Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

HEAVY DUTY CONNECTORS

Contents

TE Heavy Duty Connectors – Applications

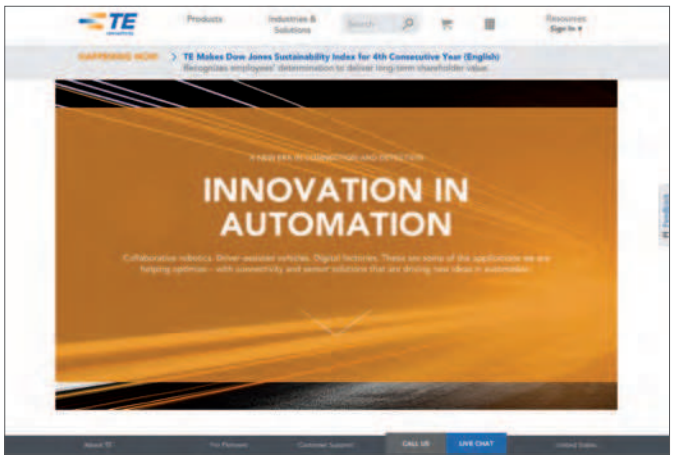
Rolling Stock

Machinery

Factory Automation

The broad range of Heavy Duty Connectors (HDC) are designed for reliably performing under the most demanding operating and harsh environmental conditions. With a tested salt spray and corrosion resistance of over 1000 hours and an IP 69 K rating, these connectors are suited for various applications in industrial environments. Thanks to their modular system, TE's Heavy Duty Connectors offer power, signal and data transmission in one connector.

TE CONNECTIVITY AT YOUR SERVICE



TE Connectivity Online

The TE Connectivity website is an innovative and interactive source for application information, product updates and technical solutions. Our step-by-step software makes our website intuitive and user-friendly to better serve you! Please contact us at: te.com

Product Information Centers

You've got questions? TE's Product Information Centers (PIC) will help you get answers. Contact a technical product information specialist.

- Email us
- Call us
- Chat with us

Please go to te.com/help for more information.

Internet

te.com

Restriction on the Use of Hazardous Substances (RoHS)

At TE Connectivity (TE), we are ready to support your RoHS requirements. We have assessed more than 1.5 million end items/components for RoHS compliance, and issued new part numbers where any change was required to eliminate the restricted materials. Part numbers in this catalog are identified as:

ROHS COMPLIANT

Part numbers in this catalog are RoHS Compliant, unless marked otherwise.

These products comply with European Union Directive 2002/95/EC as amended 1 January 2006 that restricts the use of lead, mercury, cadmium, hexavalent chromium, PBB, and PBDE in certain electricelectronic products sold into the EU as of 1 July 2006.

Note: For purposes of this Catalog, included within the definition of RoHS Compliant are products that are clearly "Out of Scope" of the RoHS Directive such as hand tools and other non-electrical accessories.

NON-ROHS COMPLIANT

These part numbers are identified with a "♦" symbol. These products do not comply with the material restrictions of the European Union Directive 2002/95/EC.

5 OF 6 COMPLIANT

A "●" symbol identifies these part numbers. These products do not fully comply with the European Union Directive 2002/95/EC because they contain lead in solderable interfaces (they do not contain any of the other five restricted substances above allowable limits). However, these products may be suitable for use in RoHS applications where there is an application-based exception for lead in solders, such as the server, storage, or networking infrastructure exemption.

Note: Information regarding RoHS compliance is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information provided by our suppliers. This information is subject to change. For latest compliance status, refer to our website referenced below.

GETTING THE INFORMATION YOU NEED

Our comprehensive on-line RoHS Customer Support Center provides a forum to answer your questions and support your RoHS needs. A RoHS FAQ (Frequently Asked Questions) is available with links to more detailed information. You can also submit RoHS questions and receive a response within 24 hours during a normal work week. The Support Center also provides:

- Cross-Reference from Non-compliant to Compliant Products
- Ability to browse RoHS Compliant Products in our on-line catalog: te.com/customersupport/productcoinpliance
- More detailed information regarding the definitions used above

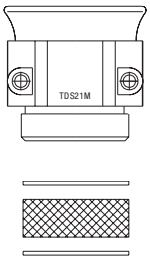
So whatever your questions when it comes to RoHS,
we've got the answers at www.te.com/leadfree

RoHS Customer Support Center

General overview of heavy duty connectors

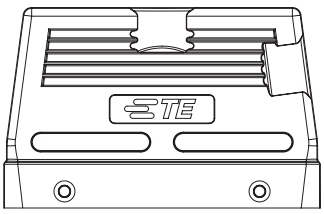
General features	TE's HDC product series is designed for data, signal and power connections in harsh environments. The modular connector design provides a high degree of flexibility so solutions can be customized for different applications such as machinery, robotics, railway, wind energy and conventional energy generation and distribution.
Inserts	HDC products consist of three key elements: inserts, contacts and hoods and housings. The inserts and contacts are modular and assembled together to provide electrical performance offering crimp-, screw- and spring-clamp termination technology.
Enclosures	The hoods and housings are made of powder coated die cast aluminum alloy or of thermoplastic and are protecting the connector inserts against the ingress of dust or water according to the degree of protection IP 65, IP 68 and IP 69 K. Cable glands in different versions or DIN-rail mounts are completing the connector-solutions as accessories.
Customized design	For customer's special requirement, we can provide customized design. Please contact us.
Specifications, Standards and Approvals	1. Specifications DIN VDE 0110 Concerning clearance and creepage distances DIN VDE 0627 Connectors and plug devices 2. Standards DIN EN 175 301-801 DIN EN 60664-1 DIN EN 61 984 IEC 60 529 3. Approvals

Connector components



CABLE FITTING

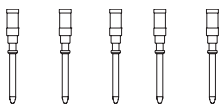
Special cable fittings for protection up to IP69K and for electro-magnetic compatibility available



HOOD

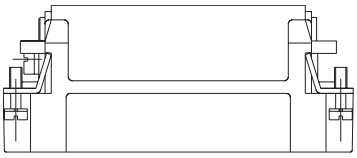
Standard and corrosion-resistant connector hoods:

