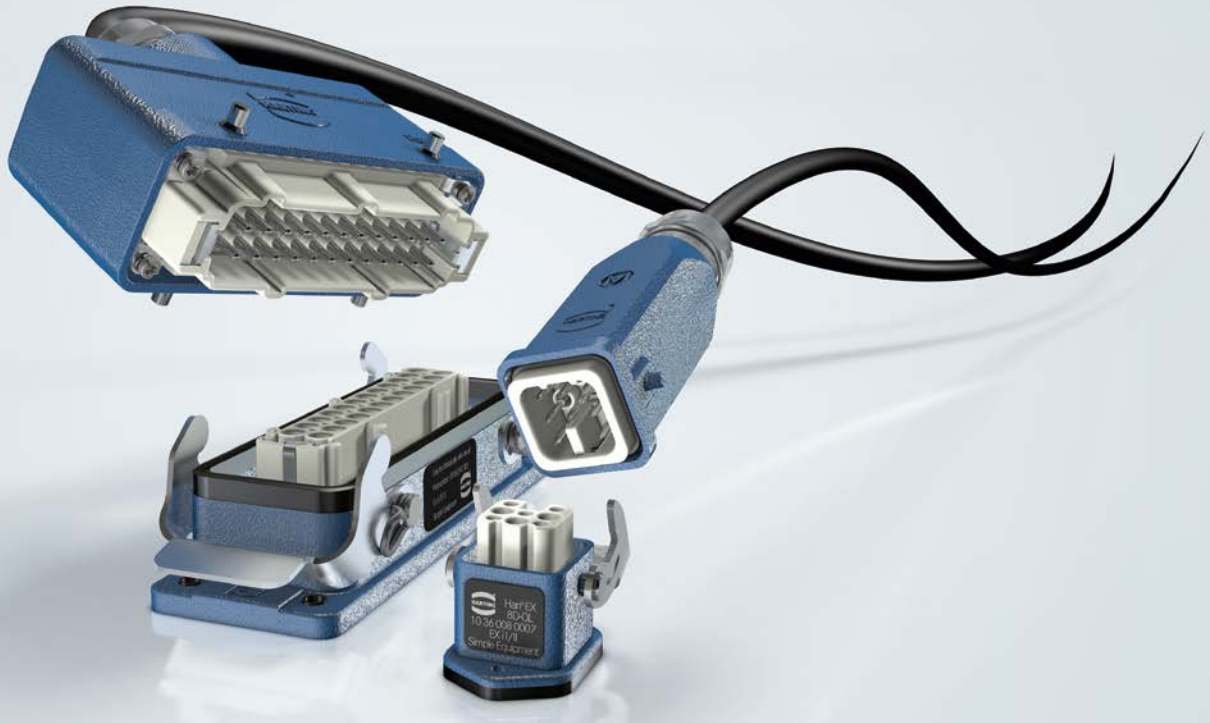
Pushing Performance



People | Power | Partnership

HARTING Han-Ex®

Connectors for explosion-hazardous environments

Content & General information

Content

Field of application
HARTING Industrial Connectors are applicable in a wide variety of electronic and electrical applications. The degree of protection of all hoods and housings is in accordance with international standard IEC 60 529 / EN 60 529.

- Power Utilities
- Industrial Instrumentation
- Robotics
- Conveyor Equipment
- Chemical Plants
- Transportation
- Machine Tool Controls
- Injection Moulding

...and many more.

Certified according to EN ISO 9001 in design/development, production, installation and servicing

Specifications:
VDE 0110
Table concerning clearance and creepage distances
VDE 0627
Connectors and plug devices
Standards:
DIN EN 175301-801, DIN EN 61 984

Note:
Connectors should not be coupled and decoupled under electrical load. Connectors of the same or different series being mounted side by side may be protected against incorrect mating by the use of coding options.

General information:
It is the user's responsibility to check whether the components illustrated in this catalogue comply with different regulations from those stated in special fields of application which we are unable to foresee. We reserve the right to modify designs in order to improve quality, keep pace with technological advancement or meet particular requirements in production.

Imprint

Author: HARTING

Basics of explosion protection

Causes of explosions

To set up an exothermic reaction like an explosion the following three components have to interact:

- Fuel: flammable vapors, liquids or gases or flammable dusts and fibres
- Oxidizer: generally air or oxygen
- Ignition energy: electrical or thermal

Each corner of the so-called ignition triangle (refer to drawing) represents an indipensable component of such an explosion. Once an exothermic reaction is ignited, the results depending on the energy released can be controllend combustion, flame waves, or explosion.

Today, all protection methods are based on the elimination of one or more factors within the triangle – in order to minimise the potential impacts of the explosion.

