0 mm²	-	-	TB 0100 148
Further tools see catalogue “Tools”				

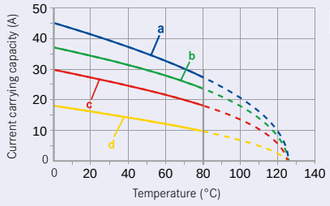
M

heavy | mate® M Characteristics 4 contacts module for turned contacts

General Characteristics	Standard	Value
Number of contacts		4
Termination technique		crimp
Wire gauge		0.5 - 4 mm² (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_u = 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^{10} 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)

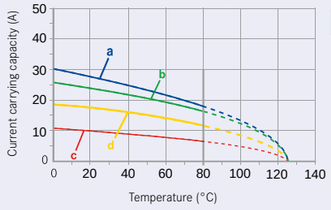
Derating curves

2.5 mm² / 1 module



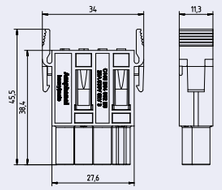
Curve	Wire gauge
a	4.0 mm²
b	2.5 mm²
c	1.5 mm²
d	0.5 mm²

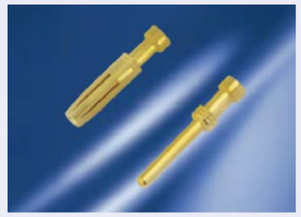
2.5 mm² / 7 modules



Curve	Wire gauge
a	4.0 mm²
b	2.5 mm²
c	1.5 mm²
d	0.5 mm²

heavy | mate® M 4 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
4 contacts module (Please order contacts separately)			
Pin module 4 contacts	C146 A04 002 E8		
Socket module 4 contacts	C146 B04 002 E8		

Supplied as	for wire gauge	AWG	Pcs.	Part Number		Figure
				Pin contact	Socket contact	
Turned 3.6 mm crimp contacts single contact						
silver plated	0.14 - 0.37 mm²	26-22	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plated	0.14 - 0.37 mm²	26-22	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75 - 1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

Tools for turned contacts

Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146
Further tools see catalogue “Tools”				

M

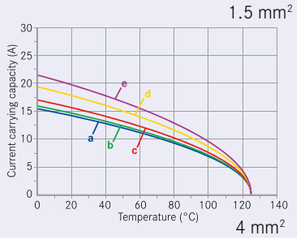
* UL/CSA - Certification in preparation.

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 mm² (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_u = 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^{10} 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 (bronce)
Contact plating		Ag (silver) / Au (gold)

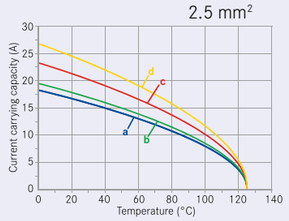
Derating Curves

1.5 mm²



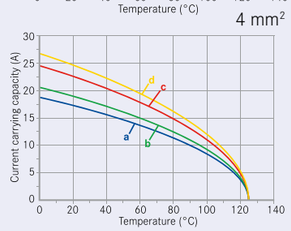
Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	2 Modules
d	1 Modules

2.5 mm²



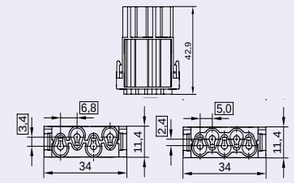
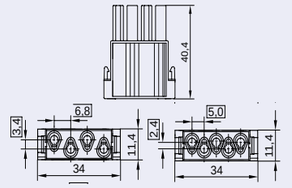
Curve	Frame
a	7 Modules
b	3-5 Modules
c	2 Modules
d	1 Modules

4 mm²



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

4 contacts, 4 + ⏚ , 5 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
4 contacts, 4 + ⏚ , 5 contacts module, PE contact 2 mm first-to-mate (Please order contacts separately)			
Pin module	C146 D04 001 E8 (4 pol) C146 D05 001 E8 (4 +PE) C146 D05 801 E8 (5 pol)		
Socket module	C146 C04 001 E8 (4 pol) C146 C05 001 E8 (4 + PE) C146 C05 801 E8 (5 pol)		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Stamped single contacts						
silver plating	0.5 - 1.5 mm²	20 - 16	100	VN01 025 0001 101	VN02 025 0001 101	
	1.5 - 2.5 mm²	16 - 14	100	VN01 025 0010 101	VN02 025 0010 101	
	2.5 - 4.0 mm²	14 - 12	100	VN01 025 0043 1	VN02 025 0043 1	
gold plating	0.5 - 1.5 mm²	20 - 16	100	VN01 025 0001 102	VN02 025 0001 102	
	1.5 - 2.5 mm²	16 - 14	100	VN01 025 0010 102	VN02 025 0010 102	
	2.5 - 4 mm²	14 - 12	100	VN01 025 0043 2	VN02 025 0043 2	
Stamped Contacts on reel for hand crimp tools						
silver plating	0.5 - 1.5 mm²	20 - 16	200	ZN01 025 0001 1	ZN02 025 0001 1	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 025 0010 1	ZN02 025 0010 1	
gold plating	0.5 - 1.5 mm²	20 - 16	200	ZN01 025 0001 2	ZN02 025 0001 2	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 025 0010 2	ZN02 025 0010 2	
Contacts on reel for crimp machines contact feeding left hand side						
silver plating	0.5 - 1.5 mm²	20 - 16	2000	TN01 025 0001 1	TN02 025 0001 1	
	1.5 - 2.5 mm²	16 - 14	2000	TN01 025 0010 1	TN02 025 0010 1	
	2.5 - 4 mm²	12	2000	TN01 025 0043 1	TN02 025 0043 1	

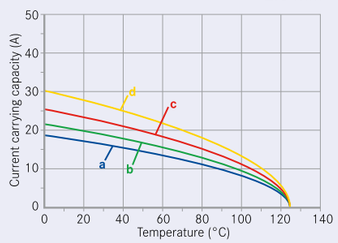
Tools

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.5 - 4.0 mm²	-	-	FG 0200 146 1
Crimping tool for single contacts	0.5 - 1.5 mm² 1.5 - 2.5 mm² 2.5 - 4.0 mm²	TA 0004 146 000 1 TA 0005 146 000 3 TA 0003 146 000 1	TA 0000 163 TA 0000 141 TA 0000 121	TA 0000 or TA 0500
Further tools see catalogue “Tools”				

Characteristics 5 contacts module for turned contacts

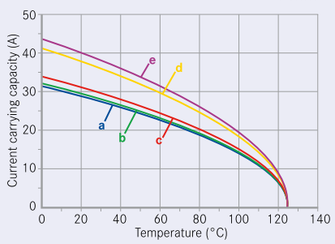
General Characteristics	Standard	Value
Number of contacts		5
Termination technique		crimp
Wire gauge		0.5 - 4 mm² (AWG 20 - 12)
Max. wire diameter		4.8 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	400 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T_u = 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^{10} 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		

2.5 mm²



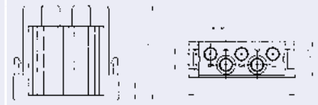
Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	1+2 Modules

4 mm²



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

5 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
5 contacts module (Please order contacts separately)			
Pin module 5 contacts	C146 A05 001 E8		
Socket module 5 contacts	C146 B05 001 E8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts						
silver plating	0.5 mm²	20	100	VN01 025 0029 1C	VN02 025 0029 1C	
	0.75 - 1.0 mm²	18	100	VN01 025 0030 1C	VN02 025 0030 1C	
	1.5 mm²	16	100	VN01 025 0031 1C	VN02 025 0031 1C	
	2.5 mm²	14	100	VN01 025 0032 1C	VN02 025 0032 1C	
	4.0 mm²	12	100	VN01 025 0033 1C	VN02 025 0033 1C	

Tools

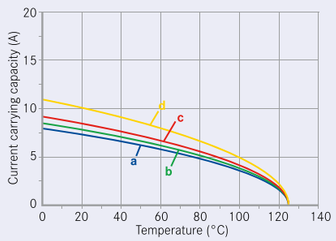
Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.5 - 4.0 mm²	-	-	FG 0300 146 4
Removal tool for modules	-	-	-	FG 1000 146
Standard crimping tool and accessories for 4-Indent crimping	0.5 - 2.5 mm² 4.0 mm²	TA 0010 146 000 2 TA 0010 146 000 3	TA 0000 144 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.5 - 4.0 mm²	-	-	TB 0100 146
Further tools see catalogue “Tools”				

M

Characteristics 10 contacts module

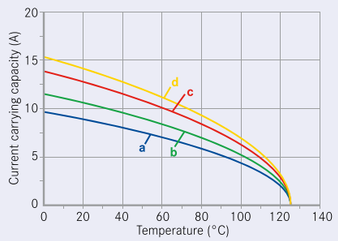
General Characteristics	Standard	Value
Number of contacts		10
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm² (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (UL/CSA 600 V)
Rated impulse withstand voltage	IEC 60664-1	6 kV
Rated Current T_u = 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^{10} 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 (bronce)
Contact plating		Ag (silver)
Derating curves		

0.5 mm²



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

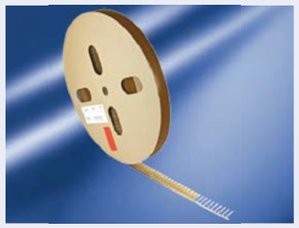
1.5 mm²



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

10 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
10 contacts module (Please order contacts separately)			
Pin module 10 contacts	C146 D10 001 E8		
Socket module 10 contacts	C146 C10 001 G8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Stamped 1.6 mm crimp contacts						
silver plating	0.14 - 0.5 mm²	26 - 20	100	VN01 016 0003 1	VN02 016 0003 1	
	0.5 - 1.5 mm²	20 - 16	100	VN01 016 0002 1	VN02 016 0002 1	
	1.5 - 2.5 mm²	16 - 14	100	VN01 016 0005 1	VN02 016 0005 1	
gold plating	0.14 - 0.5 mm²	26 - 20	100	VN01 016 0003 2	VN02 016 0003 2	
	0.5 - 1.5 mm²	20 - 16	100	VN01 016 0002 2	VN02 016 0002 2	
	1.5 - 2.5 mm²	16 - 14	100	VN01 016 0005 2	VN02 016 0005 2	
Stamped Contacts on reel for hand crimp tools						
silver plating Standard	0.14 - 0.5 mm²	26 - 20	200	ZN01 016 0003 1	ZN02 016 0003 1	
	0.5 - 1.5 mm²	20 - 16	200	ZN01 016 0002 1	ZN02 016 0002 1	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 016 0005 1	ZN02 016 0005 1	
silver plating High current	0.5 - 1.5 mm²	20 - 16	200	ZN01 016 0015 1	ZN02 016 0015 1	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 016 0016 1	ZN02 016 0016 1	
gold plating Standard	0.14 - 0.5 mm²	26 - 20	200	ZN01 016 0003 2	ZN02 016 0003 2	
	0.5 - 1.5 mm²	20 - 16	200	ZN01 016 0002 2	ZN02 016 0002 2	
	1.5 - 2.5 mm²	16 - 14	100	ZN01 016 0005 2	ZN02 016 0005 2	
Stamped Contacts on reel for crimp machines contact feeding left hand side						
silver plating Standard	0.14 - 0.5 mm²	26 - 20	2000	TN01 016 0003 1	TN02 016 0003 1	
	0.5 - 1.5 mm²	20 - 16	2000	TN01 016 0002 1	TN02 016 0002 1	
	1.5 - 2.5 mm²	16 - 14	2000	TN01 016 0005 1	TN02 016 0005 1	
silver plating High current	0.5 - 1.5 mm²	20 - 16	2000	TN01 016 0015 1	TN02 016 0015 1	
	1.5 - 2.5 mm²	18 - 14	2000	TN01 016 0016 1	TN02 016 0016 1	
gold plating Standard	0.14 - 0.5 mm²	26 - 20	2000	TN01 016 0003 2	TN02 016 0003 2	
	0.5 - 1.5 mm²	20 - 16	2000	TN01 016 0002 2	TN02 016 0002 2	
	1.5 - 2.5 mm²	16 - 14	2000	TN01 016 0005 2	TN02 016 0005 2	

Tools

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Removal tools for modules	-	-	-	FG 1000 146
Crimping tool for single contacts	0.14 - 0.5 mm² 0.5 - 1.5 mm² 1.5 - 2.5 mm²	TA 0001 146 000 1 TA 0002 146 000 1 TA 0007 146 000 3	TA 0000 202 TA 0000 163 TA 0000 141	TA 0000 or TA 0500
Further tools see catalogue “Tools”				

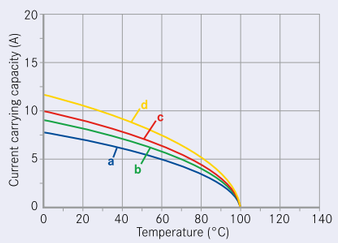
M

Characteristics 10 contacts module

General Characteristics	Standard	Value
Number of contacts		10
Termination technique		crimp
Wire gauge		0.14 - 2.5 mm² (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_u = 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^{10} 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)

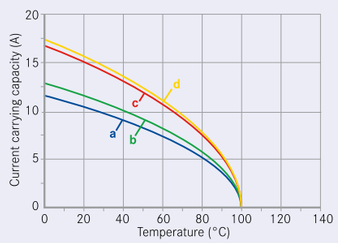
Derating curves

0.5 mm²



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

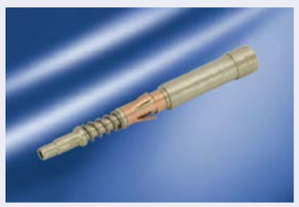
1.5 mm²



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

10 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
10 contacts module (Please order contacts separately)			
Pin module 10 contacts	C146 A10 001 E8		
Socket module 10 contacts	C146 B10 001 E8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm crimp contacts crimp contact						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16 - 15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16 - 15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	
FO contacts						
single contact	1.0 mm POF	–	10	VN01 016 0040 8 X	VN02 016 0040 8 X	

M

Tools

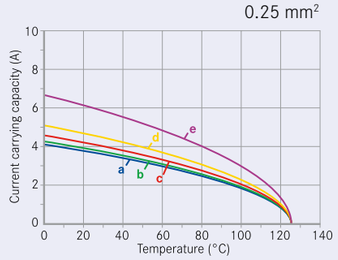
Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 2.5 mm²	-	-	FG 0300 146 1
Removal tool for modules	-	-	-	FG 1000 146
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 000 1	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Crimping tool for FO contacts	1.0 mm POF/FO	-	-	TB 0500 146
Further tools see catalogue “Tools”				

Characteristics 20 contacts module

General Characteristics	Standard	Value
Number of contacts		20
Termination technique		crimp
Wire gauge		0.09 - 0.5 mm² (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_u = 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^{10} 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)

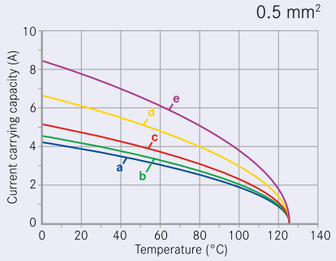
Derating curves

0.25 mm²



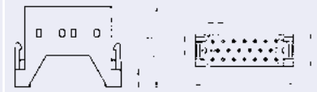
Curve	Frame
a	7 Modules
b	5 Modules
c	3 Modules
d	2 Modules
e	1 Modules

0.5 mm²



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

20 contacts module + crimp contacts

Description	Part Number	Drawing	Figure
20 contacts module (Please order contacts separately)			
Pin module 20 contacts	C146 A20 001 G8		
Socket module 20 contacts	C146 B20 001 G8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Stamped 1.0 mm crimp contacts						
gold plating	0.09 - 0.14 mm²	28 - 26	100	VN01 010 0130 2	VN02 010 0130 2	
	0.25 - 0.50 mm²	24 - 20	100	VN01 010 0131 2	VN02 010 0131 2	
Stamped Contacts on reel for hand crimp tools						
gold plating	0.09 - 0.14 mm²	28 - 26	350	ZN01 010 0130 2	ZN02 010 0130 2	
	0.25 - 0.50 mm²	24 - 20	350	ZN01 010 0131 2	ZN02 010 0131 2	
Stamped contacts on reel for crimp machines contact feeding left hand side						
gold plating	0.09 - 0.14 mm²	28 - 26	2000	TN01 010 0130 2	TN02 010 0130 2	
	0.25 - 0.50 mm²	24 - 20	2000	TN01 010 0131 2	TN02 010 0131 2	

Tools

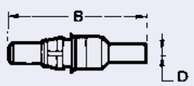
Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.09 - 0.50 mm²	-	-	17D 438 SP
Removal tool for modules	-	-	-	FG 1000 146
Standard crimping tool and accessories for 4-Indent crimping	0.09 - 0.25 mm²	TA 0001 017 0001	TA 0000 501	TA 0000 or TA 0500
Further tools see catalogue “Tools”				

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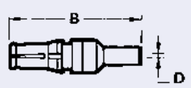
General Characteristics	Standard	Value
Number of contacts		3
Termination technique		crimp, solder
Max. wire diameter		7.2 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V
Rated impulse withstand voltage		8 kV
Rated Current T_u = 40 °C		0.5 A
Installation (overvoltage) 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^{10} 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 (bronce)
Contact plating		Au (gold)

Contact dimensions (Figure without crimp ferrule)

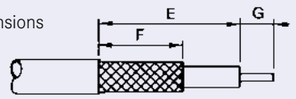
Pin contact



Socket contact

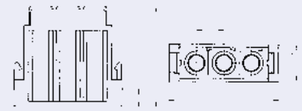
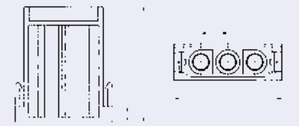


Stripping dimensions



Part Number	B	D	E	F	G
17 DM 537 401	18[1)]	1.6	4.6	4.3	1.9
17 DM 537 421	18[1)]	1.6	5.1	4.4	1.9
17 DM 537 405	23.6[2)]	3.2	9.5	7.9	2
17 DM 537 425	23.6[2)]	3.2	9.5	7.9	2

[1)] With crimp ferrule
[2)] Without crimp ferrule

Description	Part Number	Drawing	Figure
3 contacts coax module (Please order contacts separately)			
Pin module 3 contacts coax	C146 A03 501 E8		
Socket module 3 contacts coax	C146 B03 501 E8		

Supplied as	for wire gauge	Pieces	Part Number		Figure
			Pin contact	Socket contact	
Coax contacts					
	RG 179, 316	1	17 DM 537 401	17 DM 537 421	
	RG 58	1	17 DM 537 405	17 DM 537 425	
FO contacts					
single contact	50 - 62.5 / 125 µm Glass fiber	10	VN01 036 0022 X	VN02 036 0022 X	

Tools

Description	for cable size	6-hex-size in mm			Part Number	
					Crimping dies	Tool
Removal tool for contacts	RG 58, 179, 316	-			-	FG 0300 146 3
Removal tool for modules	-	-			-	FG 1000 146
Crimping tool for single contacts	RG 58	5.4	(6.5)	(1.7)	TA 0000 401	TA 0000 or TA 0500
	RG 179, 316	3.25	(4.5)	(1.7)	TA 0000 402	TA 0000 or TA 0500
Crimping tool for FO contacts	50 - 62.5 / 125 µm	-			-	TB 0800 146
Further tools see catalogue “Tools”						

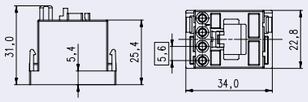
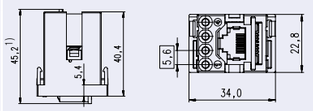
Characteristics RJ45 module

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 - 2.5mm²	-
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[1)]	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^{10}Ω	5^{8}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)

[1)] 2 Modules, 40°C ambient temperature, 1.5 mm² wire gauge

RJ45 module + crimp contacts

Description	Part Number	Drawing	Figure
RJ 45 module (Please order contacts separately)			
Pin module RJ45	C146 E12 001 E8		
Socket module RJ 45	C146 F12 001 G8		

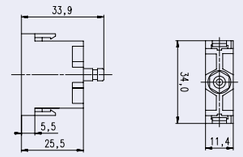
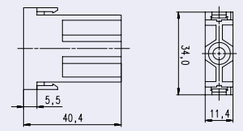
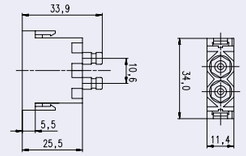
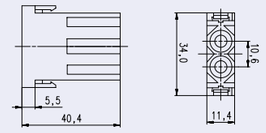
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm single contacts						
silver plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16 - 15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26 - 22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 - 1.0 mm²	20 - 16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16 - 15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Tools				
Description	**for wire gauge**	**Part number**		
		Contact locator	**Crimping dies**	**Tool**
Removal tool for contacts	-	-	-	FG 0300 146 1
Removal tool for module	-	-	-	FG 1000 146
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue “Tools”				

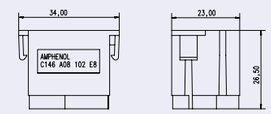
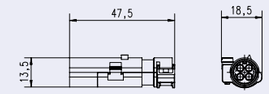
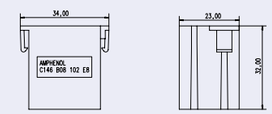
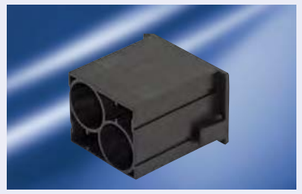
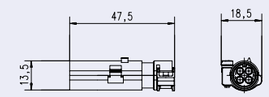
[1)] If plug socket receded: 46,8

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		2.5mm² / 4 mm²	2.5mm² / 4 mm²
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 [1)]	
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	

[1)] The modules are specifically designed for the use of PTFE tubes and should only be used in conjunction with these. The use of tubes made from other materials is not recommended, as the higher and lower category temperatures will not be achievable.