- low and high construction
- 4 different locking systems
- different cable entries and directions:
  - M Thread
  - PG Thread



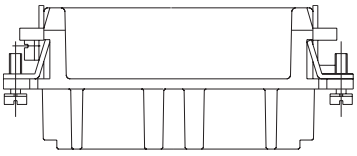
CONTACTS

Silver or gold plated
Solid machined contacts with screw, spring or crimp termination
Stamped and formed contacts



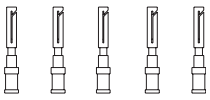
MALE INSERT

Screw, Spring clamp or crimp terminal



FEMALE INSERT

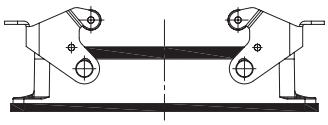
Screw, Spring clamp or crimp terminal



HOOD AND HOUSING

Standard and corrosion-resistant bottom-entry, surface-mounted and cable-to-cable hoods:

- low and high construction (bottom-entry and cable-to-cable hood) with/without cover
- 4 different locking systems

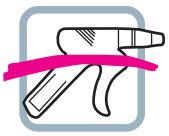


Terminal types

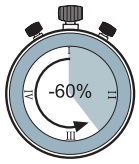
Screw dimensions and tightening torque for screw terminals						
Wire gauge (mm²)	1.5	2.5	4.0	6.0	10	16
Screw thread	M3	M3	M3.5	M4	M4	M6
Test moment of torque (Nm)	0.5	0.5	0.8	1.2	1.2	1.2
Min. pull-out for stranded wire (N)	40	50	60	80	90	100

Spring terminal

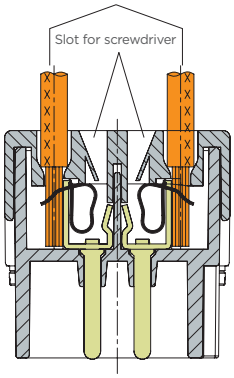
No special tools

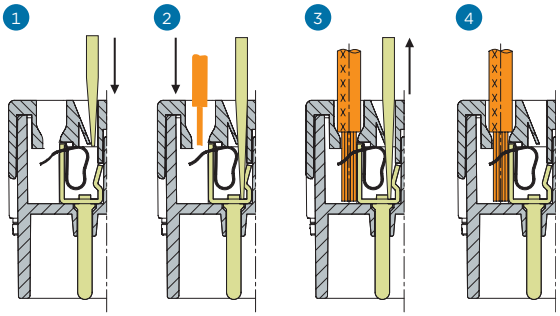


60% faster



One conductor per termination





3.5x0.5mm
Screwdriver width: 3.5x0.5mm

SCREW TERMINAL

The screw terminal is the most common type of connection. Ratings are based on VDE 0609/EN 60 999. Please refer to the table at the left for the tightening torque.

The series HE, HSB, HAVE are equipped with a wire protection, thus the use of ferrules is not necessary. The series HA is not equipped with wire protection and ferrules must be used.

SPRING TERMINAL

The spring terminal offers a vibration proof termination for solid and stranded wires with cross sections ranging from 0.14 mm² to 2.5 mm² (AWG 26-14).

Easy operation of the spring terminal with a screw driver, which is inserted in the same direction of the cable opening.

Internationally approved by UL, CSA, VDE.

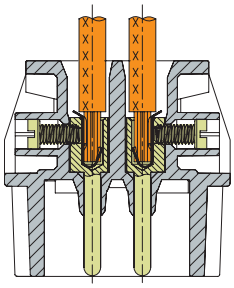
CRIMP TERMINATION

A proper crimp connection is gastight, therefore corrosion free and represents a cold weld of the parts being connected. Wires to be connected must be matched with the correct size of crimp contacts. The crimp termination represents a highly reliable vibration proof connection with low contact resistance and highest contact density which can be applied with manual and automatic crimping tools.

Terminal types

SCREW TERMINAL

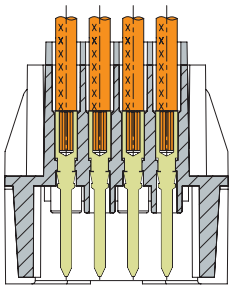
HA series
HE, HVE series
HSB series
HK series
HWK series
HEAV series



Inserts	Max. wire gauge		Stripping length L (mm)
	mm²	AWG	
HA-003, HA-004	2.5	14	4.5
HA, HEAV	2.5	14	7.5
HE, HVE	2.5	14	7.5
HSB	6.0	10	7.5
HK, HWK	35.0	2.0	10.5

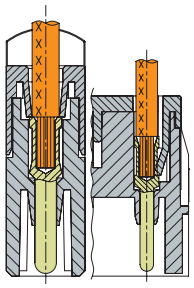
CRIMP TERMINAL

HD series
HDD series



Inserts	Max. wire gauge		Stripping length L (mm)
	mm²	AWG	
HD HDD HMN(10A) HQ(10A) HK(10A)	0.5	20	8.0
	0.75	18	8.0
	1.0	18	8.0
	1.5	16	8.0
	2.5	14	6.2

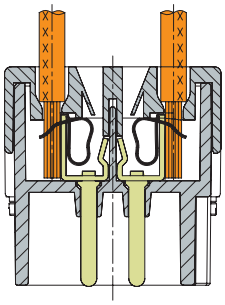
HAC, HEC series
HEEE, HEE series
HMN(16A/40A) series
HQ(16A/40A) series
HK(16A/40A) series



Inserts	Max. wire gauge		Stripping length L (mm)	
	mm²	AWG	16A	40A
HAC HEC HEE/HEEE HMN(16A/40A) HQ(16A/40A) HK(16A/40A)	0.5	20	7.5	-
	0.75	18	7.5	-
	1.0	18	7.5	9.2
	1.5	16	7.5	9.2
	2.5	14	7.5	9.2
	4.0	12	7.5	9.2
	6.0	10	-	9.2