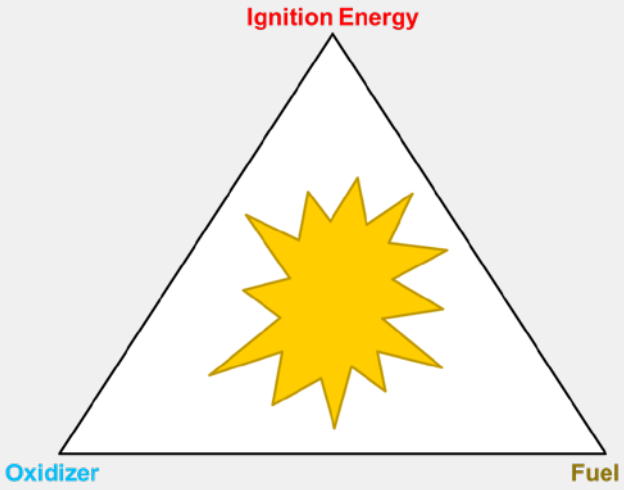


Table 1: Effective ignition sources

Source	Possible Causes
Sparks	Mechanically generated sparks (e.g. by friction, impact or removal processes), electrical sparks
Electric arc	Short-circuit, switching operations
Hot surfaces	Radiators, machining, heating in operation
Open flame, welding arc	Combustion reactions, flying sparks during welding work
Electric arc	Opening/closing of contacts, loose contacts, safety extra-low voltages (U<50V) are not considered as explosion protection measures. Even at low voltages, sufficient energy can still be generated to ignite an explosive atmosphere.
Static electricity	Discharge of charged, insulated conductive parts like e.g. many plastics
Electrical compensation currents, cathodic corrosion protection	Return currents from generators, ground/earth fault in the event of faults, induction
Electromagnetic waves in the range 3 x 1011 ... 3 x 1015 Hz	Laser beam for distance measurement, especially during focusing
High frequency 104 ... 3 x 1012 Hz	Radio signals, industrial high frequency generators for heating, drying or cutting
Lightning strike	Atmospheric weather disturbances
Ionising radiation	X-ray apparatus, radioactive material, absorption of energy leads to heating
Ultra sound	Absorption of energy in solids/liquids leads to heating
Adiabatic compression and shock waves	Sudden opening of valves
Exothermic reactions	Chemical reaction leading to heating

Overview on international standards

Table 2: International standards for electrical equipment in explosive gas atmospheres

Ignition protection category	US standard		Principle	European standard (EN)	IEC Norm	FM (USA)	UL (USA, Div.)	UL (USA, Zone)	CSA (Canada)
General provisions			*Ignition protection type*	*EN 60079-0*	*IEC 60079-0*	*FM 3600 (ISA 12.00.01)*			*CSA E60079-0*
Intrinsic safety	Ex i AEx i (IS)	NEC505	Energy limitation	EN 60079-11	IEC 60079-11	FM 3610	UL 913	UL 60079-11	CSA E60079-11
Increased safety	Ex e AEx e	NEC505	Constructional measures (no arcs, sparks or hot surfaces)	EN 60079-7	IEC 60079-7	FM 3600 (ISA 12.16.01)	UL2279 Pt.7	UL 60079-7	CSA E60079-7
Protection by enclosure	tD	NEC505	Exclusion of explosive atmosphere			FM 3615 C22.2 No. 30	e.g.hood/ housing: UL 1203		
Flameproof enclosure	Ex d AEx d	NEC505	Constructional measures (enclosing flammable parts of equipment)	EN 60079-1	IEC 60079-1	FM 3600 (ISA 12.22.01)	UL2279 Pt.1	UL 60079-1	CSA E60079-1
Cast enclosure	Ex m AEx m	NEC505	Exclusion of potentially explosive atmosphere	EN 60 079-18	IEC 60079-18	FM 3600 (ISA 12.23.01)	UL2279 Pt.18	UL 60079-18	CSA E60079-18
Oil immersion	Ex o AEx o	NEC505	Exclusion of potentially explosive atmosphere	EN 60079-6	IEC 60079-6	FM 3600 (ISA 12.16.01)	UL2279 Pt.6	UL 60079-6	CSA E60079-6
Powder filling	Ex q AEx q	NEC505	Exclusion of potentially explosive atmosphere	EN 60079-5	IEC 60079-5	FM 3622 FM 3600 (ISA 12.25.01)	UL2279 Pt.5	UL 60079-5	CSA E60079-5
Pressurised	Ex p AExp Typ X, Y, Z	NEC505 NEC500	Exclusion of potentially explosive atmosphere	EN 60079-2	IEC 60079-2				
Ignition protection type “n”	Ex n AEx n	NEC505	Improved industrial quality	EN 60079-15	IEC 60079-15	FM 3600 (ISA 12.12.02)	UL2279 Pt.15	UL 60079-15	CSA E60079-15
Intrinsically safe electrical systems „i-Sys“	Ex i		Restriction of electrical energy within equipment and of wiring exposed to explosive atmosphere	EN 60079-25	IEC 60079-25				
Intrinsically safe Fieldbus systems	Ex i		Energy limitation	EN 60079-27	IEC 60079-27				
Optical radiation	Ex op		Limitation or containment of radiation intensity	EN 60079-28	IEC 60079-28				