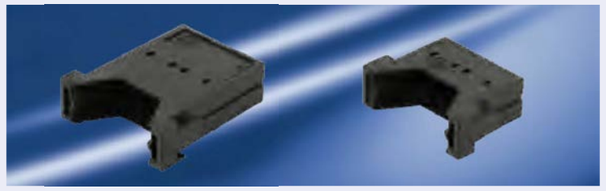
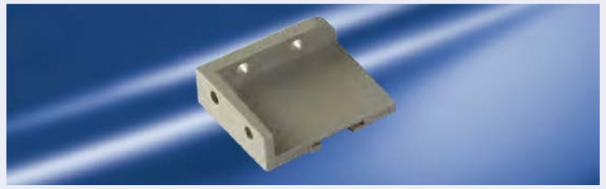
Description	Part Number	Drawing	Figure
Pneumatic module			
Pin module1 contact	C146 G01 014 G8 (2.5 mm) C146 G01 024 G8 (4.0 mm)		
Socket module 1 contact	C146 H01 034 G8 (2.5 mm) C146 H01 044 G8 (4.0 mm)		
Pin module 2 contacts	C146 G02 014 G8 (2.5 mm) C146 G02 024 G8 (4.0 mm)		
Socket module 2 contacts	C146 H02 034 G8 (2.5 mm) C146 H02 044 G8 (4.0 mm)		

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 mm² (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_u = 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^{10} 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

Description	Part Number	Drawing	Figure
Adaptor modules and Quintax-contact carriers (Please order contacts separately)			
Pin module	C146 A08 102 E8		
Quintax pin contact carriers 4 contacts	C146 A05 100 G8		
Socket module	C146 B08 102 E8		
Quintax socket contact carriers 4 contacts	C146 B05 100 G8		

Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 1.6mm crimp contacts						
gold plating	0.14 – 0.37 mm²	26-22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16-15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Tools				
Description	**for wire gauge**	**Part Number**		
		Contact locator	**Crimping dies**	**Tool**
Removal tool for contacts	0.14 - 0.37 mm²	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 00000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue “Tools”				

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® 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



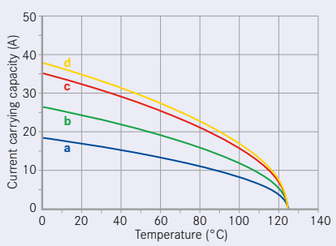




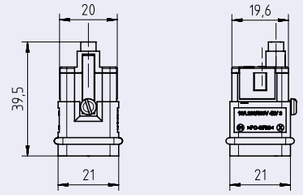
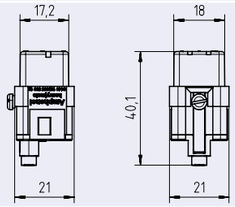

Approvals, Testhouse	Characteristics	Approval-Number
UL	see technical characteristics	E 63093
CSA	see technical characteristics	E 63093

General Characteristics	Standard	Value
Number of contacts		5 + ⏚
Termination technique		crimp
Wire gauge		0.5 – 4.0 mm² (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_u = 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^{10} 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 mm²
b	1.5 mm²
c	2.5 mm²
d	4.0 mm²

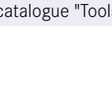
Description	Part Number	Drawing	Figure
Contact insert 5 +PE (Please order contacts separately)			
Pin insert 5 contacts	C146 10A005 500 12		
Socket insert 5 contacts	C146 10B005 500 12		

Contact arrangement

Pin insert



Socket insert



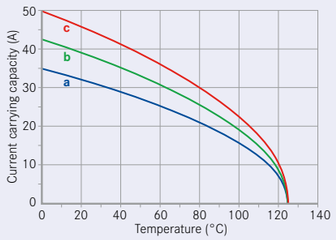
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts single contact						
silver plating	0.14-0.37 mm²	22-26	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75-1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14-0.37 mm²	22-26	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75-1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

Tools for turned contacts

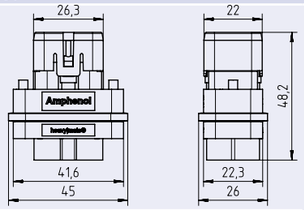
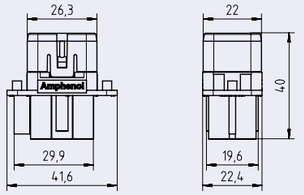
Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146
Further tools see catalogue "Tools"				

General Characteristics	Standard	Value
Number of contacts		4 + 2 + ⏚
Termination technique		crimp
Wire gauge		Power: 1.5 - 6 mm² (AWG 16 - 10) Signal: 0.14 - 2.5 mm² (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_u = 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^{10} 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 mm²
b	4 mm²
c	6 mm²

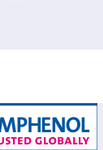
Description	Part Number	Drawing	Figure
Contact insert 4 + 2 + ⏚ (Please order contacts separately)			
Pin insert	C146 10A006 500 12		
Socket insert	C146 10B006 500 12		

Contact arrangement

Pin insert



Socket insert

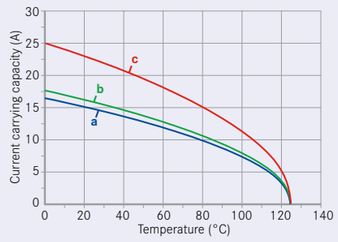


Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 4 mm crimp contacts						
silver plating	1.5 mm²	16	100	VN01 040 0010 1C	VN02 040 0010 1C	
	2.5 mm²	14	100	VN01 040 0011 1C	VN02 040 0011 1C	
	4 mm²	12	100	VN01 040 0012 1C	VN02 040 0012 1C	
	6 mm²	10	100	VN01 040 0013 1C	VN02 040 0013 1C	
Turned 1.6 mm crimp contacts						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16-15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16-15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

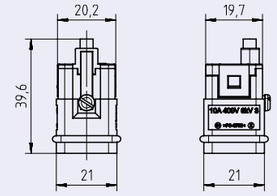
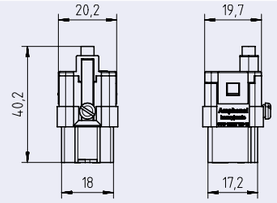
* Please note that these contact inserts are suitable only for thermoplastic housings!

General Characteristics	Standard	Value
Number of contacts		7 + ⏚
Termination technique		crimp
Wire gauge		0.14 – 2.5 mm² (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_u = 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^{10} 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 mm²
b	1.5 mm²
c	2.5 mm²

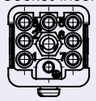
Description	Part Number	Drawing	Figure
Contact insert 7 +PE (Please order contacts separately)			
Pin insert 7 contacts	C146 10A007 500 12		
Socket insert 7 contacts	C146 10B007 500 12		
Coding element			
Pin insert (10 pieces)	VN17 059 0001 X		
Socket insert (10 Pieces)	VN17 059 0002 X		

Contact arrangement

Pin insert



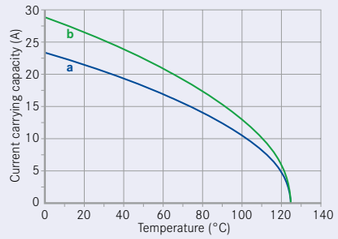
Socket insert



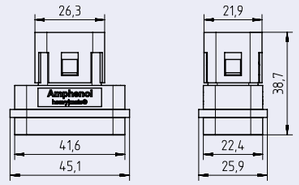
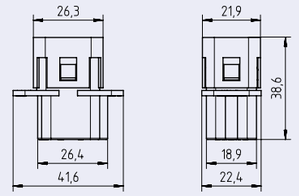
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm crimp contacts						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16-15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16-15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

General Characteristics	Standard	Value
Number of contacts		8 + ⏚
Termination technique		crimp
Wire gauge		0.5 – 4.0 mm² (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_u = 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^{10} 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

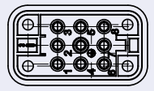


Curve	Wire gauge
a	1.5 mm²
b	2.5 mm²

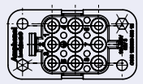
Description	Part Number	Drawing	Figure
Contact insert 8 + ⏚ (Please order contacts separately)			
Pin insert 8 contacts	C146 10A008 500 12		
Socket insert 8 contacts	C146 10B008 500 12		

Contact arrangement

Pin insert



Soket insert



Supplied as	for wire gauge	AWG	Pieces	Part number		Figure
				Pin contact	Socket contact	
Turned 2.5 mm crimp contacts						
silver plating	0.14-0.37 mm²	22-26	100	VN01 025 0055 1C	VN02 025 0055 1C	
	0.5 mm²	20	100	VN01 025 0035 1C	VN02 025 0035 1C	
	0.75-1.0 mm²	18	100	VN01 025 0036 1C	VN02 025 0036 1C	
	1.5 mm²	16	100	VN01 025 0037 1C	VN02 025 0037 1C	
	2.5 mm²	14	100	VN01 025 0038 1C	VN02 025 0038 1C	
	3.0 mm²	-	100	VN01 025 0059 1C	VN02 025 0059 1C	
	4.0 mm²	12	100	VN01 025 0039 1C	VN02 025 0039 1C	
gold plating	0.14-0.37 mm²	22-26	100	VN01 025 0055 2C	VN02 025 0055 2C	
	0.5 mm²	20	100	VN01 025 0035 2C	VN02 025 0035 2C	
	0.75-1.0 mm²	18	100	VN01 025 0036 2C	VN02 025 0036 2C	
	1.5 mm²	16	100	VN01 025 0037 2C	VN02 025 0037 2C	
	2.5 mm²	14	100	VN01 025 0038 2C	VN02 025 0038 2C	
	3.0 mm²	-	100	VN01 025 0059 2C	VN02 025 0059 2C	
	4.0 mm²	12	100	VN01 025 0039 2C	VN02 025 0039 2C	

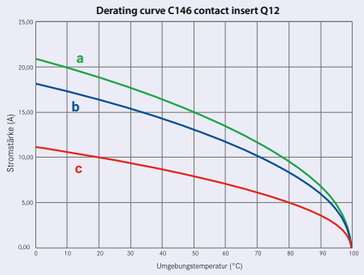
Tools for turned contacts

Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	0.14 - 4.0 mm²	-	-	FG 0300 146 7
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 0.37 mm² 0.5 - 2.5 mm² 3.0 - 4.0 mm²	TA 0010 146 000 6 TA 0010 146 000 7 TA 0010 146 000 7	TA 0000 144 TA 0000 124 TA 0000 124	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 4.0 mm²	-	-	TB 0600 146

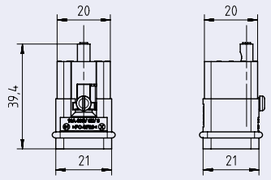
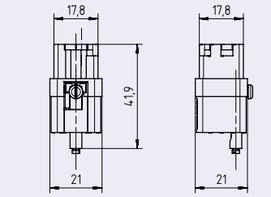
Further tools see catalogue "tools"

General Characteristics	Standard	Value
Number of contacts		12 + ⏚
Termination technique		crimp
Wire gauge		0.14 – 2.5 mm² (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_u = 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^{10} 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 mm²
b	1.5 mm²
c	0.75 mm²

Description	Part Number	Drawing	Figure
Contact insert 12 + ⏚ (Please order contacts separately)			
Pin insert 12 contacts	C146 10A012 500 12		
Socket insert 12 contacts	C146 10B012 500 12		
Coding element			
Coding element (10 Pieces)	VN17 028 0001 X		

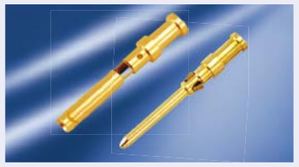
Contact arrangement

Pin insert



Socket insert

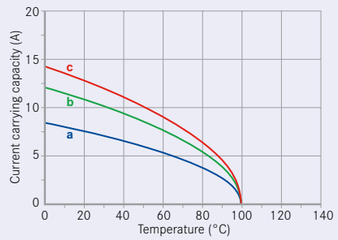


Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm crimp contacts						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16-15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16-15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

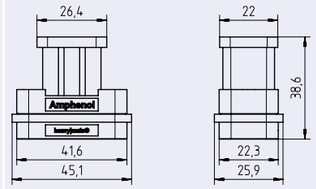
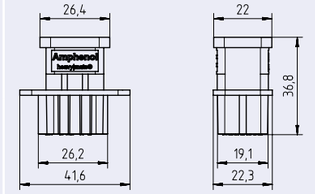
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General Characteristics	Standard	Value
Number of contacts		17 + ⏚
Termination technique		crimp
Wire gauge		0.14 – 2.5 mm² (AWG 26 - 14)
Max. wire diameter		3.7 mm
Flammability	UL94	V-0
Electrical Characteristics		
Rated voltage	IEC 60664-1	250 V (UL/CSA 250 V)
Rated impulse withstand voltage	IEC 60664-1	4 kV
Rated Current T_u = 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^{10} 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

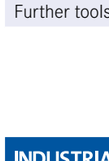


Curve	Wire gauge
a	0.5 mm²
b	1 mm²
c	1.5 mm²

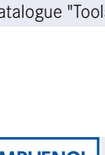
Description	Part Number	Drawing	Figure
Contact insert 17 + ⏚ (Please order contacts separately)			
Pin insert 17 contacts	C146 10A017 500 12		
Socket insert 17 contacts	C146 10B017 500 12		

Contact arrangement

Pin insert



Socket insert

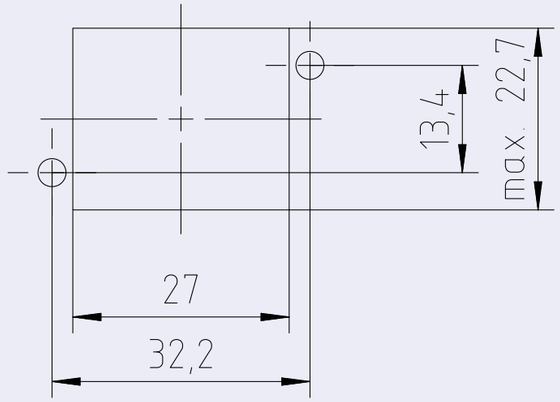


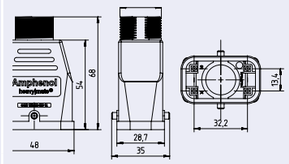
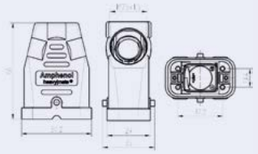
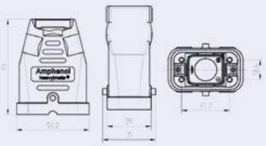
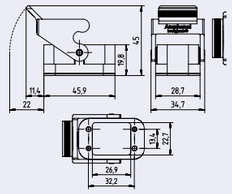
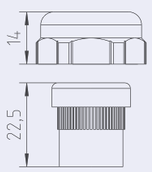
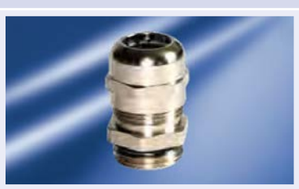
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Pin contact	Socket contact	
Turned 1.6 mm crimp contacts single contact						
silver plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 1C	VN02 016 0024 1C	
	0.5 mm²	20	100	VN01 016 0025 1C	VN02 016 0025 1C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 1C	VN02 016 0026 1C	
	1.5 mm²	16-15	100	VN01 016 0027 1C	VN02 016 0027 1C	
	2.5 mm²	14	100	VN01 016 0028 1C	VN02 016 0028 1C	
gold plating	0.14 - 0.37 mm²	26-22	100	VN01 016 0024 2C	VN02 016 0024 2C	
	0.5 mm²	20	100	VN01 016 0025 2C	VN02 016 0025 2C	
	0.75 – 1.0 mm²	20-16	100	VN01 016 0026 2C	VN02 016 0026 2C	
	1.5 mm²	16-15	100	VN01 016 0027 2C	VN02 016 0027 2C	
	2.5 mm²	14	100	VN01 016 0028 2C	VN02 016 0028 2C	

Tools for turned contacts

Description	for wire gauge	Part number		
		Contact locator	Crimping dies	Tool
Removal tool for contacts	-	-	-	FG 0300 146 1
Standard crimping tool and accessories for 4-Indent crimping	0.14 - 2.5 mm²	TA 0010 146 0001	TA 0000 184	TA 0000 or TA 0500
4-Indent crimping tool	0.14 - 2.5 mm²	-	-	TB 0400 146
Further tools see catalogue "Tools"				

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		



Description	Clamp range	Part Number	Drawing	Figure
Hoods				
Hood top entry thermoplastic		C146 10R008 606 12		
Hood top entry metal		C146 10R008 650 12		
Hood side entry metal, only for Q8 and Q17		C146 10R008 550 12		
Housings				
Housing thermoplastic		C146 10F008 001 12		
Housing metal		C146 30F008 001 12		
Glands for thermoplastic housing				
Gland bushing 10 Pieces	4 - 6.5 mm 5 - 8 mm 6.5 - 9.5 mm 7 - 10.5 mm 9 - 13 mm 11.5 - 15.5 mm	VN16 250 0020 X VN16 250 0021 X VN16 250 0022 X VN16 250 0023 X VN16 250 0024 X VN16 250 0025 X		
Glands for metal housings				
Gland bushing 10 Pieces	11 - 18 mm	VN16 250 0133 X		





heavy|mate® 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





heavy|mate® Housings standard Brief information











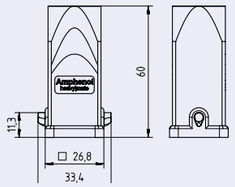
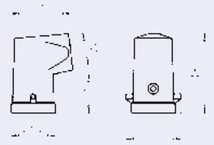
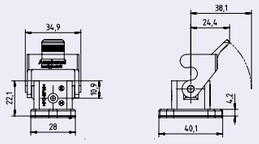
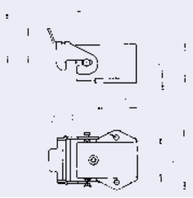
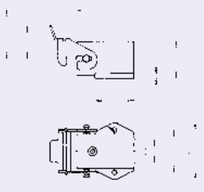
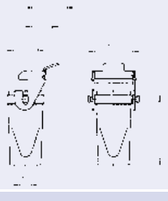


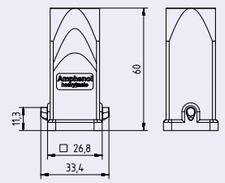
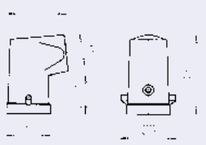
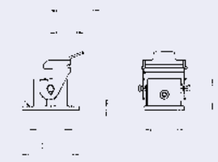
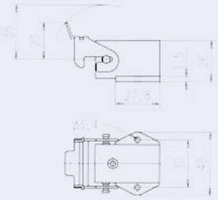
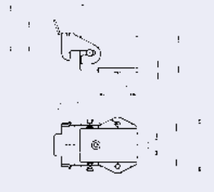
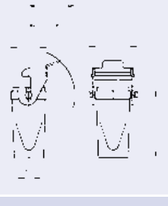
General information

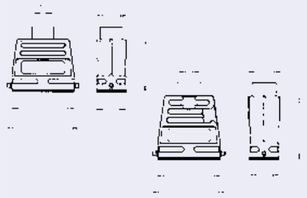
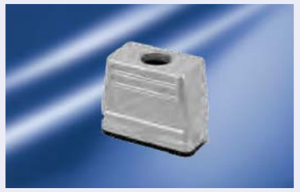
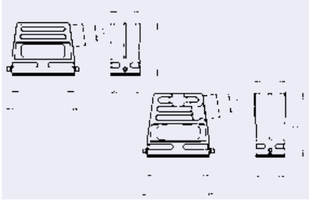
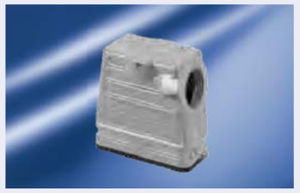
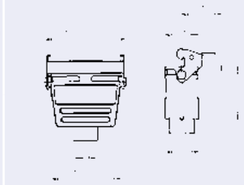
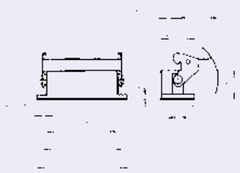
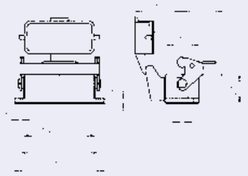
- The connectors of our heavy|mate® series are designed for use in machine tools, general electric installations and applications as well as for industrial control and other electrical equipment. Other applications than the above mentioned are in the responsibility of the user.
- For cable to cable connections a suitable cable clamp has to be used.
- The indicated dimensions with the panel cut-outs represent reference values and are in the concrete application with products to be co-ordinated.
- The sealing area of the housing has to be level and free of burrs.
- Housings in accordance with DIN EN 175 301 - 801 (DIN 43 652) .