SPRING TERMINAL

HAS series
HES series
HESAV series



Inserts	Max. wire gauge		Stripping length L (mm)
	mm²	AWG	
HAS, HES, HESAV	2.5	14	9-11

RECOMMENDED TIGHTENING TORQUE AND SIZE OF SCREW DRIVER

Size of screw	Connector type	Tightening torque [Nm]	Tightening torque [lbft]	Recommended size of screwdriver
M3	Screw terminal HA-003/HA-004/HQ-005	0.25	0.20	0.4x2.5
M3	Screw terminal HA-010, HA-016	0.50	0.40	0.5x3.5 or ±size 1
M3	HE, HVAE Screw terminal HE, HVAE fixing screws of all kinds, guiding pins and bushes	0.50	0.40	0.5x3.5
M4	Ground terminal HA, HE, HD, HDD	1.20	0.90	0.5x3.5 or ±size 1+2
M4	Terminal blocks HSB	1.20	0.90	0.8x4.5
M5	Ground terminal HSB	2.00	1.40	0.8x4.5/1.2x8.0

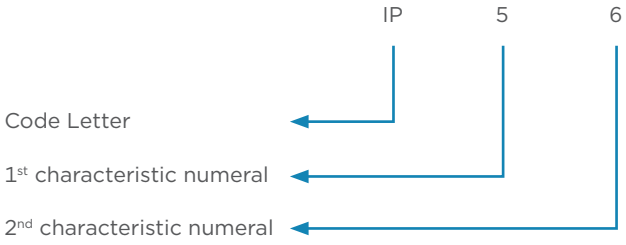
Notes

Degree of protection provided by enclosures

For safety reasons, electrical equipment needs to be protected against outside influences. The basis for the determination is the standard IEC 529 titled ‘Degree of protection provided by enclosures (IP-Code)’.

Using a standardized test procedure the extent of the protection class is verified. To classify different housings according to their protection class, a designation system is used which consists of the code – letters ‘IP’ and two code numbers.

ARRANGEMENT OF THE IP-CODE (INTERNATIONAL/INGRESS PROTECTION)



MEANING OF THE 1ST CHARACTERISTIC NUMERAL

The first numeral describes the protection of the housing against intrusion of foreign bodies as well as the protection of people against dangerous parts or influences. Because of this, there are two descriptions and definitions for each of the first code letter.

1st numeral	**Protection against solid objects and against access to hazardous parts**	
	short description	definition
0	No protection	
1	• protection against solid foreign bodies of Ø 50mm • protection against access to hazardous parts with the back of a hand	A sphere of Ø 50mm, must not intrude
2	• protection against solid foreign bodies of Ø 12mm • protection against access to hazardous parts with the finger	A sphere of Ø 12mm diameter, must not intrude
3	• protection against solid foreign bodies of 2.5mm diameter and bigger • protection against access to hazardous parts with a tool	A sphere of Ø 2.5mm diameter, must not intrude
4	• protection against solid foreign bodies of 1.0mm diameter and bigger • protection against access to hazardous parts with a wire	The probe, sphere of Ø 1.0mm, must not intrude
5	Protected against dust	The infiltration of dust is not completely prevented, but it does not infiltrate to such an extent that the operation or the safety of the device is affected
6	Dust proof	No infiltration of dust

MEANING OF THE 2ND CHARACTERISTIC NUMERAL

The second numeral describes the protection of the housing against the intrusion of water with harmful effects.

2nd numeral	Protection degrees against the intrusion of water, designated by the second code digit	
	short description	definition
0	Not protected	–
1	Protected against dripping water	Vertically falling drops shall have not harmful effects
2	Protected against dripping water when the housing is at an angle of up to 15°	Vertically falling drops shall have not harmful effects when the enclosure is tiled up to 15°
3	Protected against water spray	Water sprayed at an angle up to 60°, shall have no harmful effects
4	Protected against splash water	Water splashed against the enclosure from any direction, shall have no harmful effects
4K	Protected against splash water with increased pressure	Water splashed against the enclosure with increased pressure from any direction, shall have no harmful effects (Applies acc. to DIN 40050-9 only for road vehicles)
5	Protected against jets of water	Water splashes against the enclosure from any direction as a water jet, shall have no harmful effects
6	Protected against strong jets of water	Water splashes against the enclosure from any direction as a strong water jet, shall have no harmful effects
6K	Protected against strong jets of water with increased pressure	Water splashes directly against the enclosure from any direction as a strong water jet with increased pressure, shall have no harmful effects (Applies acc. to DIN 40050-9 only for road vehicles)
7	Protection against the effects of temporary submersion in water	Quantity of water that ingresses an enclosure, when it is temporarily immersed under standardized conditions of pressure and time, shall have no harmful effects
8	Protection against the effects of continuous submersion in water	Quantity of water that ingresses an enclosure, when it is continuously immersed under conditions of pressure and time, shall have no harmful effects. The conditions must, however be harder than for code digit 7 and agreed between user and producer
9K	Protected against water during high-pressure / jet-stream cleaning	Water that is directed against the housing with greatly increased pressure from any direction must not have any detrimental effect (Applies acc. to DIN 40050-9 only for road vehicles)

Standards

SPECIFICATIONS

TE connectors are still made on IEC 664/664 A, DIN VDE 0110/01.89 and DIN VDE 0627/06.86 standards. The standards have defined normal rules and requirements which include features construction and requirements.

To determine the minimum clearances and creepage distance, the recent applicable standard is the IEC 60664-1 standard (10.92), a fundamental safety standard to which all product in the committees should refer.

If no notice to products in the cataloge, clearance and creepage distances of all products in the cataloge are based on DIN VDE 0110:1989-01 and degrees pollution 3.

Include some contents:

1. Over-voltage categories (I, II, III, IV)
2. Degrees of pollution
3. Insulating material
4. Determination of clearances

OVER-VOLTAGE CATEGORIES

1. Over-voltage category I

Equipment in over-voltage category I is only intended for use in apparatus or parts of systems in which no over-voltages will occur or are specially protected against over-voltages by means of surge voltages, filters or capacitors.