Zone classification in Europe

Table 3: Assignment of equipment group and category

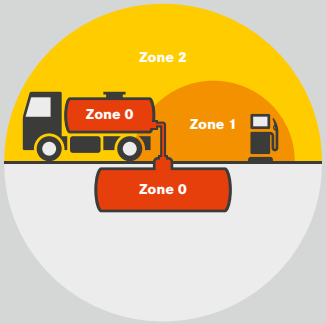
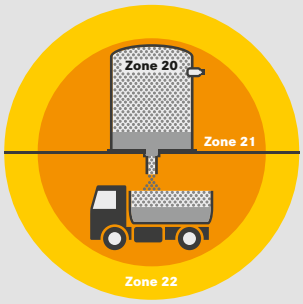
Equipment group	Category	Degree of protection	Protection guarantee	Operating conditions
I	M1	Very high safety degree	If one installation protection measure fails, a second protection measure must guarantee the necessary safety. Even if two independent errors occur, a very high safety level remains guaranteed.	For reasons of safety, it must be possible to continue operating a product even if the atmosphere is potentially explosive.
I	M2	High safety degree	Equipment will switch off, if a potentially explosive atmosphere occurs.	In normal operation, the protective measures must still guarantee the required safety even in difficult conditions, or if equipment is treated roughly or ambient influences have changed.
II	1	Very high	Two independent protective measures guarantee safety, if two faults occur independently of one another.	Equipment can still be used in zones 0, 1, 2(G) and 20, 21, 22 (D) and continue to be operated.
II	2	High	Safety is guaranteed under normal operating conditions, even if common faults occur.	Equipment can be used in zones 1, 2(G) and 21, 22 (D) and continues to be operational.
II	3	Normal	Safety is guaranteed under normal operating conditions.	Equipment can still be used in zones 2(G) and 22 (D) and continues to be operational.

Equipment group and categories
Equipment group I: Equipment intended for use in underground parts and surface installations of mines which is exposed to explosion risks from mine gases and/or combustible dusts. The assigned categories M1 and M2 are defined in the directive 94/9/EC.
Equipment group II: Equipment for use in all the other areas that might be endangered by an explosive atmosphere. Three subcategories – 1, 2 and 3 – are defined within this group.

Zone classification
Hazardous areas are classified into zones to facilitate the selection of appropriate electrical equipment as well as the design of suitable electrical installations – in order to minimise explosion risks. In Germany, dusts were previously divided into Zones 10 and 11. Following an EC directive, the dual classification system was transferred to a three-zone-scheme, differentiating on the basis of more detailed criteria. As an example, the allocation to a particular zone is now depending on the conductivity of the relevant dust. Conductive dust (with specific electrical resistance $R > 103\ \Omega m$) in Zone 22 is allocated to equipment category 2D. In such environments, only apparatus certified for the relevant category (2D) must be used. Devices for non-conductive dusts ($R > 103\ \Omega m$) are allocated to category 3D. For these devices, a Manufacturer's Declaration of Conformity is sufficient.
In both zones, 0 and 1, only electrical equipment with a Certificate of Conformity complies with the standard –or an EC-Type Examination Certificate must be present. In addition, equipment for Zone 0 must be explicitely approved for this kind of application. In Zone 2, electrical apparatuses that may concern the basic health and safety requirements of the 94/9/EC Directive are only permitted if the manufacturer declares their compliance with the requirements of the ATEX Directive. Obviously, the equipment certified for use in Zones 0 and 1 can also be used in Zone 2.

Table 4 (refer to provides an overview on the zones of explosive gas atmospheres and the allocation of equipment for the relevant zones. The correlation between category and zones (according to the operator directive 1999/92/EC) is also shown.