Range of housings		
Size A3/4	**Size A10**	**Size A16**
		
Size A32	**Size E6**	**Size E10**
		
Size E16	**Size E24**	**Size E48**
		

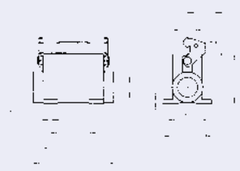
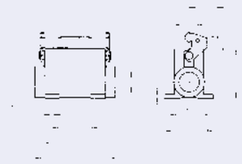
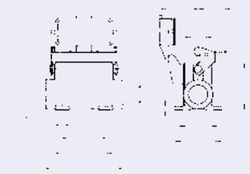
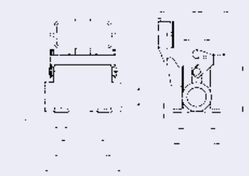
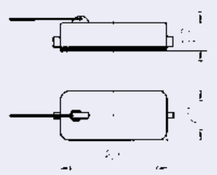
General Characteristics	Standard	Value
Protection class housing		IP65
Protection class spring cover locked unlocked spring loaded		 IP65 IP54
Locking system	DIN EN 175 301-801 (DIN 43 652)	1 central lever 1 lever 2 levers
Tightening torque (for screws used at housings and hoods)		1.0 Nm recommendation: M4 screw
Fire protection railway	EN 45545	HL3 acc. R22/23
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 100 / 21
Temperature range	IEC 60068-1	- 40 °C / + 125 °C
Upper temperature	IEC 60512-11-9	+ 100 °C
Lower temperature	IEC 60512-11-10	- 40 °C
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Metal hosuing E6 - E48	DIN EN 175 301-801 (DIN 43 652)	Aluminium die cast alloy
Colour metal housing E6 - E48		grey, similar RAL 9006
Thermoplastic housing A3/4		PC
Colour thermoplastic housing A3/4		grey, similar RAL 9006
Metal hosuing A3/4		Cu-alloy
Colour metal housing A 3/4		grey, similar RAL 9006
Protective cover		PA
Rubber gasket		NBR
Locking lever		steel / zinc coated
Plating metal housing		powder coated

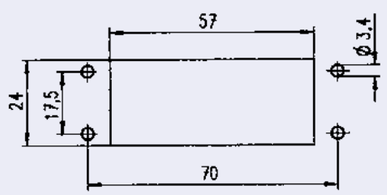
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	20 20	C146 10R003 600 4 C146 10R003 601 4 (black design)		
Hood side entry	20	C146 10R003 500 4		
Housings				
Housing bulkhead mounting with gasket	- -	C146 10F003 000 4 C146 10F003 001 4 (black design)		
Housing bulkhead end mounting 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		
Protective cover (only in connection with Pin insert)				
Cover for housings	-	C146 10Z003 100 4		

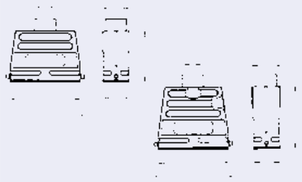
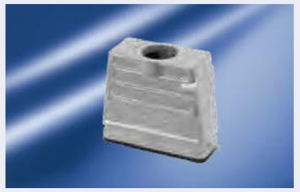
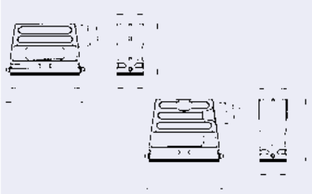
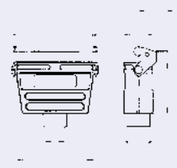
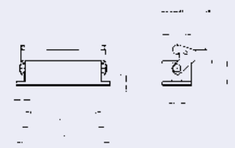
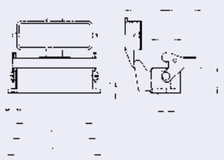
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	20	C146 30R003 600 4		
Hood side entry	20	C146 30R003 500 4		
Housings				
Housing bulkhead mounting with gasket	-	C146 30F003 000 4		
Housing bulkhead end mounting - with gasket - with foam rubber sealing (2 mm)	- -	C146 30F003 004 4 C146 30F003 104 4		
Housing single side entry with gland bushing	20	C146 30N003 500 4		
Hood cable to cable coupling	20	C146 30R003 804 4		
Protective cover (only in connection with Pin insert)				
Cover for housings	-	C146 30Z003 100 4		

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	20 25	C146 21R010 650 4 C146 21R010 600 4		
Hood top entry high profile	20 25	C146 21R015 650 2 C146 21R015 600 2		
Hood side entry low profile	20 25	C146 21R010 550 4 C146 21R010 500 4		
Hood side entry high profile	20 25	C146 21R015 550 2 C146 21R015 500 2		
Housings			**h**	
Hood coupling application low profile	20 25	C146 21R010 854 4 C146 21R010 804 4	47.5 47.5	
Hood coupling application high profile	20 25	C146 21R015 854 2 C146 21R015 804 2	59 59	
Housing bulkhead mounting with gasket	-	C146 10F015 000 2		
Housing bulkhead mounting with spring cover with gasket	-	C146 10F015 003 2		

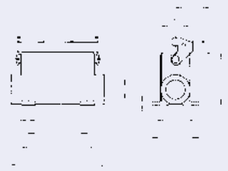
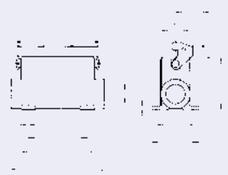
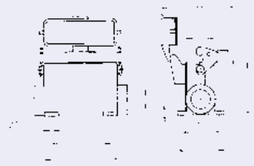
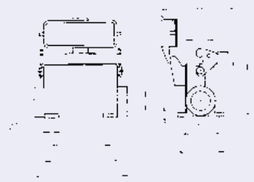
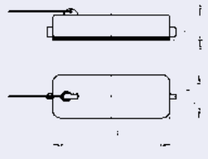
heavy | mate® Housings standard Size A10

Description	M	Part Number	Drawing	Figure
Housings				
Housing single side entry	25	C146 10N015 500 2	 1 closed if single entry	
Housing double side entry	25	C146 10N015 600 2		
Housing with spring cover single side entry	25	C146 10N015 806 2	 1 closed if single entry	
Housing with spring cover double side entry	20 25	C146 10N015 607 2 C146 10N015 606 2		
Protective cover				
Cover for housings	-	C146 10Z015 100 2		
Panel cut out for bulkhead mounting				

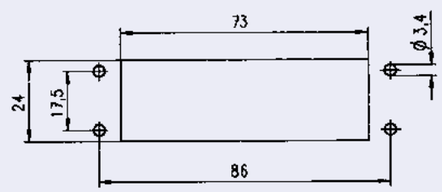


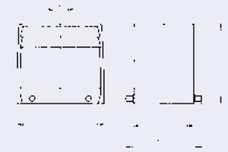
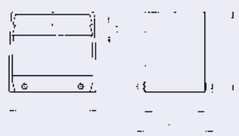
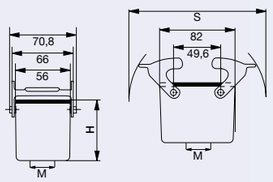
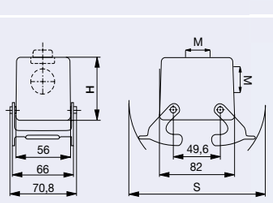
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	20 25	C146 21R016 650 4 C146 21R016 600 4		
Hood top entry high profile	20 25	C146 21R025 650 2 C146 21R025 600 2		
Hood side entry low profile	20 25	C146 21R016 550 4 C146 21R016 500 4		
Hood side entry high profile	20 25	C146 21R025 550 2 C146 21R025 500 2		
Housings			**h**	
Hood coupling application low profile	20 25	C146 21R016 854 4 C146 21R016 804 4	52.5 52.5	 
Hood coupling application high profile	20 25	C146 21R025 854 2 C146 21R025 804 2	65 65	
Housing bulkhead mounting with gasket	-	C146 10F025 000 2		
Housing bulkhead mounting with spring cover with gasket	-	C146 10F025 003 2		

heavy | mate® Housings standard Size A16

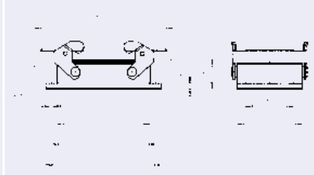
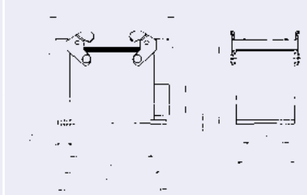
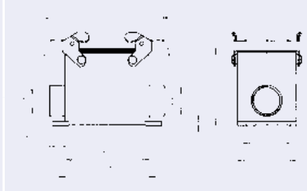
Description	M	Part Number	Drawing	Figure
Housings				
Housing single side entry	25	C146 10N025 500 2	 1 closed if single entry	
Housing double side entry	20 25	C146 10N025 601 2 C146 10N025 600 2		
Housing with spring cover single side entry	25	C146 10N025 806 2	 1 closed if single entry	
Housing with spring cover double side entry	20 25	C146 10N025 607 2 C146 10N025 606 2		
Protective cover				
Cover for housings	-	C146 10Z025 100 2		

Panel cut out for bulkhead mounting

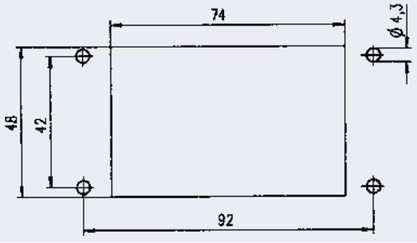


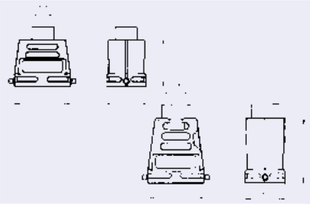
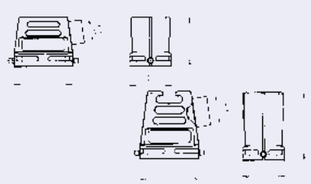
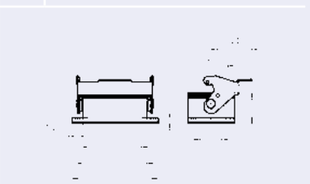
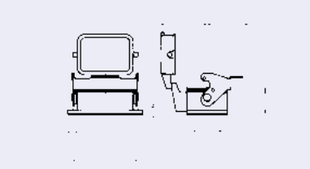
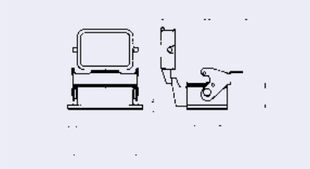
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	25 32 40	C146 21R032 650 4 C146 21R032 600 4 C146 21R032 601 4		
Hood side entry	25 32 40	C146 21R032 550 4 C146 21R032 500 4 C146 21R032 501 4		
Hood coupling application	25 32 40	C146 21R032 852 4 C146 21R032 802 4 C146 21R032 803 4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

heavy | mate® Housings standard Size A32

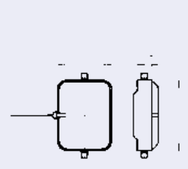
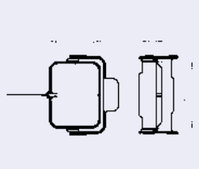
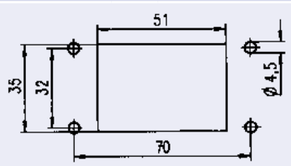
Description	M	Part Number	Drawing	Figure
Housings				
Housing bulkhead mounting with gasket	-	C146 10F032 000 4		
Housing single side entry	25 32	C146 10N032 550 4 C146 10N032 500 4		
Housing double side entry	25 32	C146 10N032 650 4 C146 10N032 600 4		

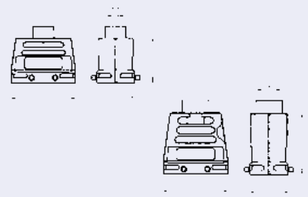
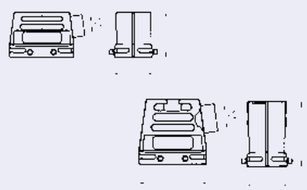
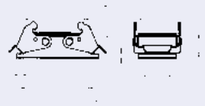
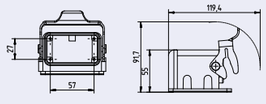
Panel cut out for bulkhead mounting



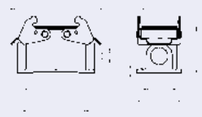
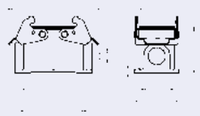
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	16 20	C146 21R006 656 1 C146 21R006 606 1		
Hood top entry high profile	25 32	C146 21R006 656 8 C146 21R006 606 8		
Hood side entry low profile	20 25	C146 21R006 506 1 C146 21R006 507 1		
Hood side entry high profile	25 32	C146 21R006 556 8 C146 21R006 506 8		
Housings			**h**	
Hood coupling application low profile	20	C146 21R006 804 1	52	
Hood coupling application high profile	25	C146 21R006 854 8	70	
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		

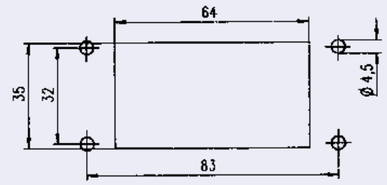
heavy | mate® Housings standard Size E6 for 1 lever locking system

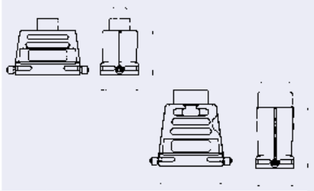
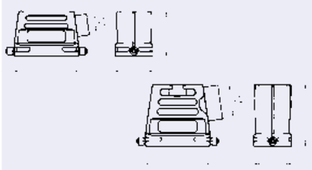
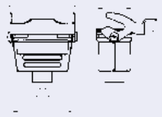
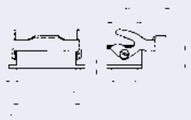
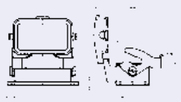
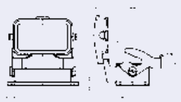
Description	M	Part Number	Drawing	Figure
Housings				
Housing single side entry low profile	20	C146 10N006 803 1	57	
Housing single side entry high profile	32 25	C146 10N006 802 2 C146 10N006 803 2	74 74 1 closed if single entry	
Housing double side entry low profile	20	C146 10N006 603 1	57	
Housing double side entry high profile	25 32	C146 10N006 603 2 C146 10N006 602 2	74 74	
Housing with spring cover single side entry low profile	20 25	C146 10N006 807 1 C146 10N006 806 1	57 57	
Housing with spring cover single side entry high profile	25 32	C146 10N006 807 2 C146 10N006 806 2	74 74 1 closed if single entry	
Housing with spring cover double side entry low profile	20	C146 10N006 607 1	57	
Housing with spring cover double side entry high profile	25 32	C146 10N006 607 2 C146 10N006 606 2	74 74	
Protective cover				
Cover for housings	-	C146 10Z006 100 1		
Cover for hoods	-	C146 10Z006 200 1		
Panel cut out for bulkhead mounting				
				

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

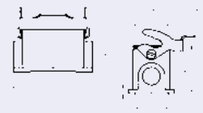
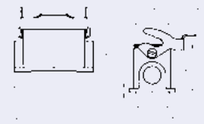
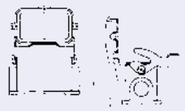
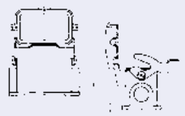
heavy | mate® Housings standard Size E10 for 2 lever locking system

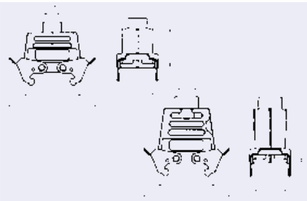
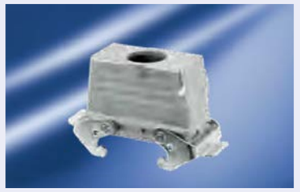
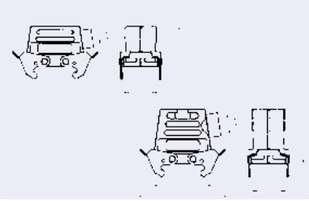
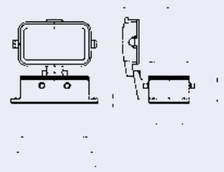
Description	M	Part Number	h	Drawing	Drawing
Housings					
Housing single side entry low profile	20 25	C146 10N010 501 1 C146 10N010 500 1	57 57		
Housing single side entry high profile	25 32	C146 10N010 501 2 C146 10N010 500 2	74 74	Screw plug for one cable entry	
Housing double side entry low profile	20	C146 10N010 601 1	57		
Housing double side entry high profile	25 32	C146 10N010 601 2 C146 10N010 600 2	74 74		
Panel cut out for bulkhead mounting					

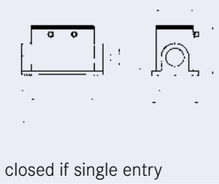
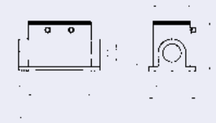
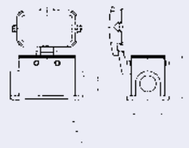
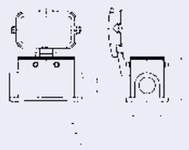


Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	20 25 32	C146 21R010 656 1 C146 21R010 606 1 C146 21R010 607 1		
Hood top entry high profile	25 32 40	C146 21R010 656 8 C146 21R010 606 8 C146 21R010 607 8		
Hood side entry low profile	20 25	C146 21R010 556 1 C146 21R010 506 1		
Hood side entry high profile	25 32	C146 21R010 556 8 C146 21R010 506 8		
Housings			**h**	
Hood coupling application low profile	20 25 32	C146 21R010 854 1 C146 21R010 804 1 C146 21R010 805 1	51 51 51		
Hood coupling application high profile	25 32 40	C146 21R010 854 8 C146 21R010 804 8 C146 21R010 805 8	70 70 70		
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		

heavy | mate® Housings standard Size E10 for 1 lever locking system

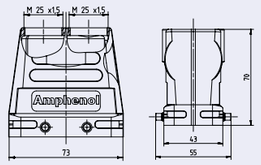
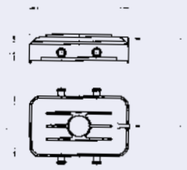
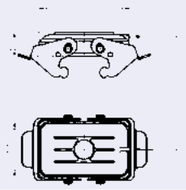
Description	M	Part Number	h	Drawing	Figure
Housings					
Housing single side entry low profile	20	C146 10N010 803 1	57	 1 closed if single entry	
Housing single side entry high profile	25 32	C146 10N010 803 2 C146 10N010 802 2	74 74		
Housing double side entry low profile	20	C146 10N010 603 1	57		
Housing double side entry high profile	25	C146 10N010 603 2	74		
Housing with spring cover single side entry low profile	20	C146 10N010 807 1	57	 1 closed if single entry	
Housing with spring cover single side entry high profile	25 32	C146 10N010 807 2 C146 10N010 806 2	74 74		
Housing with spring cover double side entry low profile	20	C146 10N010 607 1	57		
Housing with spring cover double side entry high profile	25 32	C146 10N010 607 2 C146 10N010 606 2	74 74		

Description	M	Part Number	Drawing	Figure
Hoods				
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		
Housings				
Housing with spring cover with gasket	-	C146 10F010 002 1		

Description	M	Part Number	h	Drawing	Figure
Housings					
Housing single side entry low profile	20	C146 10N010 509 1	57	 1 closed if single entry	
Housing single side entry high profile	32	C146 10N010 508 2	74		
Housing double side entry low profile	20	C146 10N010 609 1	57		
Housing double side entry high profile	25	C146 10N010 609 2	74		
Housing with spring cover single side entry low profile	20	C146 10N010 805 1	57	 1 closed if single entry	
Housing with spring cover single side entry high profile	32	C146 10N010 804 2	74		
Housing with spring cover double side entry low profile	20	C146 10N010 605 1	57		
Housing with spring cover double side entry high profile	32	C146 10N010 604 2	74		

heavy | mate® Special housings Size E10

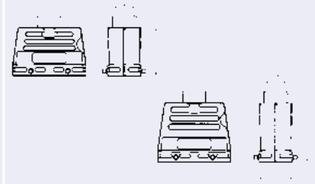
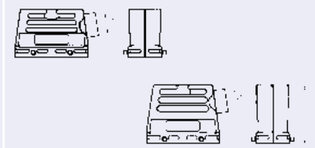
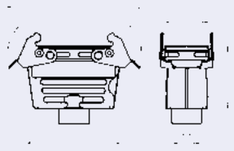
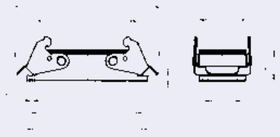
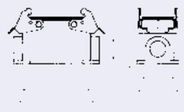
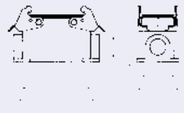
for 2 lever locking system

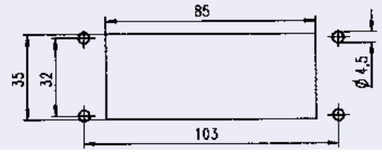
Description	M	Part Number	Drawing	Figure
Hoods				
Hood 2 top entry high profile	25	C146 10R010 902 8		
Protective cover (only in connection with Pin insert)				
Cover for housings	-	C146 10Z010 100 1		
Cover for hoods	-	C146 10Z010 200 1		
Further special housings on request.				