2. Over-voltage category II

Equipment in over-voltage category II is intended for use in systems or parts there of in which lighting over-voltages do not have to be taken into account.

3. Over-voltage category III

Equipment in over-voltage category III is intended for use in equipment for fixed installation, i.e. protective devices, relays, switches and plug devices.

Insulation Coordination for Electrical Connectors in Low Voltage Plants

Dimensioning of Clearance and Creeping Distances acc. to DIN EN60664-1; following pages show only a part of the standards.

INSULATION COORDINATION

Insulation coordination includes the design of the electrical insulation of a connector depending on its use and environment. This occurs either by design of the clearance distances (basis is the expected power surge) or by design of the creeping distance (basis is the operating voltage as well as the quality of the insulating material). Furthermore, insulation-changing conditions are taken into account (pollution, protective measures against pollution, air pressure, thermal or chemical influences).

Air distances are measured according to the outer or inner power surge expected. The four power surge classes (power surge categories I to IV) take the different use of the connector into account. Depending on the homogeneity of the field between the electrodes (case A – inhomogenous field, case B – homogenous field) the air distances can be determined according to table 2a (minimum air distances); industrial connectors are always determined according to case A.

The influence from pollution when determining the air- and creeping distances is taken into account by using four degrees of severity (pollution degree 1 to 4).

Basis of the creeping distances is the rated voltage which is deduced from the operating voltage. The minimum creeping distances are allocated in table 4 depending on the severity of pollution. If the product descriptions do not contain any additional information the products listed in this catalogue were rated according tonorm DIN VDE 0110 for surge category III and severity of pollution 3.

SURGE CATEGORY I TO IV

- Resources of surge category I are goods for the termination of fixed electrical installations of a building. Measures for the limitation of transient surges were taken either in the fixed installation or between the fixed installation and the equipment.
- Resources of surge category II are resources which use power and are fed from a fixed installation. Note: e.g. domestic appliances, portable tools and other appliances as well as similar consumers.
- Resources of surge category III are part of a fixed installation. They are resources from which a high degree of availability is expected. Note: Examples for such appliances are e.g. industrial connectors, distribution panels, power switches, distributors, switches, sockets.
- Devices of surge category IV are for use at the supply terminal of the installation.Note: Examples for such appliances are electricity counters, overload cut-out switches.

POLLUTION DEGREE 1 TO 4

DIN VDE 0110 defines the pollution degrees as follows:

Pollution Degree 1:
There is no or only dry, non-conductive pollution. The pollution is without influence.
Pollution Degree 2:
There is only non-conductive pollution. Occasional momentary conductivity due to condensation.
Pollution Degree 3:
There is conductive pollution or dry non-conductive pollution, which becomes conductive due to condensation.
Pollution Degree 4:
There is a continuous conductivity due to conductive dust, rain or moisture.

Insulation Material
The insulation materials are divided into the following four groups depending on their comparative tracking index (CTI):
Insulation material I:.....600 ≤ CTI
Insulation material II:.....400 ≤ CTI < 600
Insulation material III a:.....175 ≤ CTI < 400

Measurement of Clearances

DIAGRAM FOR THE DETERMINATION OF CLEARANCES

RATED SURGE VOLTAGE FOR UTILITIES

Rated voltage of the power supply* in V		**Rated Surge Voltage in kV (1.2/50ms) for**			
3-phase systems	single systems in the centre	utilities at the feed of the installation (surge category IV)	utilities as part of a fixed installation (surge category III)	utilities for connection to fixed installations (surge category II)	Specially protected utilities (surge category I)
	120 up to 240	4	2.5	1.5	0.8
230/400** 277/480**		6	4	2.5	1.5
400/690**		8	6	4	2.5
1000		12	8	6	4

*) chosen voltage values
**) the / dash is for a 3-phase system with 4 lines. The lower value is for phase to neutral, the higher value is for phase to phase

MINIMUM CLEARANCE IN AIR AT INSTALLATION HEIGHTS OF UP TO 2000 M ABOVE SEA LEVEL (NN)

"rated surge voltage [kV]"	case A, inhomogenous field, degree of pollution				case B, homogenous field, degree of pollution			
	1 (mm)	2 (mm)	3 (mm)	4 (mm)	1 (mm)	2 (mm)	3 (mm)	4 (mm)
0.33 _)	0.01	_)			0.01	_)		
0.40	0.02				0.02			
0.5 _)	0.04				0.04			
0.60	0.06				0.06			
0.80 _)	0.10	0.2	0.80		0.10	0.2	0.8	
1.0	0.15			1.6	0.15			1.6
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	0.5		
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

1) This voltage is
- for functional insulation: the maximum impulse voltage expected to occur across the clearance
- for basic insulation directly exposed by transient overvoltages
- for other basic insulation