Table 4: Definitions of Zones (acc. to EN 60079-10-1)

Substance	Zone	Equipment	Illustration
Gases Vapors	Zone 0 Areas where dangerous concentrations of flammable gases/vapors are continuously or long-term present	1G	
	Zone 1 Areas where dangerous concentrations of flammable gases/vapors are occasionally present	2G, 1G	
	Zone 2 Areas where dangerous concentrations of flammable gases/vapors are rarely and – in case only - briefly present	3G, 2G, 1G	
Dust	Zone 20 Areas where dangerous concentrations of flammable dusts occur continuously or for a long term	1D	
	Zone 21 Areas where dangerous concentrations of flammable dusts ocasionally occur	2D, 1D	
	Zone 22 Areas where dangerous concentrations of flammable dusts rarely occur and, in case, only briefly	3D, 2D, 1D	

Type of protection

The type of protection describes various safety concepts for different applications to prevent the ignition of a potential explosive atmosphere according to European IEC EN 60079 standards. The standards of this series can be applied to equipment individually or in combination.

The above spreadsheet shows the allocation of protection types to zones. Protection methods are adapted to the normative standards concerning surface temperature, clearance and creepage distances, to the identification of electrical operating equipment, the assignment of the electrical operating equipment, to the area of application and the degree of protection. For all areas with requirements going beyond basics, the respective protection methods are defined.

The IEC EN 60079-0 describes general requirements for the design of electrical equipment used in explosive atmospheres. These requirements are supplemented by individual standards concerning the types of protection such as IEC EN 60079-6 ff.

Temperature classes

With regard to ignition protection, the surface temperature-classes of the equipment groups I and II are different (refer to Figure 1: Temperature classes [°C] of equipment group II).

Temperature limits with dust

In the case of potential dust-explosive areas, the maximum surface temperature is given as a temperature value [°C]. There is no classification into groups. Generally, the permissible temperatures for each type of dust have to be determined by experiments. The maximum surface temperature is different for a dust cloud and a dust layer.

With regard to a dust cloud a safety factor has to be considered. The surface temperature of the apparatus must not exceed 2/3 of the minimum ignition temperature of the dust cloud. Deposited dust ignites earlier than a dust cloud. To provide this, a safety factor of 75 K has to be taken in account. This factor refers to the minimal ignition temperature of a 5 mm dust layer.

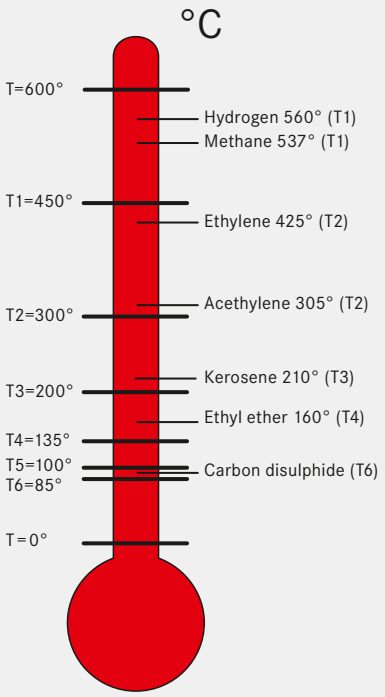


Figure 1: Temperature classes [°C] of equipment group II, according to European standards and ignition temperatures of relevant substances.

Gas explosion groups – European standards

Previously, all chemical gases or vapours used by the industry were classified by assignating them to two different explosion groups (I, II). Meanwhile, the former second explosion group was split in two, thus generating a third group that contains conductive and non-conductive dusts as well as flammable fibres/ lint. From the explosion group, the maximum surface temperature can be derived for electrical equipment that is used in the relevant area or atmossphere.
Group I comprises gases creating potentially explosive atmospheres in mines (firedamp).
In Group II, different gases, vapors and mists are considered that may create an explosive atmosphere.
Group II is again devided into three subgroups (EN 60079-0:2009).
The classification of the subgroups depends on the substance's minimal ignition energy.

Table 5: Gas explosion group I

Explosion subgroup	Gases	Ignition energy
I	Firedamp (methane from coal mines)	Maximum permissible temperature depends on deposits of carbon dust in the area

Table 6: Gas explosion group II

Explosion subgroup	Gases	Ignition energy
IIA	Propane, acetylene	≈ 300µWs
IIB	Ethylene, ethanol	≈ 150µWs
IIC	Hydrogen, carbon disulphide	≤ 50µWs

Table 7: Gas explosion group III

Explosion subgroup	Gases
IIIA	Combustible substances (fibres)
IIIB	Not conductible flammable dust, specific electric resistance > $10^3\Omega$
IIIC	Conductible flammable dust, specific electric resistance ≤ $10^3\Omega$

Hazardous area classification – North America

Definition of hazardous area
Explosion-hazardous areas are most frequently found in places where emissions of flammable gas or dust occur. In such areas, gases, vapours, mists and dusts can form explosive atmospheres in combination with air while an equipment is under normal operation or responding to an event of fault, e.g., due to wear and tear of seals or other components. Hazardous atmospheres containing inflammable gases or dusts are designated as risks to machinery and operators.