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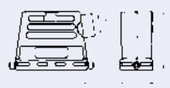
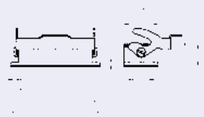
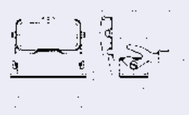
heavy | mate® Housings standard Size E16

for 2 lever locking system

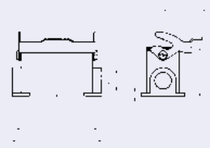
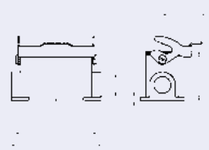
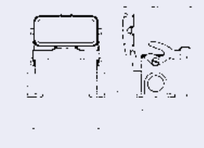
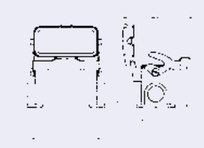
Description	M	Part Number	Drawing	h	Figure
Hoods					
Hood top entry low profile	25 32 32	C146 21R016 650 1 C146 21R016 600 1 C146 23R016 600 1 (black design)			
Hood top entry high profile	25 32 32	C146 21R016 600 8 C146 21R016 601 8 C146 23R016 600 8 (black design)			
Hood side entry low profile	25 32	C146 21R016 550 1 C146 21R016 500 1			
Hood side entry high profile	32 40	C146 21R016 500 8 C146 21R016 501 8			
Housings					
Hood coupling application low profile	25 32	C146 21R016 852 1 C146 21R016 802 1		62 62	
Hood coupling application high profile	32 40	C146 21R016 802 8 C146 21R016 803 8		76 76	
Housing bulkhead mounting with gasket	-	C146 10F016 000 1			
Housing single side entry low profile	25	C146 10N016 500 1		64	
Housing single side entry high profile	32	C146 10N016 500 2		77	
			1 closed if single entry		
Housing double side entry low profile	25	C146 10N016 600 1		64	
Housing double side entry high profile	25 32	C146 10N016 601 2 C146 10N016 600 2		77 77	
Panel cut out for bulkhead mounting					

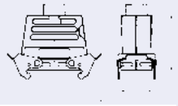
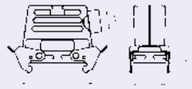
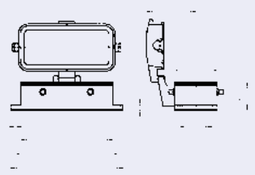


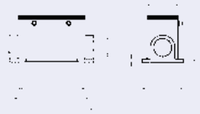
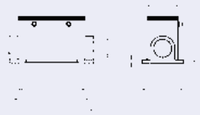
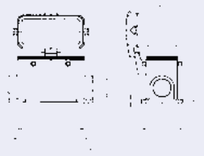
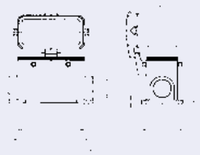
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Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32	C146 21R016 656 1 C146 21R016 606 1		
Hood top entry high profile	32 40	C146 21R016 606 8 C146 21R016 607 8		
Hood side entry low profile	25 32	C146 21R016 556 1 C146 21R016 506 1		
Hood side entry high profile	32 40	C146 21R016 506 8 C146 21R016 507 8		
Housings			**h**	
Hood coupling application low profile	25 32	C146 21R016 854 1 C146 21R016 804 1	62 62	
Hood coupling application high profile	32 40	C146 21R016 804 8 C146 21R016 805 8	76 76	
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		

heavy | mate® Housings standard Size E16 for 1 lever locking system

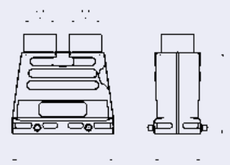
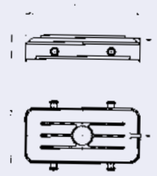
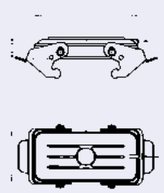
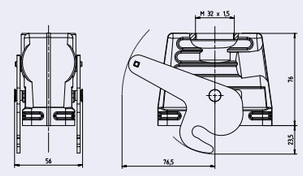
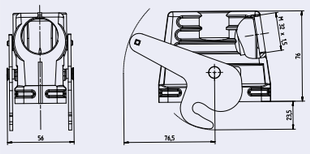
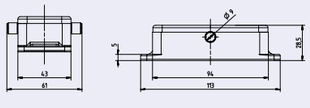
Description	M	Part Number	h	Drawing	Figure
Housings					
Housing single side entry low profile	25	C146 10N016 802 1	64	 1 closed if single entry	
Housing single side entry high profile	32	C146 10N016 802 2	77		
Housing double side entry low profile	25	C146 10N016 602 1	64		
Housing double side entry high profile	25 32	C146 10N016 603 2 C146 10N016 602 2	77 77		
Housing with spring cover single side entry low profile	25	C146 10N016 806 1	64	 1 closed if single entry	
Housing with spring cover single side entry high profile	32	C146 10N016 806 2	77		
Housing with spring cover double side entry low profile	25	C146 10N016 606 1	64		
Housing with spring cover double side entry high profile	25 32	C146 10N016 607 2 C146 10N016 606 2	77 77		

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

Description	M	Part Number	Drawing h	Figure
Housings				
Housing single side entry low profile	25	C146 10N016 508 1	64	 1 closed if single entry	
Housing single side entry high profile	32	C146 10N016 508 2	77	
Housing double side entry low profile	25	C146 10N016 608 1	64		
Housing double side entry high profile	32	C146 10N016 608 2	77	
Housing with spring cover single side entry low profile	25	C146 10N016 804 1	64	 1 closed if single entry	
Housing with spring cover single side entry high profile	32	C146 10N016 804 2	77	
Housing with spring cover double side entry low profile	25	C146 10N016 604 1	64		
Housing with spring cover double side entry high profile	32	C146 10N016 604 2	77	

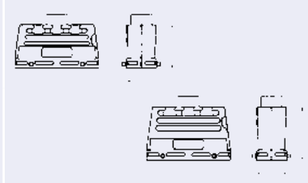
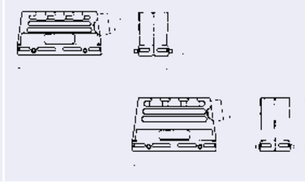
heavy | mate® Special housings Size E16

for 2 lever locking system

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

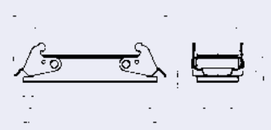
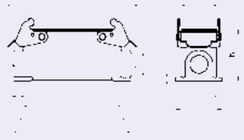
heavy | mate® Housings standard Size E24

for 2 lever locking system

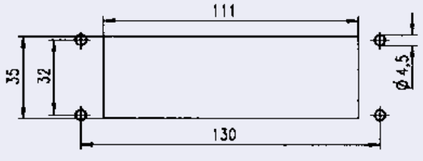
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32 20	C146 21R024 650 1 C146 21R024 600 1 C146 21R024 700 1		
Hood top entry high profile	32 40	C146 21R024 600 8 C146 21R024 601 8		
Hood side entry low profile	25 32	C146 21R024 550 1 C146 21R024 500 1		
Hood side entry high profile	32 40	C146 21R024 500 8 C146 21R024 501 8		
Hood top entry	50	on request		
Hood side entry	50	on request		

heavy | mate® Housings standard Size E24

for 2 lever locking system

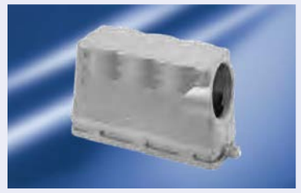
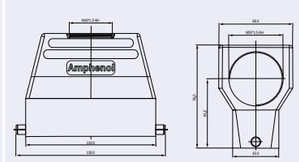
Description	M	Part Number	Drawing	Figure
Housings			h	
Hood coupling application low profile	25 32	C146 21R024 852 1 C146 21R024 802 1	62 62	
Hood coupling application high profile	32 40	C146 21R024 802 8 C146 21R024 803 8	76 76	
Housing -bulkhead mounting with gasket	-	C146 10F024 000 1		
- foam rubber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

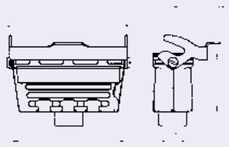
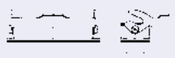
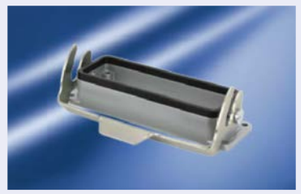
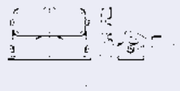
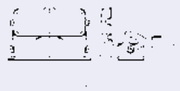
Panel cut out for bulkhead mounting



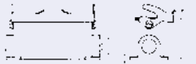
heavy | mate® Housings standard Size E24

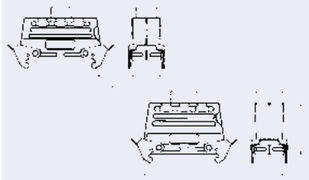
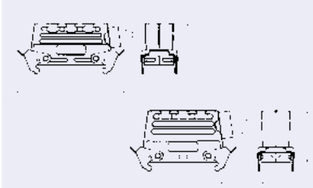
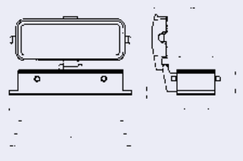
for 1 lever locking system

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32	C146 21R024 656 1 C146 21R024 606 1		
Hood top entry high profile	32 40	C146 21R024 606 8 C146 21R024 607 8		
Hood side entry low profile	25 32	C146 21R024 556 1 C146 21R024 506 1		
Hood side entry high profile	32 40	C146 21R024 506 8 C146 21R024 507 8		
Hood top entry side entry high profile	50 40	C146 21R024 916 9		

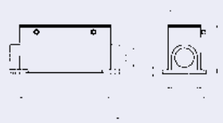
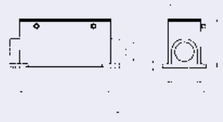
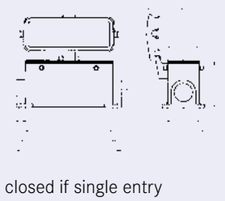
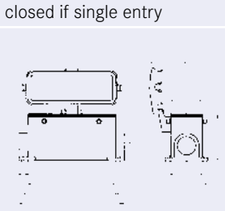
Description	M	Part Number	Drawing h	Figure
Housings				
Hood coupling application low profile	25 32	C146 21R024 854 1 C146 21R024 804 1	62 62	 
Hood coupling application high profile	32 40	C146 21R024 804 8 C146 21R024 805 8	76 76	
Housing bulkhead mounting with gasket	-	C146 10F024 001 1		 
Housing 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		 

heavy | mate® Housings standard Size E24 for 1 lever locking system

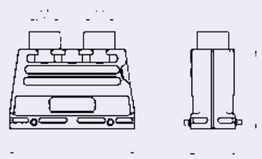
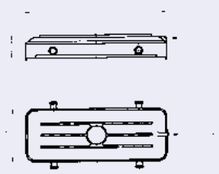
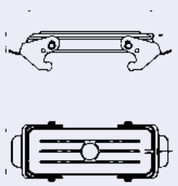
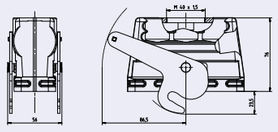
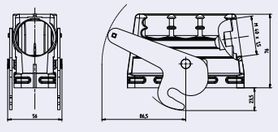
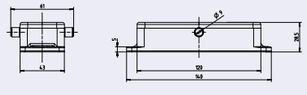
Description	M	Part Number	Drawing h	Figure
Hoods				
Housing single side entry low profile	25	C146 10N024 802 1	64	 
Housing single side entry high profile	32	C146 10N024 802 2	80	1 closed if single entry
Housing double side entry low profile	25	C146 10N024 602 1	64	 
Housing double side entry high profile	32	C146 10N024 602 2	80	
Housing with spring cover single side entry low profile	25	C146 10N024 806 1	64	 
Housing with spring cover single side entry high profile	32	C146 10N024 806 2	80	1 closed if single entry
Housing with spring cover double side entry low profile	25	C146 10N024 606 1	64	 
Housing with spring cover double side entry high profile	25 32	C146 10N024 607 2 C146 10N024 606 2	80 80	

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

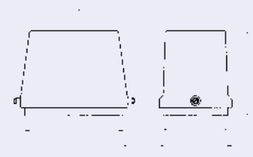
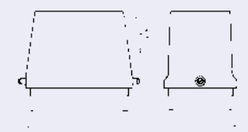
heavy | mate® Hoods standard Size E24 with 2 lever lockings

Description	M	Part Number	Drawing		Figure
Housings			h		
Housing single side entry low profile	25	C146 10N024 508 1	64	 1 closed if single entry	
Housing single side entry high profile	32	C146 10N024 508 2	80		
Housing double side entry low profile	25	C146 10N024 608 1	64		
Housing double side entry high profile	32	C146 10N024 608 2	80		
Housing with spring cover single side entry low profile	25	C146 10N024 804 1	64	 1 closed if single entry	
Housing with spring cover single side entry high profile	32	C146 10N024 804 2	80		
Housing with spring cover double side entry low profile	25 25	C146 10N024 604 1 C146 10N024 808 1	64 64	 1 closed if single entry	
Housing with spring cover double side entry high profile	25 32	C146 10N024 605 2 C146 10N024 604 2	80 80		

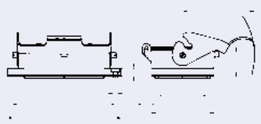
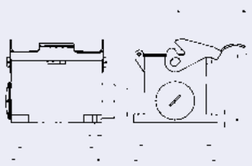
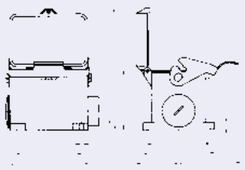
heavy | mate® Special housings Size E24 for 2 lever locking sytsem and central lever locking

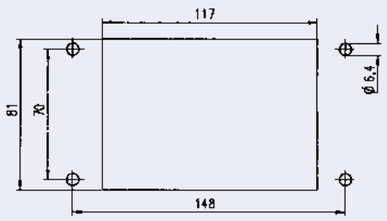
Description	M	Part Number	Drawing	Figure
Hoods				
Hood 2 top entry high profile	32 40	C146 10R024 903 8 C146 10R024 908 8		
Protective cover (only in connection with Pin insert)				
Cover for housings	-	C146 10Z024 100 1		
Cover for hoods	-	C146 10Z024 200 1		
Central lever / Hoods				
Hood top entry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

heavy | mate® Housings standard Size E48 for 1 lever locking system

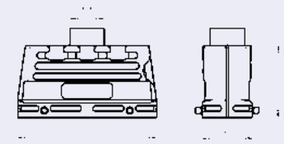
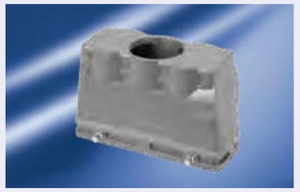
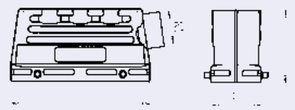
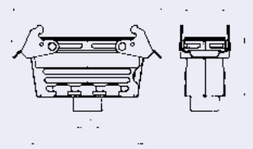
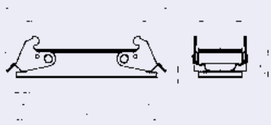
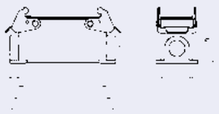
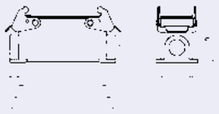
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	40 50	C146 21R048 607 1 C146 21R048 608 1		
Hood side entry	40 50	C146 21R048 507 1 C146 21R048 508 1		

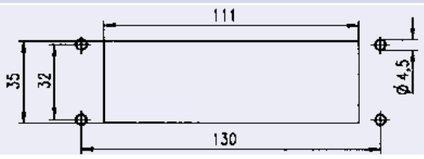
heavy | mate® Housings standard Size E48 — for 1 lever locking system

Description	M	Part Number	Drawing	Figure
Hoods				
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				

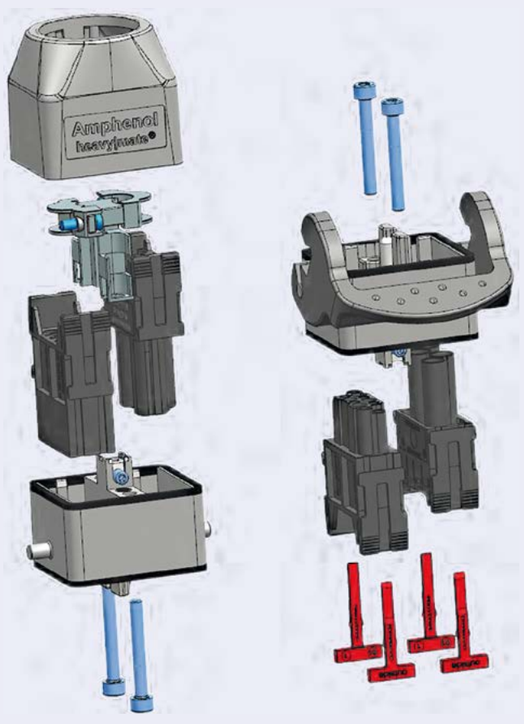


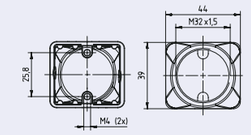
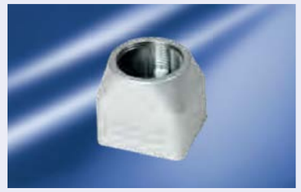
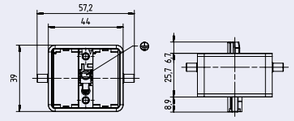
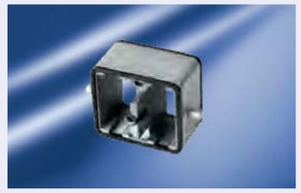
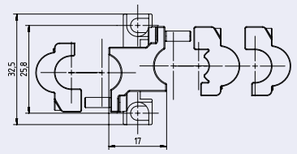
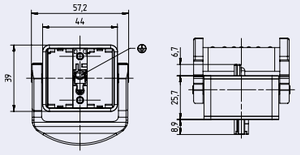
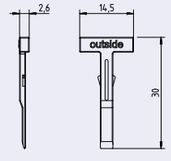
heavy | mate® Housings standard Series HvE 16 Size E16 — for 2 lever locking system

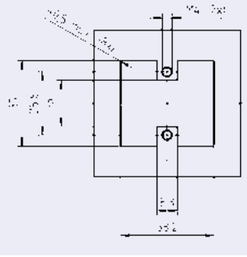
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32	C146 10R024 650 3 C146 10R024 600 3		
Hood side entry low profile	25 32	C146 10R024 550 3 C146 10R024 500 3		
Housings				
Hood coupling application low profile	25 32	C146 10R024 852 3 C146 10R024 802 3		
Housing bulkhead mounting with gasket	-	C146 10F024 000 3		
Housing single side entry low profile	25	C146 10N024 500 3	 1 closed if single entry	
Housing double side entry low profile	25	C146 10N024 600 3		
Panel cut out for bulkhead mounting				



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 mm² (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		



Description	M	Part Number	Drawing	Figure
Hoods				
Hood	32	C146 21R002 600 15		
Carrier hood	-	C146 21R002 000 15		
Shielding frame	-	C146 G05 003 G15		
Housings				
Housing bulkhead mounting incl. 2 safety pins	-	C146 10F002 000 15		
Accessories				
Safety pin (10 Pieces)	-	VN09 146 0013 X		
Panel cut out for bulkhead mounting				



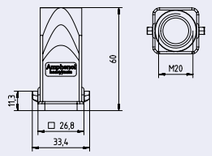
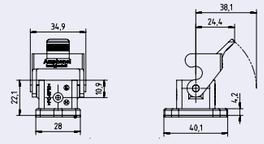
heavy | mate® Housings