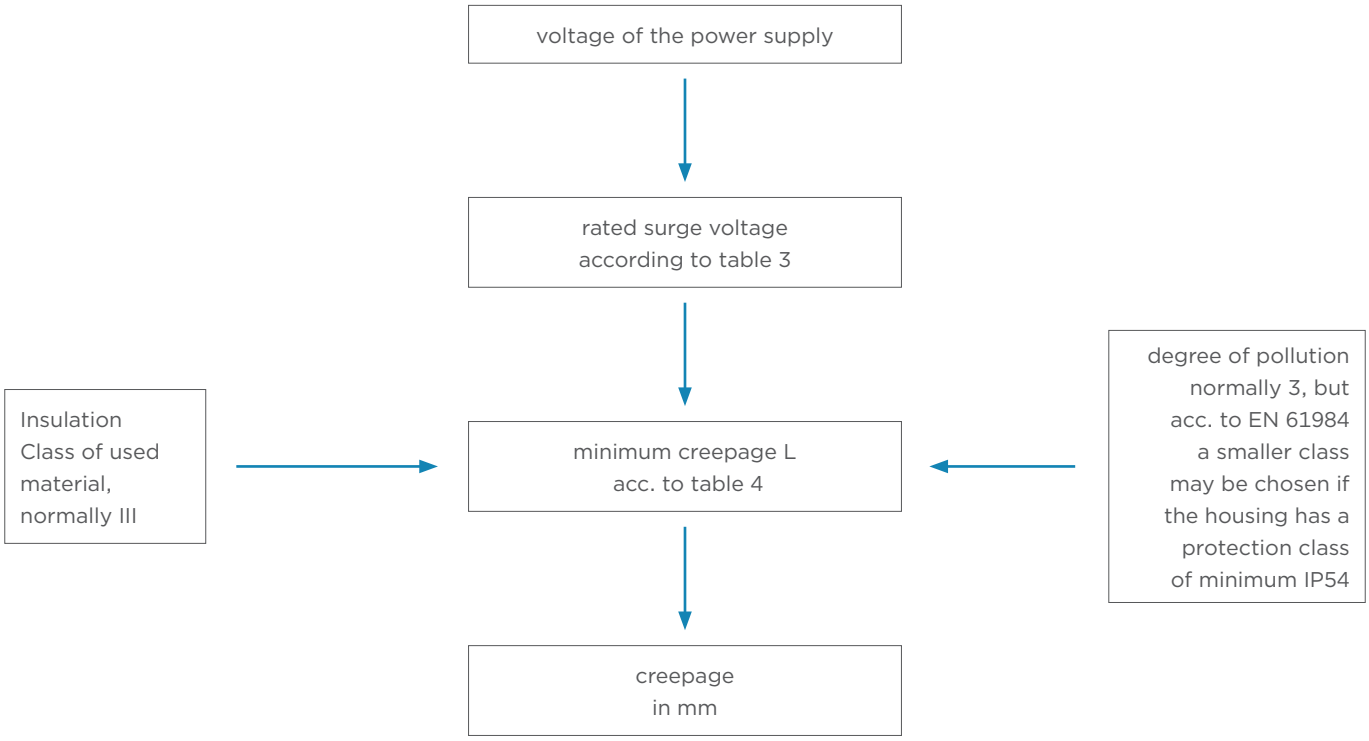
_) Preferred values

FACTORS FOR HEIGHT CORRECTION

height in m	normal air pressure in kPa	multiplication factor for distances
2000	80.0	1.00
3000	70.0	1.14
4000	62.0	1.29
5000	54.0	1.48
6000	47.0	1.70
7000	41.0	1.95
8000	35.5	2.25
9000	30.5	2.62
10000	26.5	3.02
15000	12.0	6.67
20000	5.5	14.50

Measurement of creepage

DIAGRAM FOR THE DETERMINATION OF CREEPAGE



voltage of the power supply [V]	rated voltage [V]
60	63
110/120/127	125
150	160
208	200
220/230/240	250
300	320
380/400/415	400
440	500
480/500	500
575	630
600	630
660/690	630
720/830	800
960	1000
1000	1000

Table 3
*the above shown table does not give the entire correlation of world-wide used networks and rated voltages; it is reduced to the most common ones; further details, see DIN EN60664-1

CREEPAGES IN [MM] FOR ELECTRICAL EQUIPMENTS

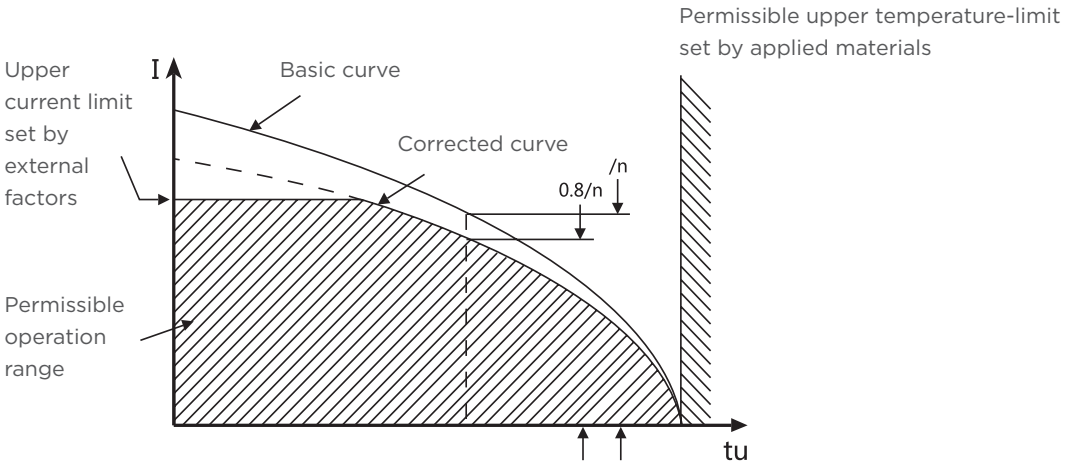
rated voltage [V]	degree of pollution									
	1 All Insulator Classes	2 Insulation Class			3 Insulation Class			4 Insulation Class		
		I	II	III	I	II	III	I	II	III
10	0.08	0.40	0.40	0.40	1.00	1.00	1.00	1.6	1.6	1.6
12.5	0.09	0.42	0.42	0.42	1.05	1.05	1.05	1.6	1.6	1.6
16	0.10	0.45	0.45	0.45	1.10	1.10	1.10	1.6	1.6	1.6
20	0.110	0.48	0.48	0.48	1.20	1.20	1.20	1.6	1.6	1.6
25	0.125	0.50	0.50	0.50	1.25	1.25	1.25	1.7	1.7	1.7
32	0.140	0.53	0.53	0.53	1.30	1.30	1.30	1.8	1.8	1.8
40	0.16	0.56	0.80	1.10	1.4	1.6	1.8	1.9	2.4	3.0
50	0.18	0.60	0.85	1.20	1.5	1.7	1.9	2.0	2.5	3.2
63	0.20	0.63	0.90	1.25	1.6	1.8	2.0	2.1	2.6	3.4
80	0.22	0.67	0.95	1.3	1.7	1.9	2.1	2.2	2.8	3.6
100	0.25	0.71	1.00	1.4	1.8	2.0	2.2	2.4	3.0	3.8
125	0.28	0.75	1.05	1.5	1.9	2.1	2.4	2.5	3.2	4.0
160	0.32	0.80	1.1	1.6	2.0	2.2	2.5	3.2	4.0	5.0
200	0.42	1.00	1.4	2.0	2.5	2.8	3.2	4.0	5.0	6.3
250	0.56	1.25	1.8	2.5	3.2	3.6	4.0	5.0	6.3	8.0
320	0.75	1.60	2.2	3.2	4.0	4.5	5.0	6.3	8.0	10.0
400	1.00	2.00	2.8	4.0	5.0	5.6	6.3	8.0	10.0	12.5
500	1.30	2.50	3.6	5.0	6.3	7.1	8.0	10.0	12.5	16.0
630	1.8	3.2	4.5	6.3	8.0	9	10.0	12.5	16	20
800	2.4	4.0	5.6	8.0	10.0	11	12.5	16.0	20	25
1000	3.2	5.0	7.1	10.0	12.5	14	16.0	20.0	25	32