Differences to European standards
Concerning standards, we have differences between the European IEC system and the North American electrical codes (CEC, NEC). Inter alia, differences derive from the categorisation of hazardous areas, the design-in of equipment, and different installation standards.
The categorisation of hazardous areas in North America is derived from the National Electrical Code's (NEC/NFPA) definition of material groups in article 500. There, explosion relevant materials are divided into the following groups:
Class I – Locations containing flammable gases, flammable liquid-produced vapors, or combustible liquid produced vapors
Class II – Locations containing combustible dusts
Class III – Locations containing fibres and flyings

According to the NEC, the differentiation into two divisions – refer to table 8 below – gives the oportunity to determine the probability that a material is reacting with other materials in the atmosphere.
The North Amercian standards further categorize hazardous areas into groups depending on the properties of the combustible gases or vapors involved (refer to table 9).

Table 8: Division of materials according to US National Electric Code (NEC)

	Class I **Gases and vapors** **NEC 500.5**	**Class II** **Flammable dust and powder** **NEC 500.6**	**Class III** **Flammable fibres or suspended particles** **NEC 500.7**
Division 1	Areas containing dangerous concentrations of flammable gases, vapors or mist – continuously or occasionally under normal operating conditions	Areas containing dangerous concentrations of flammable dusts – continuously or occasionally under normal operating conditions	Areas containing dangerous concentrations of flammable fibres or suspended particles – continuously or occasionally under normal operating conditions
Division 2	Areas probably not containing dangerous concentrations of flammable gases, vapors or mist – under normal operating conditions	Areas probably not containing dangerous concentrations of flammable dusts – under normal operating conditions	Areas probably not containing dangerous concentrations of flammable fibres or suspended particles – under normal operating conditions

Hazardous area classification – North America

Table 9: Subgroups of hazardous area classification

Class I	Group A	Atmospheres containing acetylene
	Group B	Atmospheres containing hydrogen and flammable process gases with more than 30% of hydrogen in volume, or gases and vapors posing a level of risk comparable to butadiene and ethylene oxide
	Group C	Atmospheres containing ether, ethylene or gases and vapors posing the same level of risk
	Group D	Atmospheres containing acetone, ammonia, benzene, butane, cyclopropane, ethanol, gasoline, hexane methanol, methane, natural gas, naphtha, propane or gases and vapors posing the same level of risk
Class II	Group E	Atmospheres containing combustible metal dusts, including aluminum, magnesium and their commercial alloys, or other combustible dusts which – due to particle size, abrasiveness and conductivity – present a similar threat to the use of electrical equipment
	Group F	Atmospheres containing combustible carbonaceous dusts including carbon black, charcoal, coal, or coke dusts and consisting by more than 8 percent of total entrapped volatiles, or dusts that have been sensitized by other materials, thus causing an explosion hazard
	Group G	Atmospheres containing combustible dusts not included in group E or group F, including fluorine, grain, wood, plastic and other chemicals
Class III		Atmospheres containg easily ignitable fibres and flyings, which will normally not be in supensions in the air leding to quantities sufficient to produce explosive or ignitable mixtures

The illustration below (Figures 2) shows the different categorizations of classes and divisions of NEC 500 using the example of a gas station.

Since 1996, an additional section has been added to the NEC 500 standard. The new section NEC 505 is based on the IEC model, deviding the inflammable category with regard to gases and dusts into three zones (0, 1 and 2, refer to Figure 3, next page).