- **Housings in IP67**

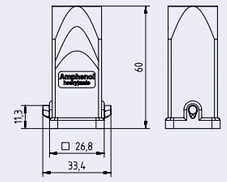
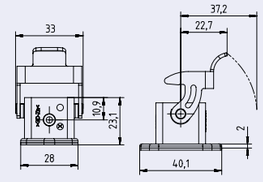
heavy | mate® Housings IP67 Characteristics

General Characteristics	Standard	Value
Protection class housing		IP67
Locking system	DIN EN 175 301-801 (DIN 43 652)	2 locking levers
Tightening torque (for screws used at housings and hoods)		1 Nm recommendation: M4 screw
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		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Metal housings E6 - E24	DIN EN 175 301-801 (DIN 43 652)	Aluminium die cast alloy
Colour metal housing E6 - E24		grey - similar RAL 9006
Thermoplastic housings A3/4		PC
Colour thermoplastic housings A3/4		grey - similar RAL 7032/9005
Metal housing A3/4		Zinc die cast alloy
Colour metal housing A3/4		grey - similar RAL 9006
Rubber gasket		CR
Locking lever		steel / zinc coated
Surface		powder coating

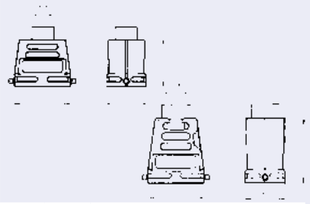
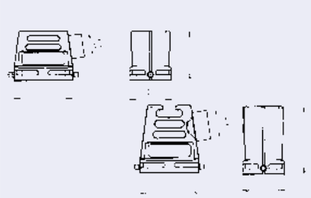
heavy|mate® Housings IP67 Size A3/4

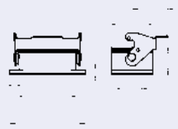
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	20 20	C146 10R003 600 4 C146 10R003 601 4 (black design)		
Housings				
Housing bulkhead mounting with gasket	- -	C146 10F003 000 4 C146 10F003 001 4 (black design)		

heavy|mate® Gehäuse IP67 Metal Size A3/4

Description	M	Part number	Drawing	Figure
Hoods				
Hood top entry	20	C146 30R003 600 4		
Housings				
Housing bulkhead mounting with gasket	-	C146 30F003 000 4		

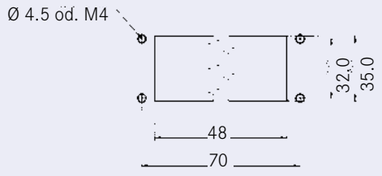
heavy | mate® Housings IP67 Size E6

Description	M	Part Number	Drawing	Figure
Hoods				
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		
Housings			**L1**	**L2**
Housing bulkhead mounting	-	C146 67F006 000 8	70	80



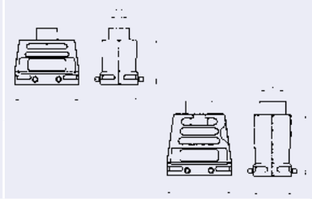
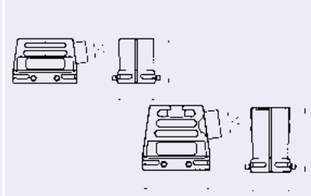


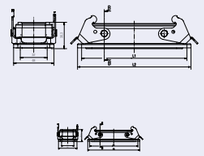
Panel cut out for bulkhead mounting



Version A + B

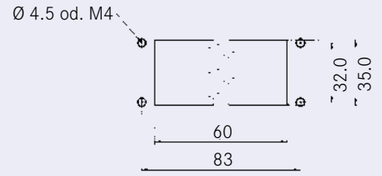
heavy | mate® Housings IP67 Size E10

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	16 20	C146 21R010 650 1 C146 21R010 600 1		
Hood top entry high profile	25 30	C146 21R010 650 8 C146 21R010 600 8		
Hood side entry low profile	20 25	C146 67R010 550 1 C146 21R010 500 1		
Hood side entry high profile	25 32	C146 21R010 550 8 C146 21R010 500 8		
Housings			**L1**	**L2**
Housing bulkhead mounting		C146 67F010 000 8	83	93



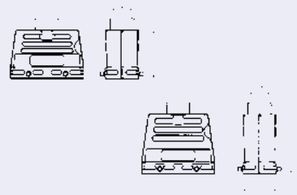
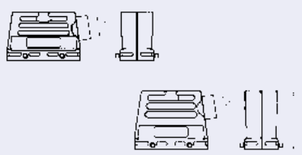


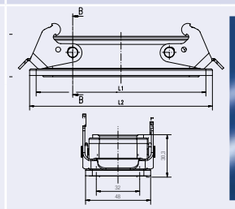
Panel cut out for bulkhead mounting



Version A + B

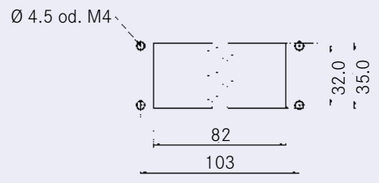
heavy | mate® Housings IP67 Size E16

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32	C146 21R016 650 1 C146 21R016 600 1		
Hood top entry high profile	32 40	C146 21R016 600 8 C146 21R016 601 8		
Hood side entry low profile	25 32	C146 21R016 550 1 C146 21R016 500 1		
Hood side entry high profile	32 40	C146 21R016 500 8 C146 21R016 501 8		
Housings			**L1**	**L2**
Housing bulkhead mounting		C146 21F016 000 8	103	113



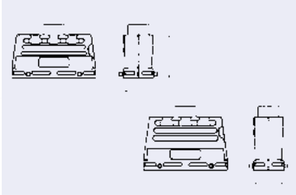
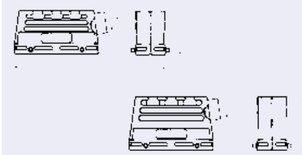


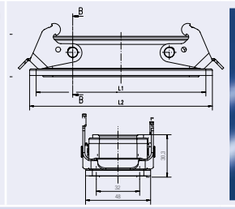
Panel cut out for bulkhead mounting



Version A + B

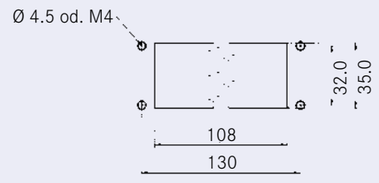
heavy | mate® Housings IP67 Size E24

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32 20	C146 21R024 650 1 C146 21R024 600 1 C146 21R024 700 1		
Hood top entry high profile	32 40	C146 21R024 600 8 C146 21R024 601 8		
Hood side entry low profile	25 32	C146 21R024 550 1 C146 21R024 500 1		
Hood side entry high profile	32 40	C146 21R024 500 8 C146 21R024 501 8		
Housings			**L1**	**L2**
Housing bulkhead mounting		C146 67F024 000 8	130	140





Panel cut out for bulkhead mounting



Version A + B



heavy | mate® Housings

- Housings IP68 / 69K

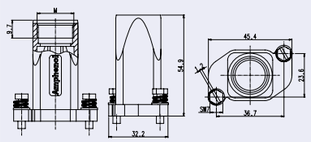
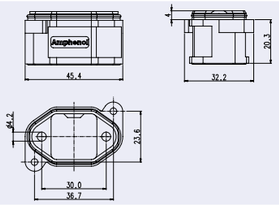
heavy | mate® Housings IP68 / IP69K Characteristics

General Characteristics	Standard	Value
Protection class housing		IP68 / IP69K
Locking system		2 x screw M4 / M6
Tightening torques for locking screws		4.0 Nm
Tightening torque (for screws used at housings and hoods)		40 Nm recommendation: M4 / M6
Fire protection railway	EN 45545	HL3 acc. R22/23
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		
Housings		Aluminium die cast alloy
Colour housings		black – similar to RAL 9005
Rubber gasket		Silicon
Locking lever		stainless steel
Surface		powder coating

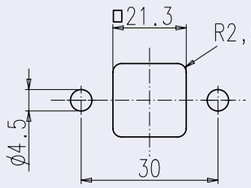
heavy|mate® Housings IP68 / IP69K Size A3/4

Brief information

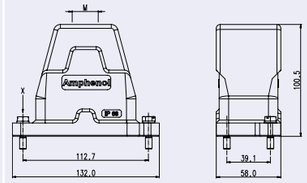
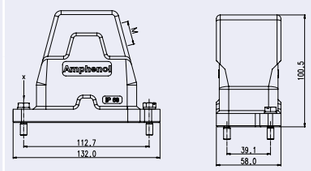
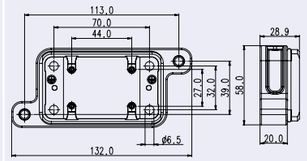
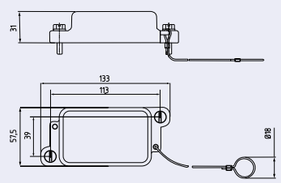
Please remove the sealing on the socket insert before assembling the insert to the IP68 / 69K housings size A3/4.

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

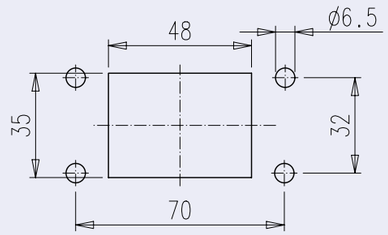
Panel cut out for bulkhead mounting



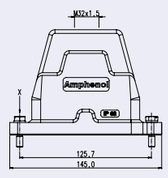
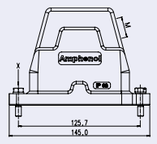
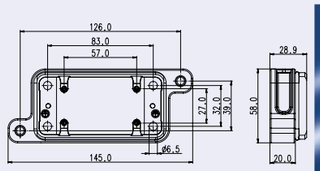
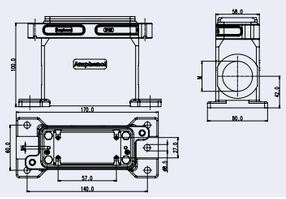
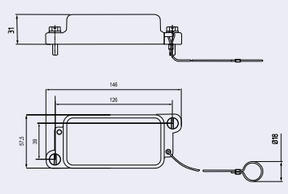
heavy|mate® Housings IP68 / IP69K Size E6

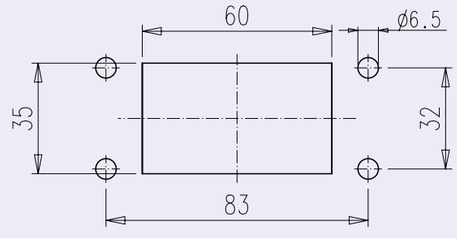
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	32 40 25	C146 68R006 600 8 C146 68R006 601 8 C146 68R006 650 8		
Hood side entry	32 40 25	C146 68R006 500 8 C146 68R006 501 8 C146 68R006 550 8		
Housings				
Housing bulkhead mounting	-	C146 68F006 001 1		
Housing bulkhead mounting easy mount	-	C146 68F006 011 1		
Housing	40	C146 68N006 500 2		
Protective cover				
Protective cover for housings	-	C146 68Z006 100 1		

Panel cut out for bulkhead mounting



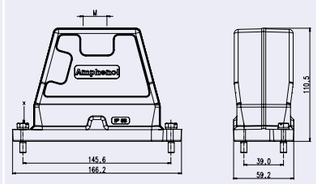
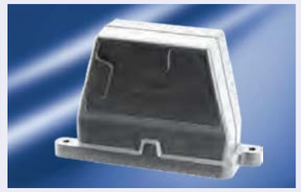
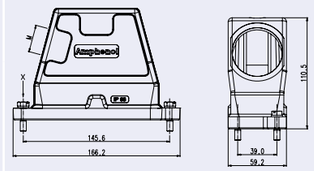
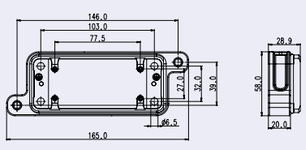
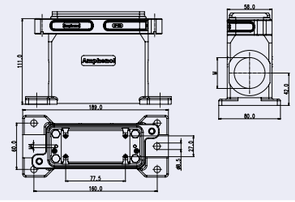
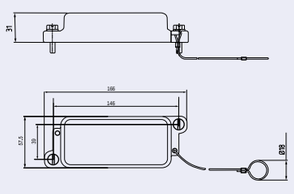
heavy | mate® Housings IP68 / IP69K Size E10

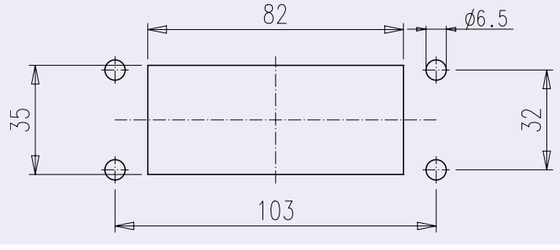
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	32 40 25	C146 68R010 600 8 C146 68R010 601 8 C146 68R010 650 8		
Hood side entry	32 40 25	C146 68R010 500 8 C146 68R010 501 8 C146 68R010 550 8		
Housings				
Housing bulkhead mounting	-	C146 68F010 001 1		
Housing bulkhead mounting easy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



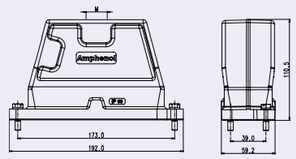
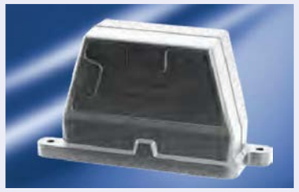
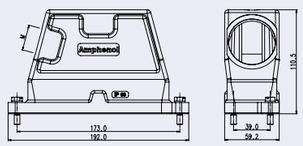
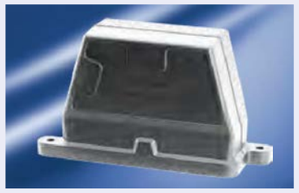
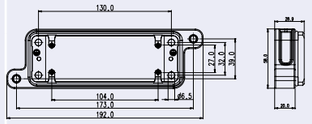
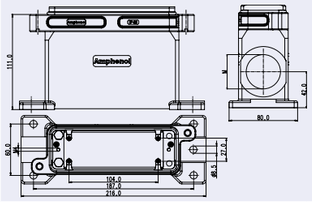
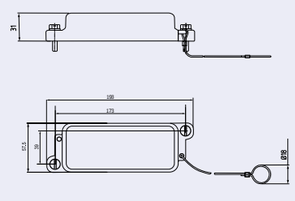
INDUSTRIAL@AMPHENOL TRUSTED GLOBALLY

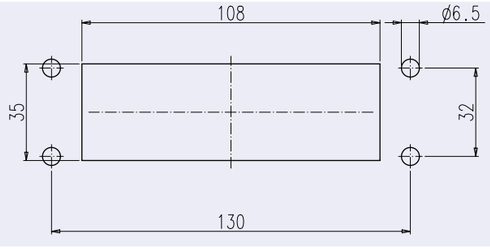
heavy | mate® Housings IP68 / IP69K Size E16

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	32 40 25	C146 68R016 600 8 C146 68R016 601 8 C146 68R016 650 8		
Hood side entry	32 40 25	C146 68R016 500 8 C146 68R016 501 8 C146 68R016 550 8		
Housings				
Housing bulkhead mounting	-	C146 68F016 001 1		
Housing bulkhead mounting easy mount	-	C 146 68F016 011 1		
Housing	40	C146 68N016 501 2		
Protective cover				
Protective cover for housings	-	C146 68Z016 100 1		
Panel cut out for bulkhead mounting				



INDUSTRIAL@AMPHENOL TRUSTED GLOBALLY

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





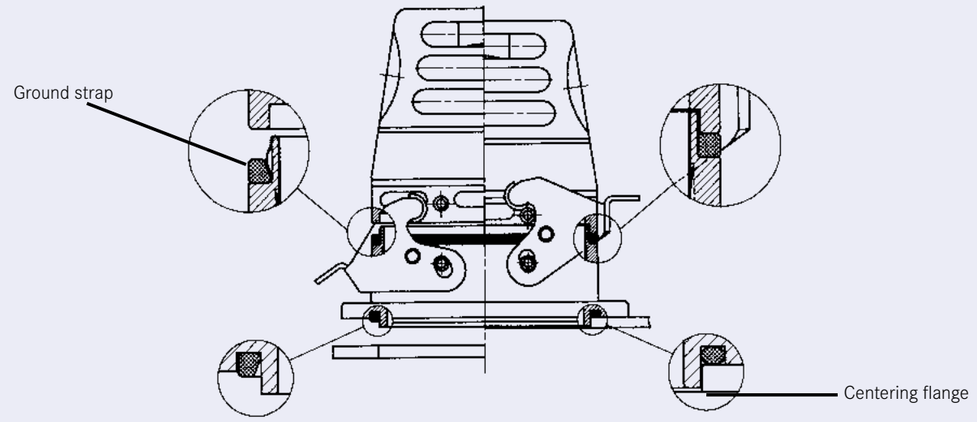
heavy | mate® Housings

- **EMC-Housings**

General information

- conductive surface
- standard locking levers
- same housing dimensions like standard housings
- two housing sizes
- with or without ground strap
- high attenuation
- protection class IP65
- mating cycles > 500

Concept

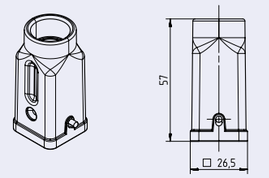
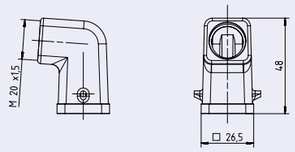
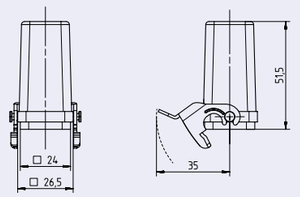
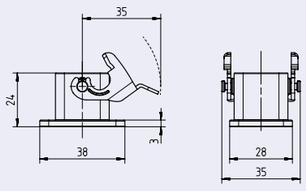
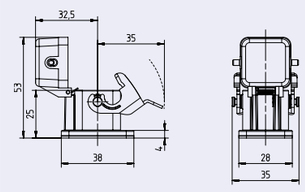
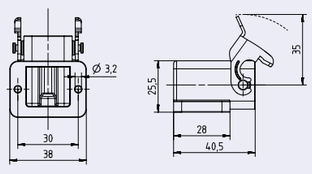


Range of housings in two housing sizes

Version A Standard flange without ground strap	Version B Standard flange with ground strap	Version C Centering flange with ground strap
		

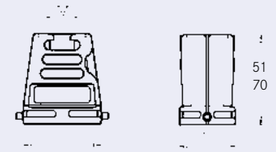
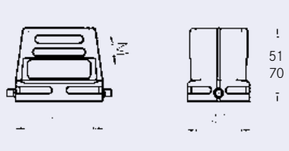
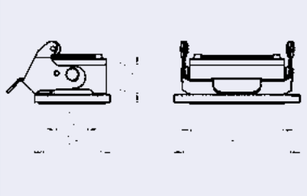
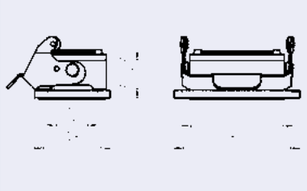
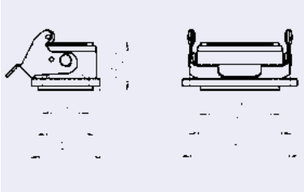
General Characteristics	Standard	Value
Protection class housing		IP65
Locking system		2 locking levers
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 100 / 21
Upper temperature	IEC 60512-11-9	+ 100 °C
Lower temperature	IEC 60512-11-10	- 40 °C
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Housings		Aluminium die cast alloy
Colour housings		grey – similar to RAL 9006
Rubber gasket		CR
Locking lever		steel / zinc coated
Surface		conducting special surface

heavy|mate® Housings EMC Size A3

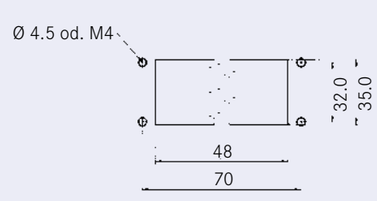
Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	PG 11	C146 11R003 600 4		
Hood side entry	20	C146 11R003 500 4		
Housings				
Hood cable to cable coupling	20	C146 11R003 804 4		
Housing bulkhead mounting		C146 11F003 000 4		
Housing bulkhead mounting with spring cover		C146 11F003 003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

heavy|mate® Housings EMC Size E6

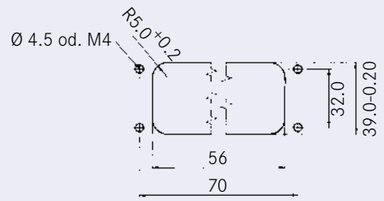
for 1 lever locking system

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	20 25	C146 11R006 606 1 C146 11R006 607 1		
Hood top entry high profile	25 32	C146 11R006 656 8 C146 11R006 606 8		
Hood side entry low profile	16 20 25	C146 11R006 556 1 C146 11R006 506 1 C146 11R006 507 1		
Hood side entry high profile	25 32	C146 11R006 556 8 C146 11R006 506 8		
Housings				
Housing bulkhead mounting Version A Standard flange without ground strap		C146 11F006 901 8		
Housing bulkhead mounting Version B Standard flange with ground strap		C146 11F006 902 8		
Housing bulkhead mounting Version C Centering flange with ground strap		C146 11F006 001 8		