Table 4

Standards

CURRENT CARRYING CAPACITY

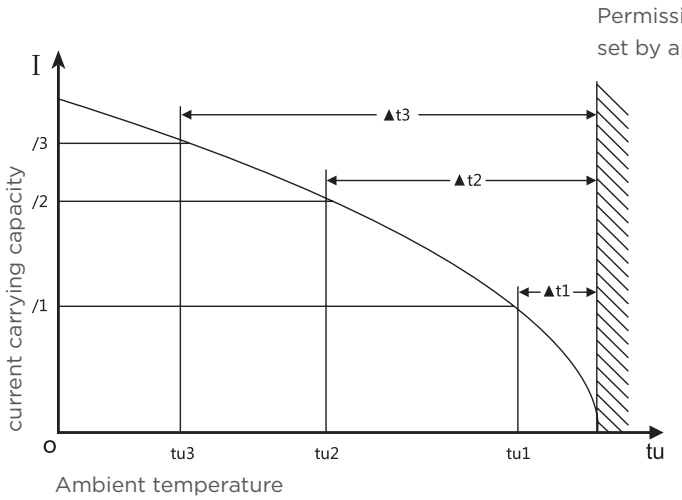
The current carrying capacity is determined in tests which are conducted on the basis of the DIN IEC 60 512 part 3. The current carrying capacity is limited by the thermal properties of materials which are used for inserts as well as by the insulating materials. These components have a maximum temperature which should not be exceeded.



Example of a current capacity curve

The relationship between the current, the temperature rise (loss at the contact resistance) and the ambient temperature of the connector is represented by a curve. On a linear coordinate system the current lies on the vertical line (ordinate) and the ambient temperature on the horizontal line (abscissa) which ends at the permissible upper-limit temperature.

In another measurement the self-heating (Δt) at different currents is determined. The corrected current carrying capacity curve is derived from this basic curve. The reasons for the correction are external factors that bring an additional limitation to the current carrying capacity, i.e. connectable wire gauge or an unequal dispersion of current. In practice it is not usual to load all terminals simultaneously with the maximum current. In such a case one contact can be loaded with a higher current as permitted by the current capacity curve, if less than 20% of the whole is loaded.



Standards

TIGHTENING TORQUE OF TERMINAL BLOCK SCREWS

IEC 60 947-1:1996/EN 60 947-1:1977 modified, table 4 specifies tightening torques for screw connections based on the type and size of the screw for electrical and mechanical type tests. Tightening contact terminal block to this torque guarantees that the connected conductors are reliably connected. The technical product data given in this catalog differ from this value. However they indicate a practical range of tightening torques which provides a gas-tightening contact and offers long-term contact stability.

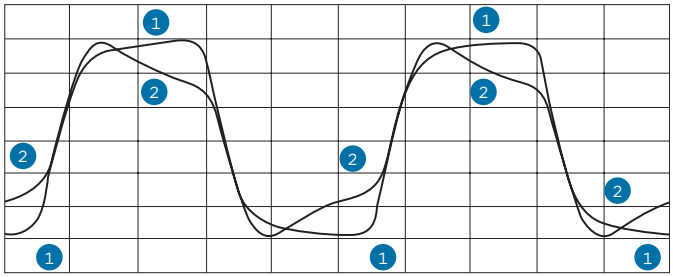
Extract from IEC 60 947-1/EN 60 947, Table 4

The torque according to IEC, EN

	Head screw with slot		
Thread Type	Recommended tightening torque		
	Torque [Nm]	CuZn or CuSN screw [Nm]	Steel screw [Nm]
M2.5	0.4	0.6	0.8
M3	0.5	0.8	1.0
M3.5	0.8	1.2	-
M4	1.2	1.8	2.0
M5	2.0	3.0	4.5
M6	2.5	4.0	8.0

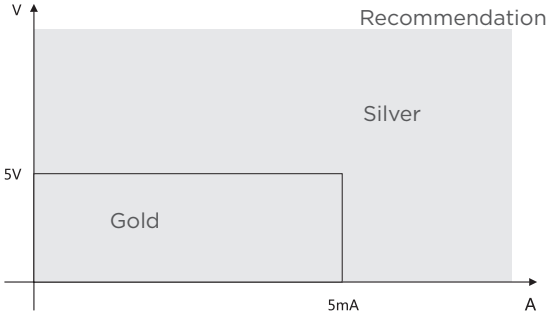
LOW CURRENTS AND VOLTAGES

Standard contacts have a silver plated surface. This precious metal has excellent conductive properties. In the course of a contact's lifetime, the silver surface generates a black oxide layer due to its affinity to sulphur. This layer is smooth and very thin and is partly interrupted. When the contacts are mated and unmated, thus guaranteeing very a low contact resistances. In the case of very low currents or voltages small changes to the transmitted signal may be encountered. This is illustrated below where an artifically aged contact representing a twenty year life is compared with a new contact.