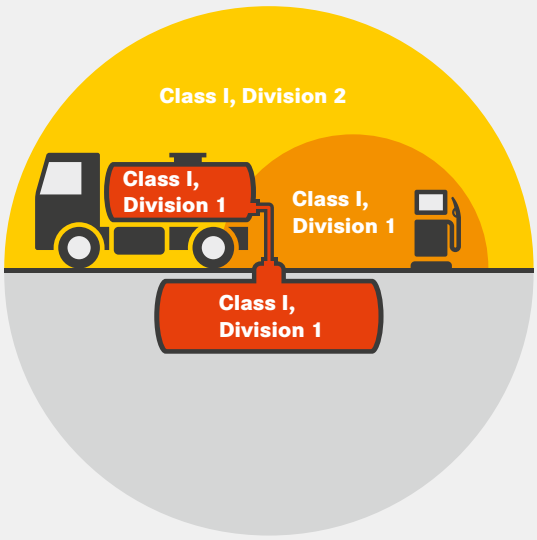
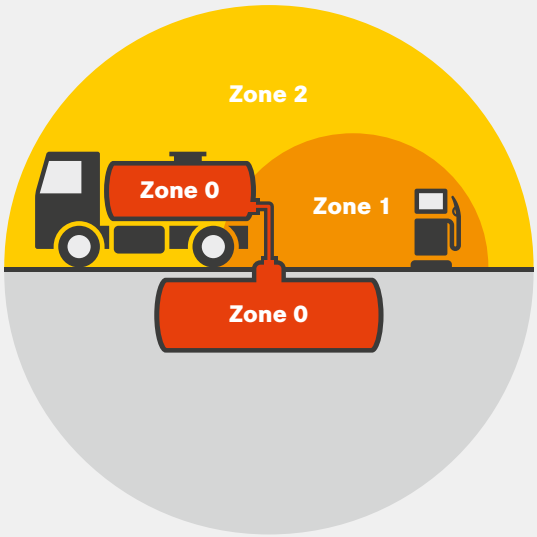


Figure 2: Classes and divisions using the example of a gas station acc. to NEC 505

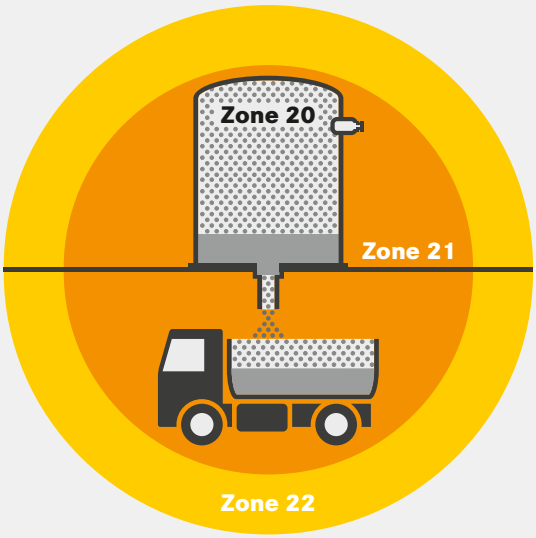
Hazardous area classification – Europe

The European standard IEC/EN describes the probability of inflammable gases and dusts in three different zones. Figure 3 describes the different gas zones by the example of a gas station.

Figure 4, refer to illustration below, explains the dust zone classification on the example of a bulk container.



Zoneneinteilung des explosionsgefährdeten Bereichs bei Gasen, laut IEC/EN 60 079



Zoneneinteilung des explosionsgefährdeten Bereichs bei brennbaren Stäuben, laut IEC/EN 60 079

Table 10: Hazardous area zones for mixtures of air with flammable substances (acc. to IEC/EN 60 079)

Zone 0	Areas, where explosive atmospheres consisting of mixtures of air with flammable substances in the form of gas, vapor or mist are present continuously, for long periods of time or frequently
Zone 1	Areas, where explosive atmospheres consisting of mixtures of air with flammable substances in the form of gas, vapor or mist under normal operation conditions are likely to occur occasionally
Zone 2	Areas, where explosive atmospheres consisting of mixtures of air with flammable substances in the form of gas, vapor or mist under normal operation conditions are not likely to occur occasionally

Table 11: Hazardous area zones for combustible dusts (acc. to IEC/EN 60 079)

Zone 20	Areas, where ignitable atmospheres in the form of clouds of combustible dusts in the air are present continuously, for long periods of time or frequently
Zone 21	Areas, where ignitable atmospheres in the form of clouds of combustible dust in the air under normal operational conditions are likely to occur occasionally
Zone 22	Areas, where ignitable atmospheres in the form of clouds of combustible dust in air are ot likely to occur under normal operation conditions. If they occur anyway, they will persist for a short period of time only

Maximum surface temperatures for equipment

The European standard IEC/EN 60079-0 offers a classification for equipment used in explosion hazard areas to three different groups (refer to table 12).

Categorization of surface temperatures for equipment
Regarding the surface temperature of equipment, the European standard offers six different classes. The categories are defined by the maximum surface temperature for the equipment to remain functional. Figure 5 forms the categories by temperature. The temperature classes are defined in relation to a standard environment of 40°C. If an equipment needs a different ambient temperature to be functional, this must be visibly documented on the equipment.