Panel cut out for bulkhead mounting



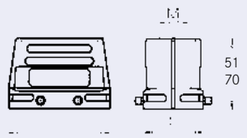
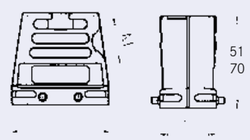
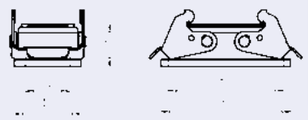
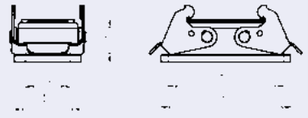
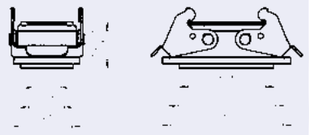
Version A + B

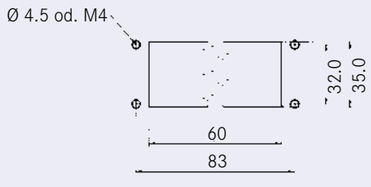


Version C

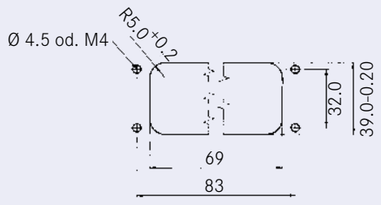
heavy | mate® Housings EMC Size E10

for 2 lever locking system

Description	M	Part Number	Drawing	Figure
Hoods				
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		
Housings				
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				



Version A + B

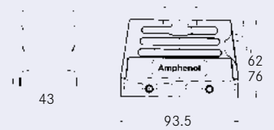
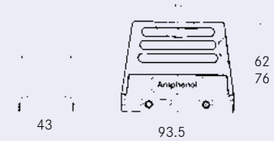
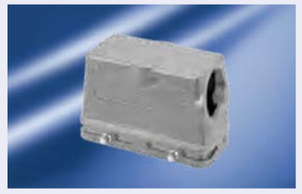
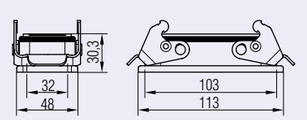
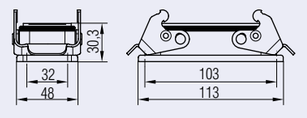
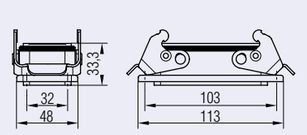


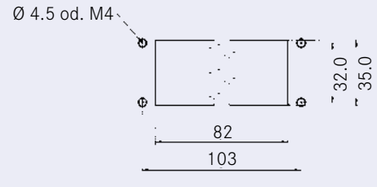
Version C

INDUSTRIAL@AMPHENOL TRUSTED GLOBALLY

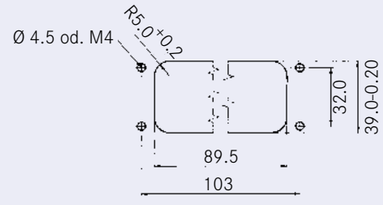
heavy | mate® Housings EMC Size E16

for 2 lever locking system

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32	C146 11R016 650 1 C146 11R016 600 1		
Hood top entry high profile	25 32 40	C146 11R016 650 8 C146 11R016 600 8 C146 11R016 601 8		
Hood side entry low profile	25 32	C146 11R016 550 1 C146 11R016 500 1		
Hood side entry high profile	25 32 40	C146 11R016 550 8 C146 11R016 500 8 C146 11R016 501 8		
Housings				
Housing bulkhead mounting Version A Standard flange without ground strap		C146 11F016 901 8		
Housing bulkhead mounting Version B Standard flange with ground strap		C146 11F016 902 8		
Housing bulkhead mounting Version C Centering flange with ground strap		C146 11F016 000 8		
Panel cut out for bulkhead mounting				

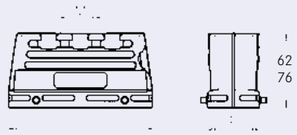
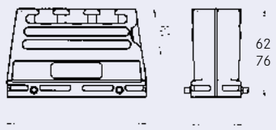
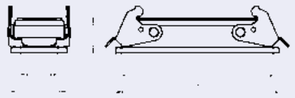
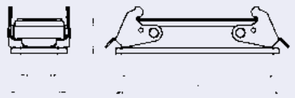
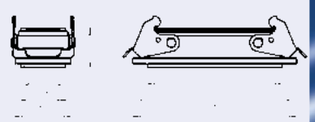


Version A + B

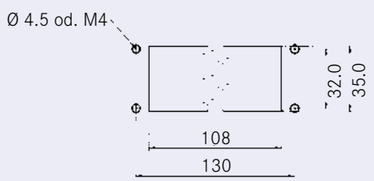


Version C

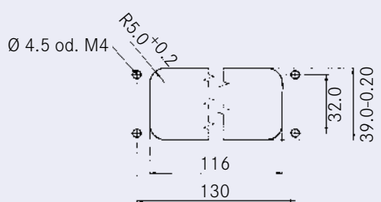
INDUSTRIAL@AMPHENOL TRUSTED GLOBALLY

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry low profile	25 32	C146 11R024 650 1 C146 11R024 600 1		
Hood top entry high profile	25 32 40	C146 11R024 650 8 C146 11R024 600 8 C146 11R024 601 8		
Hood side entry low profile	25 32	C146 11R024 550 1 C146 11R024 500 1		
Hood side entry high profile	25 32 40	C146 11R024 550 8 C146 11R024 500 8 C146 11R024 501 8		
Housings				
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



heavy | mate® Housings

- **Corrosion resistant Housings**

heavy | mate® Housings corrosion resistant Characteristics + Notes

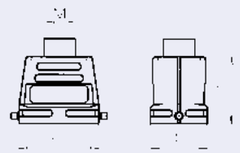
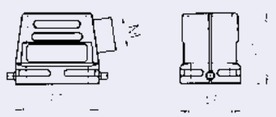
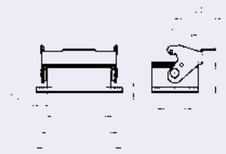
General Characteristics	Standard	Value
Protection class housing		IP65
Locking system		2 locking levers
Salt mist resistance	IEC 60512-11-6:2002	>500h
Climatical Characteristics		
Climatic category	IEC 60068-1	40 / 100 / 21
Upper temperature	IEC 60512-11-9	+ 100 °C
Lower temperature	IEC 60512-11-10	- 40 °C
Mechanical Characteristics		
Mechanical operation	IEC 60512-9-1	≥ 500 mating cycles
Materials		
Housings		Aluminium die cast alloy
Colour housings		grey – similar to RAL 9005
Rubber gasket		NBR
Locking lever		steel / special coated
Surface		conducting special surface

General information

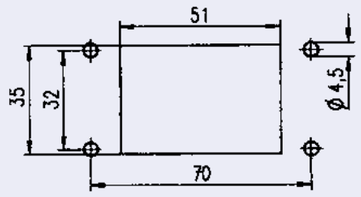
500h salt mist resistance can be achieved when using a plastic cable gland.
When a metal cable gland is required, we recommend to use additionally our special studs on the hoods to achieve this value.

Order codes are:
N16 025 0112 5 X Metal stud M25 corrosion resistant
N16 032 0112 5 X Metal stud M32 corrosion resistant
N16 040 0112 5 X Metal stud M40 corrosion resistant

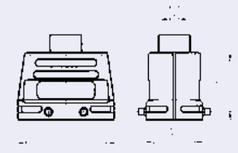
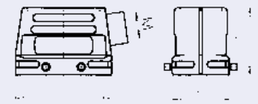
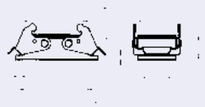
heavy | mate® Housings corrosion resistant Size E6

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	25	C146 50R006 607 1		
Hood side entry	25	C146 50R006 507 1		
Housings				
Housing bulkhead mounting		C146 50F006 000 1		

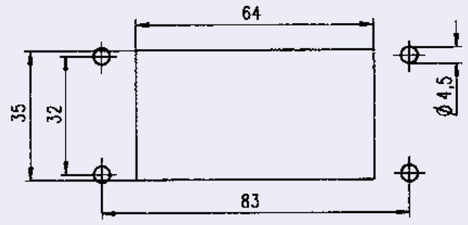
Panel cut out for bulkhead mounting



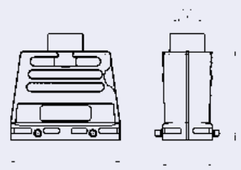
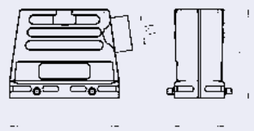
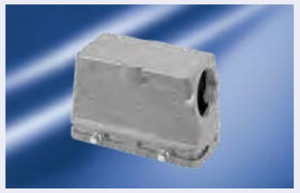
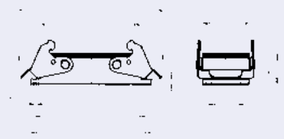
heavy | mate® Housings corrosion resistant Size E10

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	25	C146 50R010 600 1		
Hood side entry	25	C146 50R010 500 1		
Housings				
Housing bulkhead mounting		C146 50F010 000 1		

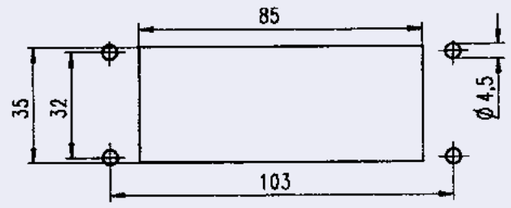
Panel cut out for bulkhead mounting



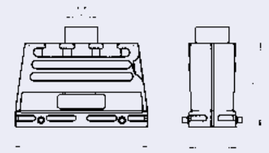
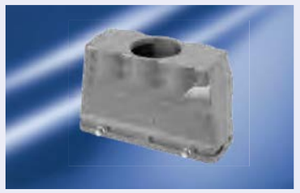
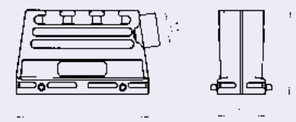
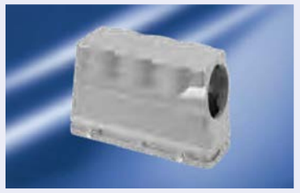
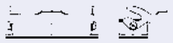
heavy | mate® Housings corrosion resistant Size E16

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

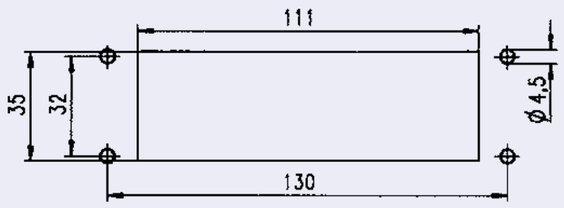
Panel cut out for bulkhead mounting



heavy | mate® Housings corrosion resistant Size E24

Description	M	Part Number	Drawing	Figure
Hoods				
Hood top entry	40	C146 50R024 601 8		
Hood side entry	40	C146 50R024 501 8		
Housings				
Housing bulkhead mounting		C146 50F024 000 1		

Panel cut out for bulkhead mounting

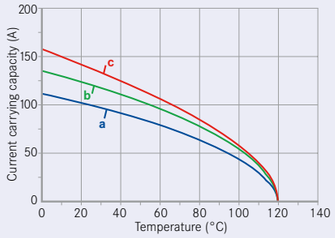


heavy | mate® Accessories

- Wallbushing universal port
- Gland bushings
- Key pin and locking devices
- Foam rubber sealing
- Label for CSA regulation
- Shielding lever
- Wall brackets
- Tolerance compensation system

General Characteristics	Standard	Value
Number of contacts		1
Termination technique		crimp
Wire gauge		10 - 25 mm² (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

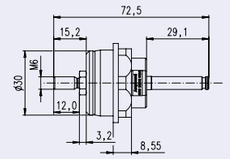
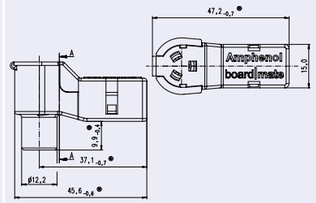


Curve	Wire gauge
a	10 mm²
b	16 mm²
c	25 mm²

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.

heavy | mate® Accessories Wallbushing universal port

Description	Part Number	Drawing	Figure
Wallbushing Connector universal port			
Wallbushing Connector universal port 6 mm	C360 10D001 002 2		
Housings for 6mm Radsok for 10 - 16 mm² Housings for 6 mm Radsok for 25 mm²	C360 G01 141 E2 C360 G01 341 E2		

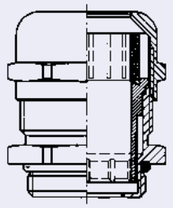
Supplied as	for wire gauge	AWG	Pieces	Part Number		Figure
				Socket contact	for housings	
6 mm Radsok contacts						
Single contact	10 - 16 mm²		50	N02 060 6164 002	C360 G01 141 E2	
	25 mm²		50	N02 060 6165 002	C360 G01 341 E2	

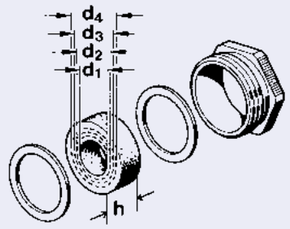
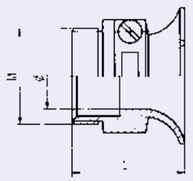
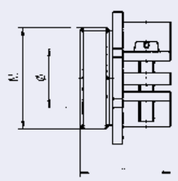
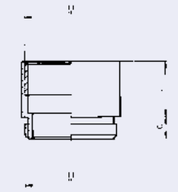
Tools

Description	for wire gauge	Part Number		
		Contact locator	Crimping dies	Tool
Electro hydraulic crimping tool				TE0500 / Klauke Part Number: EK 12042L
Crimping dies N02 060 6164 002	10 mm² 16 mm²			TE0500 - 081 TE0500 – 061
Crimping dies N02 060 6165 002	25 mm²			TE0500 - 041
Further tools see catalogue “Tools”				

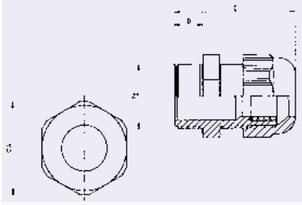
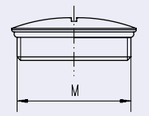
Assembly instructions for metric clamp

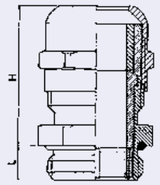
- The cable jacket should be removed as far as the underside of the cable clamping; the wire netting is then to be cut down a little further and subsequently must be formed into a circular rim. The protective jacket can remain attached to the cable provided that it passes through the lower opening of 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
Gland bushing IP54 (Attention: not usable for hoods without stud / -30°C up to +120°C)				
Thermoplast clamp with variable inner diameter 10 Pieces	20	VN16 200 0113 X		
Metal with variable inner diameter 10 Pieces	20 25 32 40 50	VN16 200 0114 X VN16 250 0114 X VN16 320 0114 X VN16 400 0114 X VN16 500 0114 X		
Cable clamp without gasket 5 Pieces	16 20 25 32	VN16 160 0102 V VN16 200 0102 V VN16 250 0102 V VN16 320 0102 V		
Cable clamp without gasket 5 Pieces	20 25 32	VN16 200 0103 V VN16 250 0103 V VN16 320 0103 V		
Stud [1]	16 20 25 32 40	N16 016 0112 1 N16 020 0112 1 N16 025 0112 1 N16 032 0112 1 N16 040 0112 1		

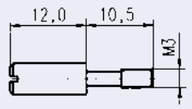
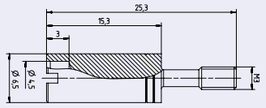
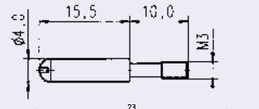
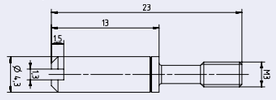
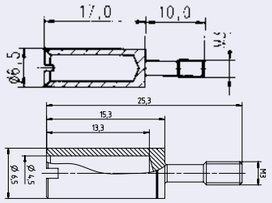
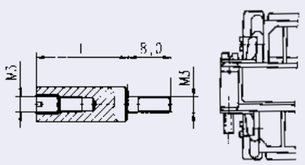
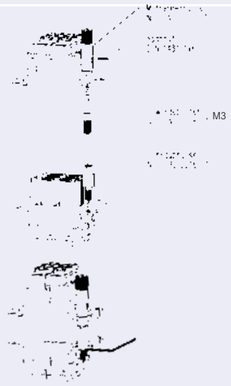
[1] To ensure protection class IP54, the screws of the studs should be bonded with Loctite all around.

Description	Clamping range ø in mm	A in mm	M	Part Number	Drawing	Figure
Gland bushing IP67 (Material PA / - 20 °C + 80 °C)						
Gland bushing with vibration protection 10 Pieces	4 - 10 6 - 12 9 - 16 10 - 21 16 - 28	20 24 28 36 46	16 20 25 32 40	VN16 160 0127 X VN16 200 0127 X VN16 250 0127 X VN16 320 0127 X VN16 400 0127 X		
Plugs brass nickel-plated with recess and o-ring 10 Pieces			20 25 32 40	VN16 020 0113 1 X VN16 025 0113 1 X VN16 032 0113 1 X VN16 040 0113 1 X		

Description	Clamping range F in mm	H in mm	L in mm	M	Part Number	Drawing	Figure
Gland bushing IP68 (Material CuZn / - 30 °C + 120 °C)							
Gland bushing 10 Pieces	5,5 - 10 8 - 13 11 - 18 15 - 21 19 - 27	22 24 29 30 34	5,5 6 7 8 8	16 20 25 32 40	VN16 160 0133 X VN16 200 0133 X VN16 250 0133 X VN16 320 0133 X VN16 400 0133 X		

Description	Clamping range F in mm	M	Part Number	Drawing	Figure
EMC gland bushing IP68 (Material CuZn / PA / - 30 °C + 120 °C)					
Gland bushing EMV 10 Pieces	5.5 - 10 8 - 13 11 - 18 15 - 21 19 - 27	16 20 25 32 40	VN16 160 0126 X VN16 200 0126 X VN16 250 0126 X VN16 320 0126 X VN16 400 0126 X		

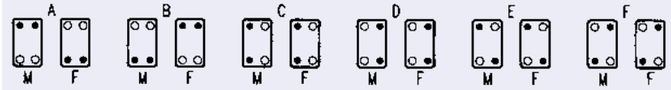
heavy|mate® Key pins and lockings

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		

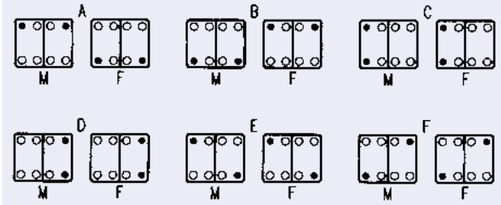
heavy|mate® Accessories Polarization system

Polarization system with key pin

For housings with one contact insert



For housings with two contact inserts



Descriptions

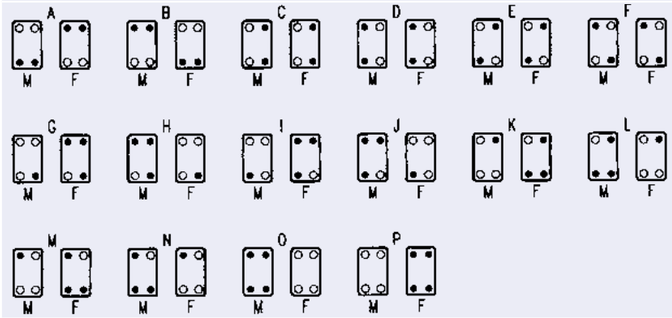
- ● Key pin
- ○ Locking screw

M Pin insert

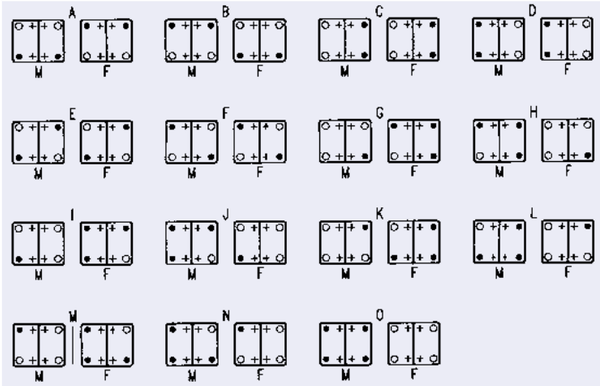
F Socket insert

Polarization system with guide pin and guide socket

For housings with one contact insert



For housings with two contact inserts

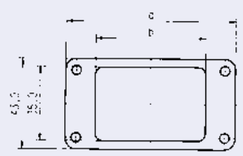
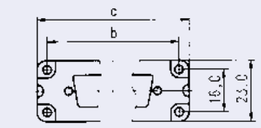
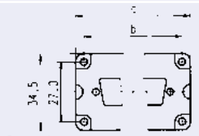
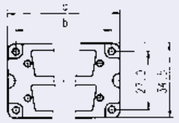
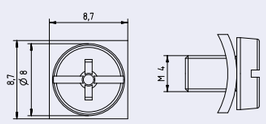
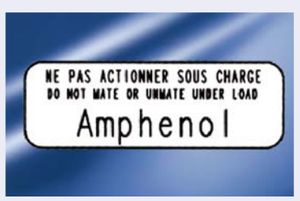