1 New contact
2 After ageing

Changes to the transmitted signal after artifical ageing



Left is a table derived from actual experiences

Selection guide

TECHNICAL INFORMATION OF INSERTS

Insert	Type	Poles	Current	Voltage	Terminal	Contacts	Shells
HA	HA-003	3+PE	10A	250 V	screw	-	H3A
	HA-004	4+PE	10A	250V	screw	-	H3A
	HA-010	10+PE	16A	250V	screw crimp	CEM/F(16A) DEM/F(16A)	H10A
	HA-016	16+PE	16A	250V			H16A
	HA-032	32+PE	16A	250V			H32A
	HAS-003	003+PE	10A	400V	spring	-	H3A
	HAS-004	004+PE	10A	400V	spring	-	H3A
HD	HD-007	7+PE	10A	250V	crimp	CDM/F(10A) DDM/F(10A) CJM/F(10A)	H3A
	HD-008	8	10A	50V			H3A
	HD-015	15+PE	10A	250V			H10A
	HD-025	25+PE	10A	250V			H16A
	HD-040	40+PE	10A	250V			H16B
	HD-050	50+PE	10A	250V			H32A
	HD-064	64+PE	10A	250V			H24B
	HD-080	80+PE	10A	250V			H32B
	HD-128	128+PE	10A	250V			H48B
HDD	HDD-016	16+PE	10A	250V	crimp	CDM/F(10A) DDM/F(10A) CJM/F(10A)	H6B
	HDD-024	24+PE	10A	250V			H6B
	HDD-042	42+PE	10A	250V			H10B
	HDD-072	72+PE	10A	250V			H16B
	HDD-108	108+PE	10A	250V			H24B
	HDD-144	144+PE	10A	250V			H32B
	HDD-216	216+PE	10A	250V			H48B
HE	HE-006	6+PE	16A	500V	screw crimp spring double spring	CEM/F(16A) DEM/F(16A)	H6B
	HE-010	10+PE	16A	500V			H10B
	HE-016	16+PE	16A	500V			H16B
	HE-024	24+PE	16A	500V			H24B
	HE-032	32+PE	16A	500V			H32B
	HE-048	48+PE	16A	500V			H48B
HEE	HEE-010	10+PE	16A	500V	crimp	CEM/F(16A) DEM/F(16A)	H6B
	HEE-018	18+PE	16A	500V			H10B
	HEE-032	32+PE	16A	500V			H16B
	HEE-046	46+PE	16A	500V			H24B
	HEE-064	64+PE	16A	500V			H32B
	HEE-092	92+PE	16A	500V			H48B
	HEE-015	14+PE	16A	200V		CSF(16A)	-

Selection guide

TECHNICAL INFORMATION OF INSERTS

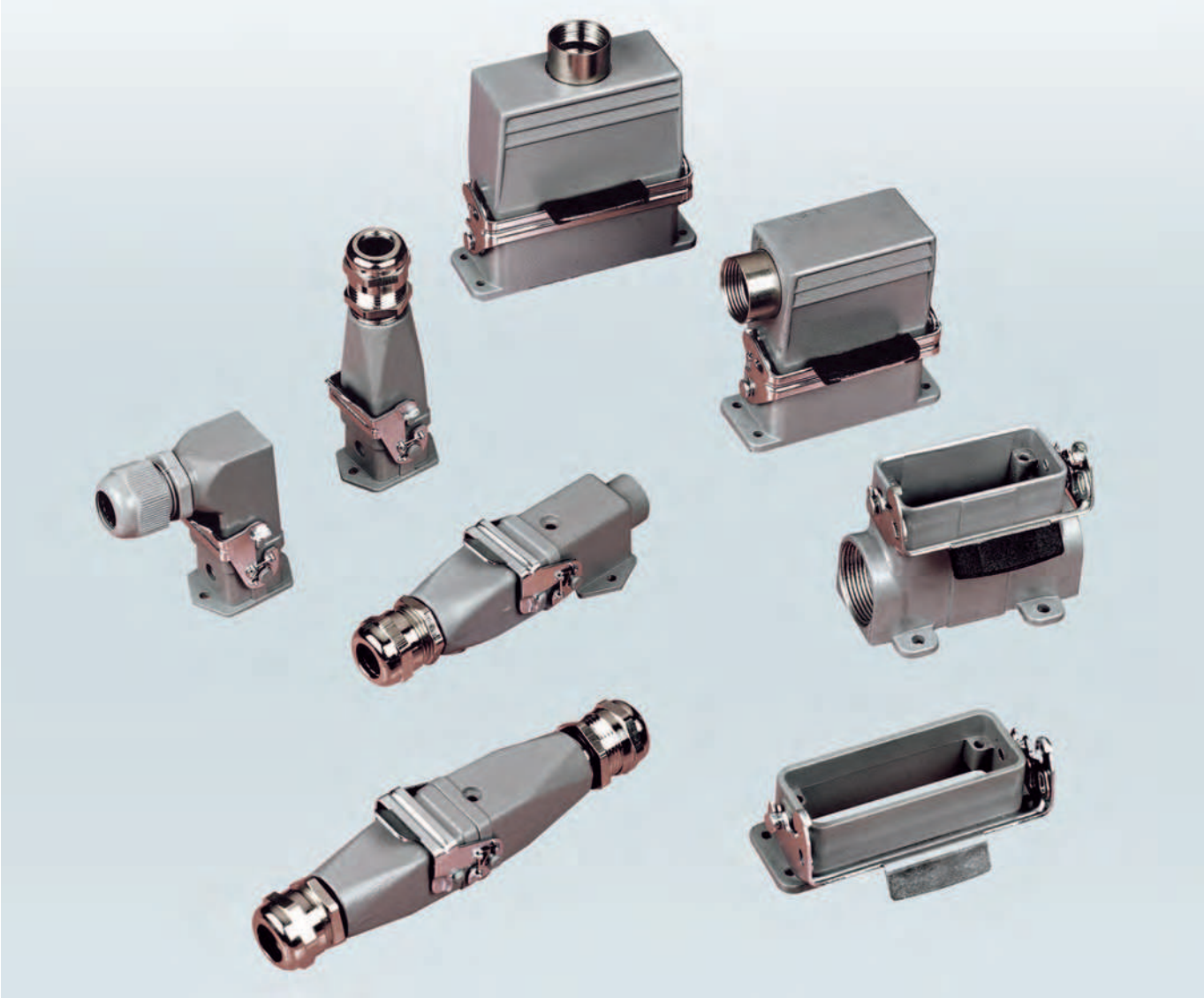
Insert	Type	Poles	Current	Voltage	Terminal	Contacts	Shells
HEEE	HEEE-020	20+PE	16A	400V	crimp	CEM/F(16A) DEM/F(16A)	H6B
	HEEE-032	32+PE	16A	400V			H10B
	HEEE-040	40+PE	16A	500V			H16B
	HEEE-048	48+PE	16A	400V			H16B
	HEEE-064	64+PE	16A	500V			H24B
	HEEE-072	72+PE	16A	400V			H24B
	HEEE-080	80+PE	16A	500V			H32B
	HEEE-096	96+PE	16A	400V			H32B
	HEEE-128	128+PE	16A	500V			H48B
	HEEE-144	144+PE	16A	400V			H48B
HVE	HVE-003	3+PE+2	16A	830V	screw crimp spring	CEM/F(16A) DEM/F(16A)	H10B
	HVE-006	6+PE+2	16A	830V			H16B
	HVE-010	10+PE+2	16A	830V			H24B
HSB	HSB-006	6+PE	35A	400/690V	screw	-	H16B
	HSB-012	12+PE	35A	400/690V	screw	-	H32B
HQ	HQ-005	5+PE	16A	400V	crimp	CEM/F(16A) DEM/F(16A)	H3A
	HQ-007	7+PE	10A	400V		CDM/F(10A) DDM/F(10A)	H3A
	HQ-008	8+PE	16A	500V		CEM/F(16A) DEM/F(16A)	H8A
	HQ-012	12+PE	10A	400V		CDM/F(10A) DDM/F(10A)	H3A
	HQ-017	17+PE	10A	250V			H8A
	HQ4/2	4+PE+2	40A+10A	600V+250V		CDM/F(10A) DDM/F(10A) CMM/F(40A) DMM/F(40A)	H8A
HEAV	HEAV-006	6+PE	16A	500V	screw spring	-	H6B
	HEAV-010	10+PE	16A	500V		-	H10B
	HEAV-016	16+PE	16A	500V		-	H16B
	HEAV-024	24+PE	16A	500V		-	H24B
HMN	HMN-001	1	200A	1000V	crimp	CHM/F(200A)	-
	HMN-D2	2	100A	1000V	crimp	CNM/F(100A)	-
	HMN-002	2	70A	1000V	crimp	CSM/F(70A)	-
	HMN-003	3	40A	690V	crimp	CMM/F(40A) DMM/F(40A)	-
	HMN-004	4	40A	830V	crimp	CMM/F(40A) DMM/F(40A)	-
	HMN-004SC	4	-	-	-	-	-
	HMN-005	5	16A	400V	spring	-	-
	HMN-006	6	16A	500V	crimp	CEM/F(16A) DEM/F(16A)	-
	HMN-006P	6	16A	830V	crimp		-