Table 12: Equipment classification to zones acc. to IEC/EN 60 079-0

Group I	Equipment used in mining where methan and coal dusts occur in the atmosphere
Group II	Equipment used in industrial environment where explosive gases occur in the atmosphere
Group III	Equipment used in industrial environment where explosive dusts occur in the atmosphere

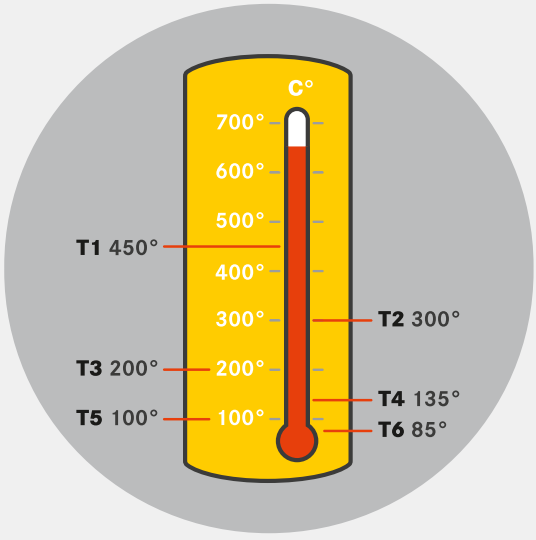


Figure 5: European classification of maximum surface temperatures for equipment in explosion hazard zones

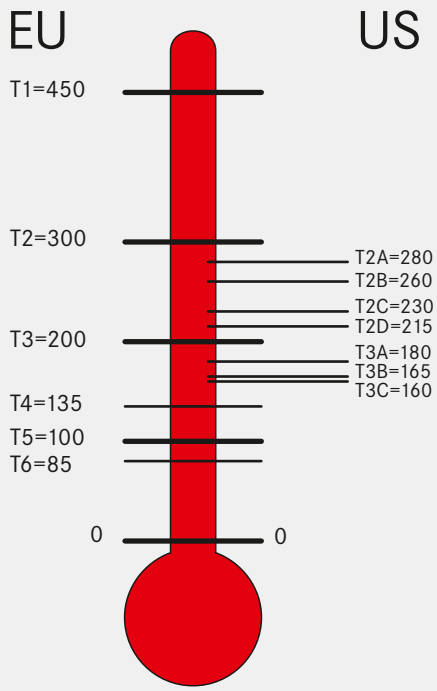


Figure 6: Equipment groups and maximum surface temperatures acc. to European and North American standards

Ignition protection types

Depending on equipment and environment the standards offer different protection principles. Table 13 shows a selection of protection types and principles from an overall of 13 protection methods, defined by the relevant IEC/EN standards.
Each type of protection implies various safety concepts for different applications to prevent from the ignition of a potential explosive atmosphere. The different categories can be applied individually or in combination. The basical standard is IEC/EN 60079-0 ff.

Table 13: Ignition protection types in potentially explosive gas atmospheres

Protection types	Basic of protection	CENELEC	IEC	UL	Zone, Class	Protection principle
Ex d 	Flameproof	EN 60079 -1	IEC 60079 -1	UL 60079-1	Class 1, Zone 2	Explosion prevention
Ex e 	Increased safe	EN 60079 -7	IEC 60079-7	UL 60079-7	Class 1, Zone 2	Prevention of sparks
Ex m 	Encapsulation	EN 60079-18	IEC 60079-18	UL 60079-18	Class 1, Zones 0 and 1	Exclusion of explosion atmosphere
Ex q 	Powder filling	EN 60079-5	IEC 60079-5	UL 60079-5	Class 1, Zones	Prevention of sparks
Ex tD 	Protection by enclosure	EN 60079-31	IEC 60079-31	ISA 61241-1	Class 2, Zones 21 and 22	Exclusion of explosion atmosphere
Ex p 	Pressurized	EN 60079-2	IEC 60079-2	UL 60079-2	Class 1, Zone 1	Exclusion of explosion atmosphere
Ex o 	Oil immersion	EN 60079-6	IEC 60079-6	UL 60079-6	Class 1, Zone 1	Exclusion of explosion atmosphere
Ex i 	Intrinsic safe	EN 60079-11	IEC 60079-11	UL 60079-11	Class 1, Zones 0 and 1	Energy limitation

Connecting Ex and Non-Ex areas

Han® Ex connectors are designed to meet the intrinsic safety requirements for ignition protection in explosion-hazard areas zoned 1 and 2. In intrinsically safe circuits, a limit is set to energy so that even a spark would not ignite an explosive environment. With the Han® Ex series, HARTING offers a comprehensive and well-matched connection systems consisting of hoods/housings, inserts and cable glands. Hoods and housings are made from an alloy that can safely be used in a methane-coal atmosphere. In addition, hoods and housings offer protection IP65 (in mated position). Furthermore, the hood's/housing's blue colour indicates that an intrinsically safe circuit is present. The inserts compatible with Han® Ex allow for high-density contact arrangements, meeting the standards of the category *intrinsically safe* even in the tightest of spaces. Han® Ex connectors are designed especially for the named explosion protection method. The intrinsic safety protection technique is based on the limitation of energy supply, thus ensuring a safe operation of electrical equipment in hazardous areas. The limitations may relate to current, voltage, capacitivity and/or inductivity. Finally, a Han® Ex connector is always part of a comprehensive supply system for devices in the field, including current transfers between Ex and Non-ex areas, which is explained by Figure 7.