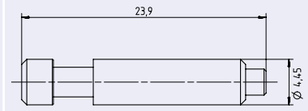
Descriptions

- ● Guide pin
- ○ Guide socket
- \+ Locking screw

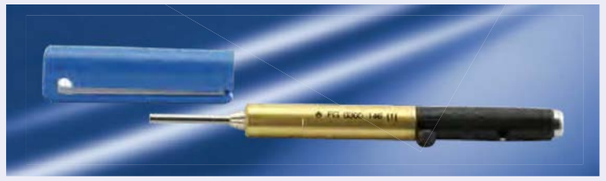
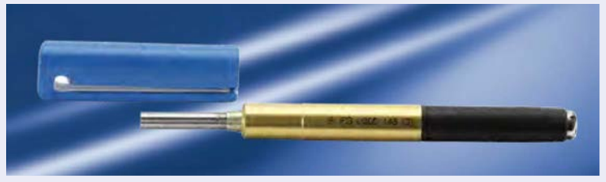
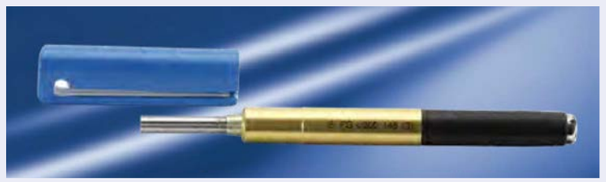
M Pin insert

F Socket insert

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

Description	Part number	Drawing	Figure
Coding element			
Coding element (10 Pieces)	VN17 045 0001 X		

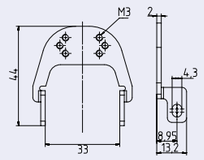
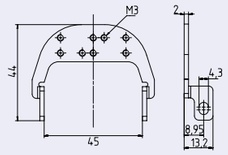
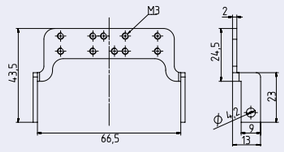
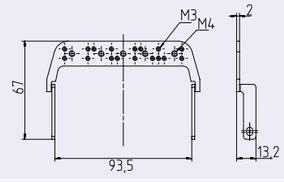
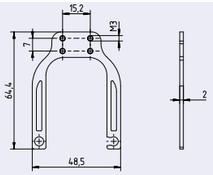
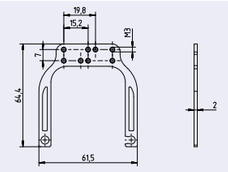
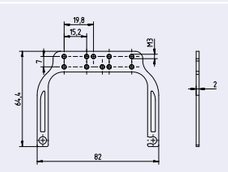
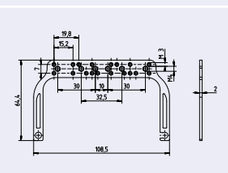
heavy | mate® Removal tools

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	

heavy | mate® Accessories Cable lug for earth connection

Supplied as	for wire gauge	AWG	Pieces	Part number	Figure
Cable lug for earth connection					
Cable lug	6 mm^2 10 mm^2		20	VN15 006 0009 Z VN15 010 0007 Z	
Single contact	10 - 16 mm^2	8 - 6	1	N 15 043 0003 003	

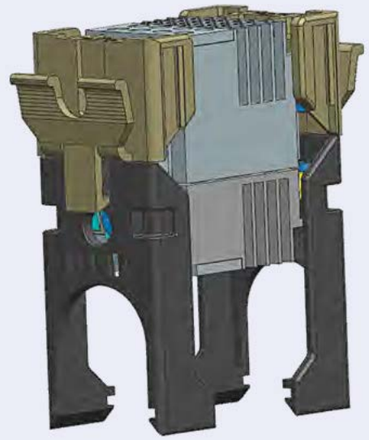
Clamp 1 under screw is approved for wires up to 6 mm2 (with wire end sleeve). For wires 10 - 16 mm^2 please use clamp 2 with cable lug.

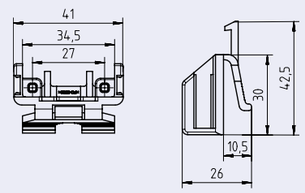
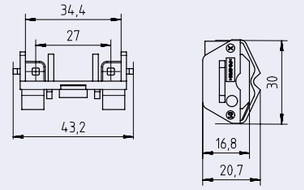
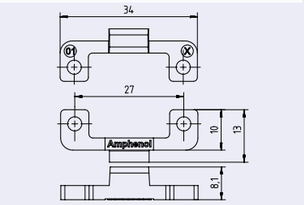
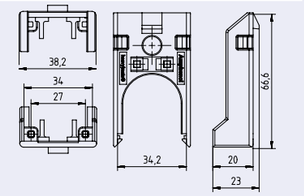
Description	Part Number	Drawing	Figure
Shielding levers for contact inserts			
Shielding lever for contact inserts Size E6	N 25 006 0012		
Shielding lever for contact inserts Size E10	N 25 010 0012		
Shielding lever for contact inserts Size E16	N 25 016 0012		
Shielding lever for contact inserts Size E24	N 25 024 0011		
Shielding levers for module frames heavy l mate F			
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		

Wall brackets

Accessories for use of heavy | mate® contact inserts without housing, for example on mounting rails in control cabinets.

Figure

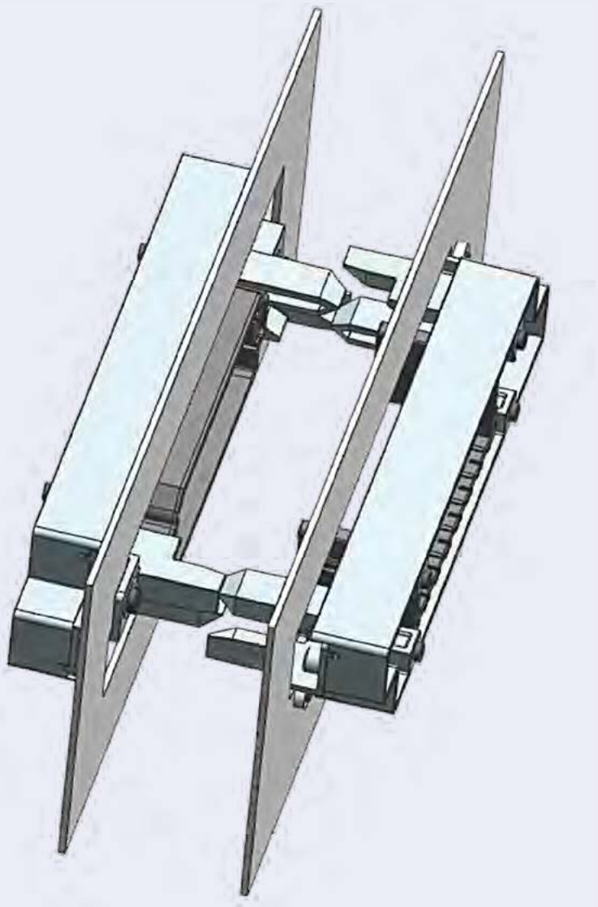


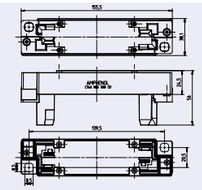
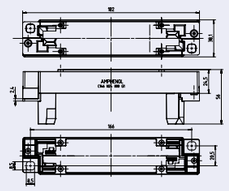
Description	Part Number	Drawing	Figure
Coupling	N 09 146 0006		
Wall bracket	N 09 146 0007		
Wall bracket	N 09 146 0008		
Mounting rail adaptor	N 09 146 000 9		

Mounting rail adaptor fits to hat rail 35 mm x 7.5 mm und 35 mm x 15 mm acc. EN 50022 / DIN EN 60715

Characteristics	Applications
• 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	• Motor control centers • Modular UPS • Inverter • Charging stations • Slip rings

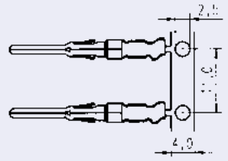
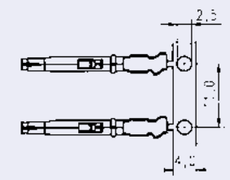
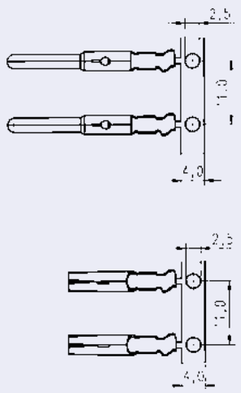
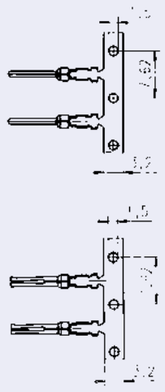
Figure



Description	Part Number	Drawing	Figure
Frames for tolerance compensation system Size E10	C146 N10 000 G1		
Frames for tolerance compensation system Size E16	C146 N16 000 G1		
Frames for tolerance compensation system Size E24	C146 N24 000 G1		

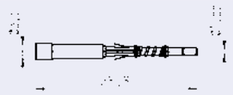
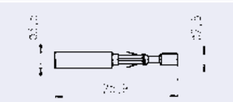
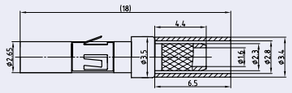
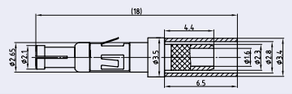
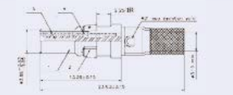
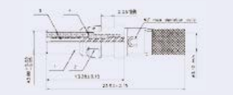
heavy | mate® Information

- Drawings contacts
- Safety classification
- Technical information

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[1] .N02 016 0015 1[1]		
	.N01 016 0005 1 .N02 016 0005 1 .N01 016 0016 1[1] .N02 016 0016 1[1]		
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		

[1] marked with "H"

Series	Part Number	Wire gauge	B	Identific.	Drawing	Figure
heavy | mate® D, DD, M 100 Pieces	VN01 016 0024 1C	0.14 - 0.37	2.6	1	.N01 016 002X	
	VN01 016 0025 1C	0.5	2.6	2		
	VN01 016 0026 1C	0.75 - 1.0	2.6	3		
	VN01 016 0027 1C	1.5	3.0	4		
	VN01 016 0028 1C	2.5	3.2	5		
	VN02 016 0024 1C	0.14 - 0.37	2.6	1	.N02 016 002X	
	VN02 016 0025 1C	0.5	2.6	2		
	VN02 016 0026 1C	0.75 - 1.0	2.6	3		
	VN02 016 0027 1C	1.5	3.0	4		
	VN02 016 0028 1C	2.5	3.2	5		
heavy | mate® E, EE 100 Pieces	VN01 025 0055 1C	0.14 - 0.37	2.7	no slot	.N01 025 003X	
	VN01 025 0035 1C	0.5	2.6	no slot		
	VN01 025 0036 1C	0.75 - 1.0	2.6	1 slot		
	VN01 025 0037 1C	1.5	3.0	2 slots		
	VN01 025 0038 1C	2.5	3.45	3 slots		
	VN01 025 0059 1C	3.0	3.7	1 big slot		
	VN01 025 0039 1C	4.0	4.0	no slot		
	VN02 025 0055 1C	0.14 - 0.37	2.7	no slot	.N02 025 003X	
	VN02 025 0035 1C	0.5	2.6	no slot		
	VN02 025 0036 1C	0.75 - 1.0	2.6	1 slot		
	VN02 025 0037 1C	1.5	3.0	2 slots		
	VN02 025 0038 1C	2.5	3.45	3 slots		
	VN02 025 0059 1C	3.0	3.7	1 big slot		
	VN02 025 0039 1C	4.0	4.0	no slot		
heavy | mate® F, K, Q 100 Pieces	VN01 040 0010 1C	1.5	3	slot 1, 2		
	VN01 040 0011 1C	2.5	3.5	slot 1, 2, 3		
	VN01 040 0012 1C	4	4.1	no slot		
	VN01 040 0013 1C	6	5	slot 1		
	VN01 040 0015 1C	10	5.65	slot 2, 3		
	VN02 040 0010 1C	1.5	3	slot 1, 2		
	VN02 040 0011 1C	2.5	3.5	slot 1, 2, 3		
	VN02 040 0012 1C	4.0	4.1	no slot		
	VN02 040 0013 1C	6.0	5	slot 1		
	VN02 040 0015 1C	10.0	5.65	slot 2, 3		
heavy | mate® M 100 Pieces	VN01 025 0029 1C	0.5	2.6		.N01 025 00XX	
	VN01 025 0030 1C	0.75 - 1.0	2.6			
	VN01 025 0031 1C	1.5	3.0			
	VN01 025 0032 1C	2.5	3.45			
	VN01 025 0033 1C	4.0	3.9			
	VN02 025 0029 1C	0.5	2.6		.N02 025 00XX	
	VN02 025 0030 1C	0.75 - 1.0	2.6			
	VN02 025 0031 1C	1.5	3.0			
	VN02 025 0032 1C	2.5	3.45			
	VN02 025 0033 1C	4.0	3.9			
	VN01 036 0004 1C	1.5	3	2 slots	.N01 036 000X	
	VN01 036 0005 1C	2.5	3.45	3 slots		
	VN01 036 0001 1C	4.0	3.9	no slot		
	VN01 036 0002 1C	6.0	4.6	1 slot		
	VN01 036 0003 1C	10.0	5.9	2 slots		
	VN01 036 0021 1C	16.0	8.3	no slot		
	VN02 036 0004 1C	1.5	3	2 slots	.N02 036 000X	
	VN02 036 0005 1C	2.5	3.45	3 slots		
	VN02 036 0001 1C	4.0	3.9	no slot		
	VN02 036 0002 1C	6.0	4.6	1 slot		
	VN02 036 0003 1C	10.0	5.9	2 slots		
	VN02 036 0021 1C	16.0	8.3	no slot		

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	●		●		●

heavy | mate® Informationen Classification according to DIN EN 61984 (VDE 0627)

finger safety unmated	hand back safety mated	connetor with breaking capacity [1]	rewirable	Cable clamp with [2]	Cable clamp without [3]	Style
	●	●	●	●	●	Hood with pin insert
		●	●	4)	●	Pin insert
●	●	●	●	●	●	Hood with socket insert
		●	●	4)	●	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.

[1] When used as connector with braking capacity the load shall be reduced
[2] When using cable seals (from page 288)

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[3] When using standard gland bushings
[4] See detail information

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.
- It 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 camply 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 mm² (AWG10), for bigger cross-sections (10-16 mm² / 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

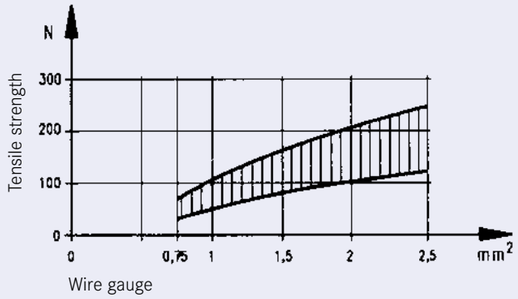
Screw clamps are designed acc. to EN 60999-1/VDE 0609. Chart 1 below shows the screw size depending on wire size and the required clamping and testing torque.

Chart 1

Wire size (mm²)	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



Wire gauge

Crimp connection

A crimp connection is a non-detachable electrical connection between a wire and a crimp contact produced with the crimp technology. Precise crimping dies are matched to the crimp barrel and the wire size and a defined deformation results in a reliable electrical connection. There are open barrels (stamped contacts) and closed crimp barrels (turned contacts).

The main advantages of crimp connections are:
- Efficient termination of contacts.
- Reproduceable electrical and mechanical figures by a constant crimp quality.
  (A detailed description of the crimp technology can be found in our catalogue "tools").

The requirements for crimp connections are defined in DIN EN 60352-2.

An important point for the quality of a crimp connection is the achieved tensile strength of the termination. Measuring the tensile strength is a practible means for quality control purposes. Chart 2 below shows the required minimum tensile strength for open and closed barrels according to the wire size.

Chart 2: Tensile strength for crimp connetions

Wire size		Tensile strength
mm²	AWG [1]	N
0.05	30	6
0.08	28	11
0.12	26	15
0.14		18
0.22	24	28
0.25		32
0.32	22	40
0.5	20	60
0.75		85
0.82	18	90
1.0		108
1.3	16	135
1.5		150
2.1	14	200
2.5		200
3.3	12	275
4.0		310
5.3	10	355
6.0		360
8.4	8	370
10.0		380

Cross reference AWG - mm²

The chart below allows a cross reference between American Wire Gauge (AWG) and metric wire sizes (mm²).

Chart 3

AWG	Wire composition	Leiter-Ø	Wire size	AWG	Wire composition	Leiter-Ø	Wire size
30	1 x 0.25	0.25 mm	0.05 mm²	20	1 x 0.81	0.81 mm	0.52 mm²
	7 x 0.10	0.36 mm	0.06 mm²		7 x 0.32	0.97 mm	0.56 mm²
28	1 x 0.32	0.32 mm	0.08 mm²		19 x 0.20	1.02 mm	0.62 mm²
	7 x 0.13	0.38 mm	0.09 mm²	18	1 x 1.02	1.02 mm	0.79 mm²
26	1 x 0.40	0.40 mm	0.13 mm²		19 x 0.25	1.27 mm	0.96 mm²
	7 x 0.16	0.48 mm	0.14 mm²	16	19 x 0.29	1.44 mm	1.23 mm²
	19 x 0.10	0.51 mm	0.15 mm²	14	19 x 0.36	1.80 mm	1.95 mm²
24	1 x 0.51	0.51 mm	0.21 mm²	12	19 x 0.46	2.29 mm	3.09 mm²
	7 x 0.20	0.61 mm	0.23 mm²	10	37 x 0.40	3.10 mm	4.60 mm²
	19 x 0.13	0.64 mm	0.24 mm²	8	133 x 0.29	4.0 mm	8.80 mm²
22	1 x 0.64	0.64 mm	0.33 mm²	6	133 x 0.36	5.5 mm	13.5 mm²
	7 x 0.25	0.76 mm	0.36 mm²				
	19 x 0.16	0.81 mm	0.38 mm²				

It has to be noted that wires of the same AWG number but with different composition have slightly different mm².

[1] Only for information

Chart 4: Composition and Dimensions of Copper Wires

Wire Size	Wire Composition	Wire diameter
0.09 mm²	12 x 0.10	0.48 mm
0.14 mm²	18 x 0.10	0.50 mm
0.25 mm²	14 x 0.15	0.70 mm
0.34 mm²	7 x 0.25	0.78 mm
0.5 mm²	16 x 0.20	1.0 mm
0.75 mm²	24 x 0.20	1.2 mm
1.0 mm²	32 x 0.20	1.4 mm
1.5 mm²	30 x 0.25	1.6 mm
2.5 mm²	35 x 0.30	2.2 mm
4.0 mm²	56 x 0.30	2.8 mm
6.0 mm²	19 x 0.64	3.4 mm
10 mm²	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

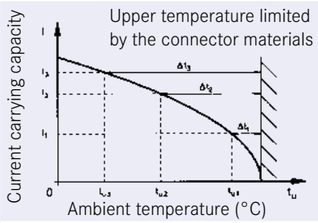


Chart 5: Current carrying capacity of copper wires in (A)

Installation type / Wire size (mm2)	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).

Reduction values

The values in chart 5 are based on an ambient temperature of 40 °C. For other ambient temperatures the values have to be adjusted using the correction values of chart 6 below.

For installations with many cables and conductors under load the current carrying capacity is reduced according to the two following charts 7 and 8.

Chart 6

Ambient temperature (°C)	Correction value
30	1.15
35	1.03
40	1.00
45	0.91
50	0.82
55	0.71
60	0.58

Chart 7: Reduction values for accumulated conductors

Installation type	Number of cables and conductors / pairs under load			
	2	4	6	9
Threephase cable and conductor				
B1 and B2	0.80	0.85	0.87	0.86
C	0.65	0.75	0.78	0.76
E-one row	0.57	0.72	0.75	0.72
E-multi row	0.50	0.70	0.73	0.88
DC conductor (pair), independent of installation type	1.0	0.76	0.64	0.43

Chart 8: Reduction values for multicore cable and conductors up to 10mm²

Number of conductors (pairs) under load	AC (conductor > 1 mm²)	DC (Pairs 0.2 to 0.75 mm²)
5	0.75	0.52
7	0.65	0.45
10	0.55	0.39
24	0.40	0.27

Conductors of control circuits generally do not need a reduction.