Selection guide

TECHNICAL INFORMATION OF INSERTS

Insert	Type	Poles	Current	Voltage	Terminal	Contacts	Shells
HMN	HMN-008	8	16A	400V	crimp	CEM/F(16A) DEM/F(16A)	-
	HMN-012	12	10A	250V	crimp	CDM/F(10A) DDM/F(10A)	-
	HMN-017	17	10A	160V	crimp	CDM/F(10A) DDM/F(10A)	-
	HMN-020	20	16A	500V	crimp	CEM/F(16A) DEM/F(16A)	-
	HMN-025	25	5A	50V	crimp	CAM/F(5A) DAM/F(5A)	-
	HMN-009	9	5A	50V	crimp	CAM/F(5A) DAM/F(5A)	-
	HMN-RJ45	8	1A	50V	crimp	-	-
	HMN-Q1	1+1	16A	50V	crimp	CEM/F(16A) DEM/F(16A)	-
	HMN-Q2	4+4	10A	50V	crimp	CDM/F(10A) DDM/F(10A)	-
	HMN-Q3	8+8	5A	50V	crimp	CAM/F(5A) DAM/F(5A)	-
	PIN-Q1	1	16A	50V	crimp	CEM/F(16A) DEM/F(16A)	-
	PIN-Q2	4	10A	50V	crimp	CDM/F(10A) DDM/F(10A	-
	PIN-Q3	8	5A	50V	crimp	CAM/F(5A) DAM/F(5A)	-
	HMN-DM	-	-	-	-	-	-
HK/ HWK	HK4/0	4+PE	80A	690V	screw	-	H16B
	HK4/2	4+PE+2	80A+16A	690V+400V	screw	-	H16B
	HK6/12	6+PE+12	40A+10A	690V+230/400V	screw	-	H16B
	HK12/2	12+PE+2	40A+10A	690V+250V	crimp	CMM/F(40A) DMM/F(40A) CDM/F(10A) DDM/F(10A)	H16B
	HK6/36	6+PE+36	40A+10A	690V+160V	crimp	CMM/F(40A) DMM/F(40A) CDM/F(10A) DDM/F(10A)	H16B
	HK4/8	4+PE+8	80A+16A	400V	screw	-	H24B
	HK8/24	8+PE+24	16A+10A	230/400V+160V	crimp	CEM/F(16A) DEM/F(16A) CDM/F(10A) DDM/F(10A)	H10B
	HWK6/6	6+PE+6	40A+16A	690V+400V	screw	-	H16B
	HWK3/3/6	3+PE+3+6	100A+40A+16A	400/690V+400/ 690V+250/400V	screw	-	H24B

HA Series



1. Specifications
DIN VDE 0110 Concerning clearance and creepage distances
DIN VDE 0627 Connectors and plug devices

2. Standards
DIN EN 60664-1
DIN EN 61 984

3. Approvals