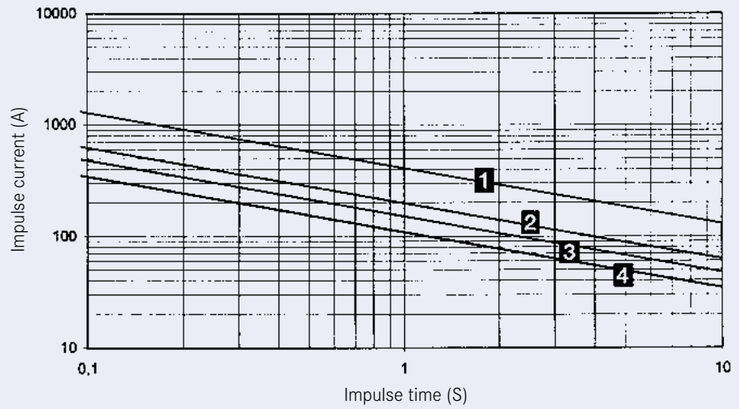
Impulse current carrying capacity

A surge can happen to a connector and its contacts by an impulse current, e.g. through a short circuit in the system or by switching operations. The short-timed high current heat cannot be transferred outside fast enough so the contacts are stressed by the high temperature which in the worst case can lead to a local weld.

The robust design of our connectors prevents most damage by impulse currents.

The diagram 4 below can be used as a guideline.

Chart 4: Impulse current carrying capacity of single contacts



Curve No.	Connector style	Curve No.	Connector style
1	heavy|mate® E or A with screw contact	3	heavy|mate® S with stamped crimp contact
2	heavy|mate® E with stamped crimp contact	4	heavy|mate® D with stamped crimp contact

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 installtions or parts of it in which lightning overvoltages do not need to be considered, however switching overvoltages generated by the euipment, 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			
Three phase systems	IV	III	II	I
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 devise 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 10

Impulse withstand voltage in kV	Minimum clearances in air in mm up to 2000 m above sea level							
	Case A (non homogeneous field)				Case B (homogeneous field)			
	Pollution degree				Pollution degree			
	1	2	3	4	1	2	3	4
0.33	0.01	0.2	0.8	1.6	0.01	0.2	0.8	1.6
0.40	0.02				0.02			
0.50	0.04				0.04			
0.60	0.06				0.06			
0.80	0.10				0.1			
1.0	0.15				0.15			
1.2	0.25	0.25			0.2			
1.5	0.5	0.5			0.3	0.3		
2.0	1.0	1.0	1.0		0.45	0.45		
2.5	1.5	1.5	1.5		0.6	0.6		
3.0	2	2	2	2	0.8	0.8		
4.0	3	3	3	3	1.2	1,2	1.2	
5.0	4	4	4	4	1.5	1.5	1.5	
6.0	5.5	5.5	5.5	5.5	2	2	2	2
8.0	8	8	8	8	3	3	3	3
10	11	11	11	11	3.5	3.5	3.5	3.5
12	14	14	14	14	4.5	4.5	4.5	4.5
15	18	18	18	18	5.5	5.5	5.5	5.5
20	25	25	25	25	8	8	8	8
25	33	33	33	33	10	10	10	10
30	40	40	40	40	12.5	12.5	12.5	12,5
40	60	60	60	60	17	17	17	17
50	75	75	75	75	22	22	22	22
60	90	90	90	90	27	27	27	27
80	130	130	130	130	35	35	35	35
100	170	170	170	170	45	45	45	45

When defining the minimum clearances for connectors generally the values of the inhomogeneous field can be chosen or the required clearance has to be defined by a voltage test.

Creepage distances

The creepage distance is the shortest distance along the surface of the insulating material between two conductive parts.
For the dimensioning of the creepage distance the following factors are taken into account: the rated voltage, the pollution degree and the tracking formation of the insulating material.

The materials are separated into four groups according to their CTI values (Comparative Tracking Index):

Material group I	600 ≤ CTI
Material group II	400 ≤ CTI < 600
Material group IIIa	175 ≤ CTI < 400
Material group IIIb	100 ≤ CTI < 175

The minimum creepage distances can be selected from chart 11.

Chart 11

U-eff Rated voltage U in V	Min. creepage distance in mm														
	Printed circuits		Other devices												
	Pollution degree		Pollution degree					Pollution degree				Pollution degree			
			1	2				3				4			
	1	2	Material group					Material group				Material group			
	2)	3)	2)	I	II	IIIa	IIIb	I	II	IIIa	IIIb	I	II	IIIa	IIIb
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.

Chart 12

1st charact. numeral	Brief description	Definition
0	Non-protected	–
1	Protected against access to hazardous parts with the back of a hand. Protected against solid foreign objects of ≥50mm Ø.	The probe, sphere of 50mm Ø, shall not fully penetrate and shall have adequate clearance from hazardous parts.
2	Protected against access to hazardous parts with a finger. Protected against solid foreign objects of ≥12,5mm Ø.	The jointed test finger of 12mm Ø, 80mm length, shall have adequate clearance from hazardous parts. The probe, sphere of 12,5mm Ø, shall not fully penetrate.
3	Protected against access to hazardous parts with a tool. Protected against solid foreign objects of ≥2,5mm Ø.	The probe of 2,5mm Ø shall not penetrate at all.
4	Protected against access to hazardous parts with a wire. Protected against solid foreign objects of ≥1mm Ø.	The probe of 1mm Ø shall not penetrate at all.
5	Protected against access to hazardous parts with a wire. Dust-protected.	The probe of 1mm Ø shall not penetrate. Intrusion of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the device or to impair safety.
6	Protected against access to hazardous parts with a wire Dust-tight.	The probe of 1mm Ø shall not penetrate. No intrusion of dust.

Chart 13

2nd charact. numeral	Brief description	Definition
0	Non-protected	–
1	Protected against vertically falling water drops	Vertically falling drops shall have no harmful effects.
2	Protected against vertically falling water drops when enclosure tilted up to 15°	Vertically falling drops shall have no harmful effects when the enclosure is tilted at any angel up to 15° .
3	Protected against spraying water	Water sprayed at any angle up to 60° shall have no harmful effects.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effects.
5	Protected against water jets	Water projected in jets against the enclosure from any direction shall have no harmful effects.
6	Protected against powerful water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
7	Protected against the effects of temporary immersion in water	Intrusion of water in quantities causing harmful effects shall not be possible when the enclosure is temporalily immersed in water for 30 min. in 1m depth.
8	Protected against the effects of continous immersion in water	Intrusion of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7.
9K[1)]	Protected against water during high pressure/steam jet cleaning	Water projected in powerful jets with high pressure and heat against the enclosure from any direction shall have no harmful effects.

[1)] Remark: Numeral acc. to DIN 40050 part 9, vehicles IP code, IP69K is not a part of DIN EN 60 529 or IEC 60 529, is specificated in DIN 40 050-9

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

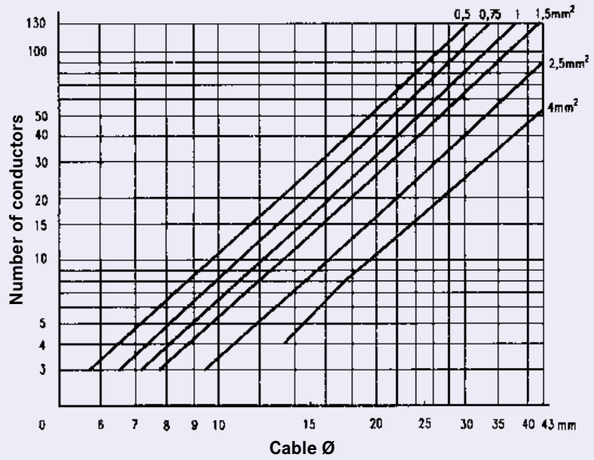
The sealing of the cable entries of all Amphenol-industrial connectors is with gland bushings. All sealings are made from Neoprene which has a good resistance against grease, oil and gasoline.

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

Diagram 5



American Wire Gauge (AWG)

System of numerical designations for wire sizes, based on specified ranges of cross-sectional areas.
Starts with 4/0 (000) at the largest size, going to 3/0, 2/0, 1/0, 1, 2, and up to 40 and beyond for the smallest size. A step of one AWG number corresponds to a reduction of cross-sectional area of appr. 20 %.

Attenuation

A reduction of power. Occurs naturally when waves travel through lines, wave guides, or media such as air or water. Is produced additionally by imperfections in electrical or optical connections (attenuation in fibre optics), e. g. contact resistance, mismatch, etc.

Bulkhead connector

Connector designed to be inserted into a panel cutout from the rear of the panel, thus forming part of the barrier between two spaces. Back-mounted.

Clearance

The shortest distance in air between two conductive parts, see IEC 60664.

Climatic stability

General term describing the behavior of components under various climatic conditions, e. g. high and low temperatures, tropical climate, high humidity, moist heat, fungus, atmospheric conditions (industial atmosphere), reduced air pressure, etc. Climatic conditions for test purposes are explained in IEC 60068, DIN 46 040.

Connector

A component which terminates conductors for the purpose of providing connection and disconnection to
a suitable mating component which shall not be engaged or disengaged when live. Depending on the fastening to a cabinet, panel, rack etc. or a cable, they are classified as fixed or free connectors.
A connector comprises one or more contacts and a housing which may have a separate connector insert and a separate outer housing or shell.

Connector housing

The part of a connector into which the insert and the contacts are assembled. It may function as part of the locking mechanism.

Connector insert

An insulating element designed to support and position contacts in a connector housing.

Connector life

The number of mating cycles prior to abrasion of the conductive contact surface and which does not result in a significant rise of the contact resistance. Tests according to test 9a of ICE 60512-5 / DIN EN 60512 Part 5.

Contact

The conductive element in a connector which mates with a corresponding element to provide an electrical path.

Contact resistance

The electrical resistance of a mated set of contacts under specified conditions. Tested according to tests 2a, 2b, 2c, of IEC 60 512 -2/ DIN EN 60 512-2.

Contact size

The designation used to differentiate one contact from another. It may be denoted by one of the following numbering systems:

- numbering system: assigned numbers used to denote the size of the contact and its related conductor accomodation (e. g. in AWG units),
- current rating system: the related current-carrying capacity is used to denote the size of the contact,
- cross-sectional area system: reference is made to the cross-sectional area of the maximum conductor accommodation to denote the size of the contact, e. g. in mm^2.

Creepage distance

The shortest distance along the surface of the insulating material between two conductive parts. The longer the distance, the less the risk of arc damage or tracking. Minimum creepage distances are specified according to the rated voltage and the applicable pollution degree and Comperative Tracking Index.

Crimped connection

A solderless connection made by crimping. IEC 60352-2 / DIN IEC 60352 Part 2.

Derating curve

The method for determining derating is specified in IEC 60 512-3. Here the combination of ambient temperature (Tu) and the current (J) leading to the same maximum allowable temperature (Tb) at the hottest point of the connector are plotted.

DIN

Deutsches **I**nstitut für **N**ormung. A German standards organization.

Electromagnetic interference (EMI)

General term describing the undesirable effects of the immission or emission of radio frequency fields.
In connectors electromagnetic interference is prevented by shielding. Shielded connectors normally provide means to connect the screens of attached cables.

Funnel entry (restricted entry C146 D series)

Flared or widened entrance to a conductor barrel permitting easier insertion of the conductor.

Insertion or withdrawal force

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.

Insulation grip

The area of a crimp contact that has been reshaped around the insulation of the conductor by compression during the crimping operation.

Insulation resistance

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.

Intermateable

Two connectors are intermateable when they are capable of being connected electrically and mechanically but without regard to their performance and intermountability.

Locator

In a crimping tool the device used for positioning a crimp contact or terminal end.

Locking lever

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.

Mating cycle

One mating cycle comprises one insertion and one withdrawal operation. Term used in the definition of connector life.

Material group

Classification of insulation materials according to their CTI values (CTI = Comperative Tracking Index)

Overvoltage category

A numeral defining a transient overvoltage condition. Overvoltage categories I, II, III and IV are used.

Connector with braking capacity (CBC)

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.

Rated current

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 preferrably at an ambient temperature of 40 °C without the upper temperature being exceeded.

Shield, shielding

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.

Terminal block

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.

Wire range

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 mm2 or in AWG numbers.

Stamped crimp contacts series C146, stripping length

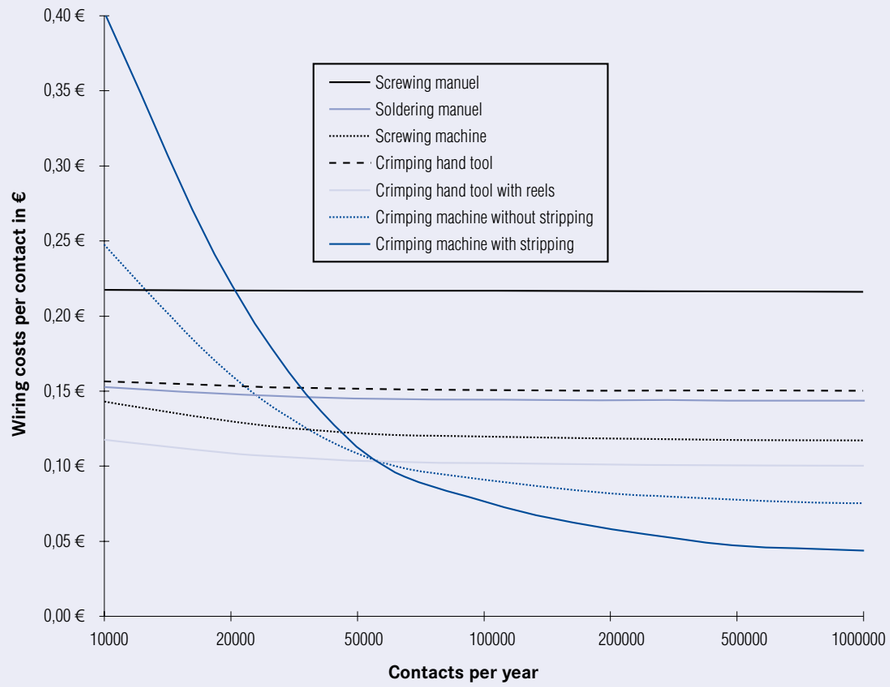
Termination crimp [mm2]	Wire gauge mm²	Wire gauge AWG	Insulation diameter of the wire [mm]	Min. stripping length [mm]	Contact Part Number	Series
0.09 - 0.25	0.09 - 0.25	28 - 24	0.7 - 1.6	2.3 + 0.4	N01 010 0130 2 N02 010 0130 2	heavy | mate® M heavy | mate® M
0.14 - 0.5	0.14 0.25 0.5	26 24-22 20	1.0 - 2.0	3.0 + 0.5	N01 016 0003 N02 016 0003	heavy | mate® D/M heavy | mate® D/M
0.25 - 0.5	0.25 0.5	24-22 20	1.6 - 2.0	2.3 + 0.4	N01 010 0131 2 N02 010 0131 2	heavy | mate® M heavy | mate® M
0.5 - 1.5	0.5 0.75 1.0 1.5	20 20 - 18 18 - 16 16 - 15	1.8 - 2.8	3.5 + 1.0	N01 016 0002 N02 016 0002 N01 016 0015 N02 016 0015 N01 025 0001 N02 025 0001	heavy | mate® D/M heavy | mate® D/M heavy | mate® D heavy | mate® D heavy | mate® E/M heavy | mate® E/M
1.5 - 2.5	1.5 2.5	16 - 15 14	2.5 - 3.5	3.5 + 1.0	N01 016 0005 N02 016 0005 N01 016 0016 N02 016 0016 N01 025 0010 N02 025 0010	heavy | mate® D/M heavy | mate® D/M heavy | mate® D heavy | mate® D heavy | mate® E/M heavy | mate® E/M
2.5 - 4.0	2.5 4.0	14 12	3.3 - 4.2	3.5 + 1.0	N01 025 0043 N02 025 0043	heavy | mate® M heavy | mate® M

Turned crimp contacts series heavy | mate®, stripping length

Termination crimp [mm²]	Min. stripping length + Tolerance[mm]	Contact Part Number	Series	Min. stripping length + Tolerance[mm]	Contact Part Number	Series
	1.6 (Contact with clip)			2.5 (Contact with clip)		
0.14 - 0.37	8 + 1	N01 016 0024 N02 016 0024	heavy | mate® D/DD/F/K/M/Q			heavy | mate® M
0.5	8 + 1	N01 016 0025 N02 016 0025	heavy | mate® D/DD/F/K/M/Q	7 + 1	N01 025 0029 N02 025 0029	heavy | mate® M
0.75 - 1.0	8 + 1	N01 016 0026 N02 016 0026	heavy | mate® D/DD/F/K/M/Q	7 + 1	N01 025 0030 N02 025 0030	heavy | mate® M
1.5	8 + 1	N01 016 0027 N02 016 0027	heavy | mate® D/DD/F/K/M/Q	7 + 1	N01 025 0031 N02 025 0031	heavy | mate® M
2.5	6 + 1	N01 016 0028 N02 016 0028	heavy | mate® D/DD/F/K/M/Q	7 + 1	N01 025 0032 N02 025 0032	heavy | mate® M
4.0				7 + 1	N01 025 0033 N02 025 0033	heavy | mate® M
	2.5 (Contact without clip)			3.6 (Contact with clip)		
0.5	7 + 1	N01 025 0035 N02 025 0035	heavy | mate® E/EE/F/Q			
0.75 - 1.0	7 + 1	N01 025 0036 N02 025 0036	heavy | mate® E/EE/F/Q			
1.5	7 + 1	N01 025 0037 N02 025 0037	heavy | mate® E/EE	10 + 1	N01 036 0004 N02 036 0004	heavy | mate® M
2.5	7 + 1	N01 025 0038 N02 025 0038	heavy | mate® E/EE	10 + 1	N01 036 0005 N02 036 0005	heavy | mate® M
4.0	7 + 1	N01 025 0039 N02 025 0039	heavy | mate® E/EE	10 + 1	N01 036 0001 N02 036 0001	heavy | mate® M
6.0				10 + 1	N01 036 0002 N02 036 0002	heavy | mate® M
10.0				10 + 1	N01 036 0003 N02 036 0003	heavy | mate® M

Time saving through the introduction of stamped contacts

Wiring costs of different contacts



Break Even at about 60.000 contacts per year

General conditions	
Maturity (Depreciation)	5 years
Interest	8 %
Maintenance	5 %
Hourly wages	20 €

Non binding declarations are based on experienced values.

Part Number	Page
17 D 438 SP	123, 129, 187, 294
C 146 68F016 011 1	267
C146 10A001 600 15	84, 97
C146 10A001 800 15	88, 123, 125
C146 10A001 901 15	91, 119
C146 10A001 902 15	90, 119
C146 10A002 600 15	84, 99
C146 10A002 800 15	90, 117
C146 10A002 800 15	119
C146 10A003 002 4	18
C146 10A003 102 3	140
C146 10A003 600 15	84, 101
C146 10A003 601 15	84, 101
C146 10A004 002 4	18
C146 10A004 100 13	147
C146 10A004 600 15	85, 105
C146 10A004 901 15	90, 117
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C146 10A006 000 1	49
C146 10A006 002 1	48
C146 10A006 100 13	147
C146 10A006 102 1	48
C146 10A006 102 3	141
C146 10A006 102 5	135
C146 10A006 400 1	48
C146 10A006 500 1	49
C146 10A006 500 12	203
C146 10A006 600 1	48
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C146 10A006 810 1	78
C146 10A007 000 2	27
C146 10A007 500 12	205
C146 10A007 500 2	27, 85
C146 10A007 600 15	103
C146 10A008 000 2	27
C146 10A008 500 12	207
C146 10A008 500 2	27
C146 10A008 600 15	86, 109
C146 10A008 901 15	88, 123
C146 10A008 902 15	88, 123
C146 10A008 905 15	88, 125
C146 10A008 906 15	88, 125
C146 10A009 600 15	89, 129
C146 10A010 000 1	51
C146 10A010 002 1	50
C146 10A010 002 4	19
C146 10A010 102 1	50
C146 10A010 102 3	142
C146 10A010 102 4	19
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C146 10A010 500 10	65
C146 10A010 600 1	50
C146 10A010 810 1	78
C146 10A012 100 13	151
C146 10A012 500 12	209
C146 10A012 600 15	86, 111
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C146 10A015 060 2	28
C146 10A015 500 2	28
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C146 10A020 600 15	87, 117
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C146 10A108 000 9	42
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C146 10B016 600 1	52
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