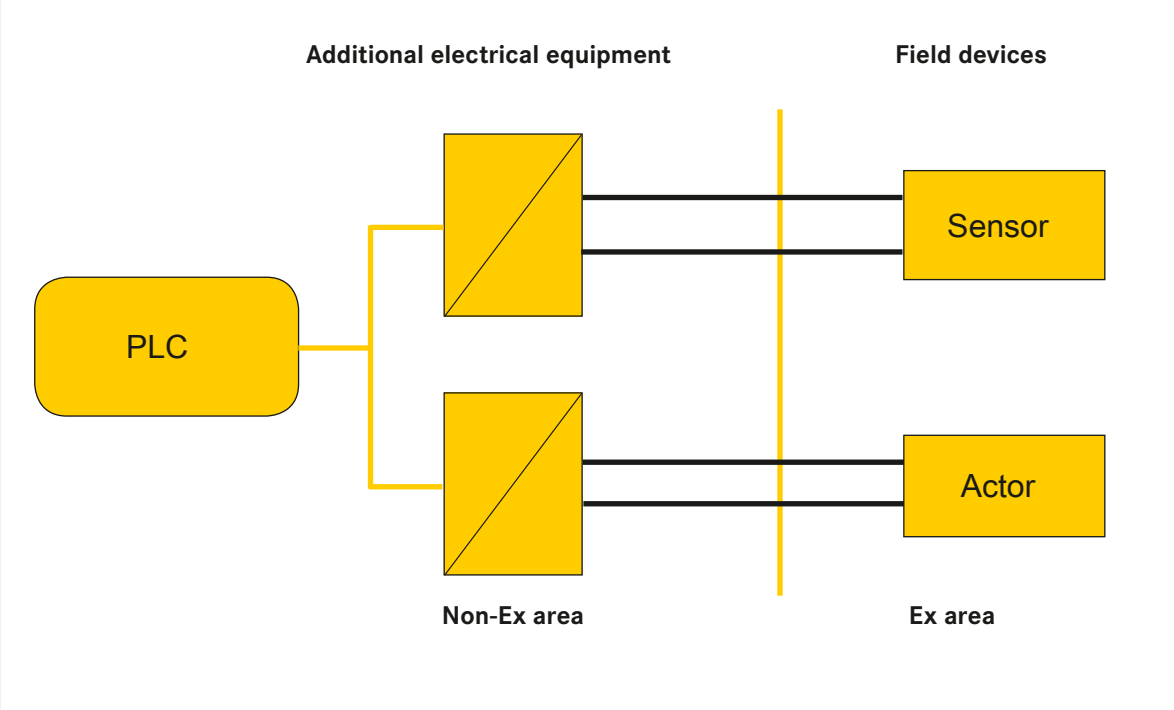


Figure 7: Han® Ex is a comprehensive connector system allowing for the safe transmission of power, signal and data between Non-Ex and Ex areas.

Han® Ex Sets – Hoods/Housings Size 3A

Connector sets for explosion-hazardous environments

Features

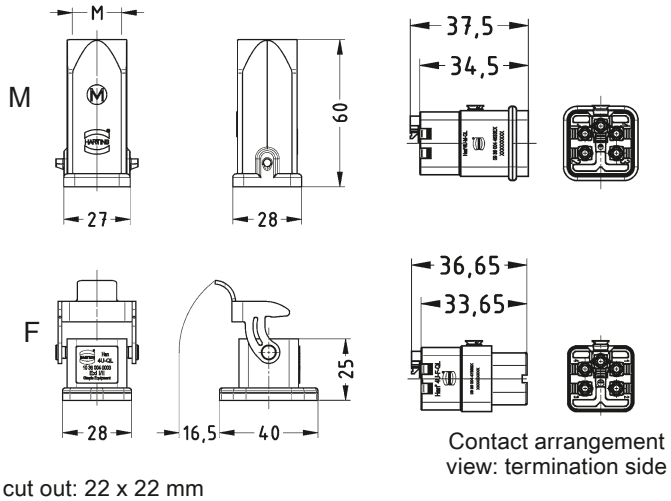
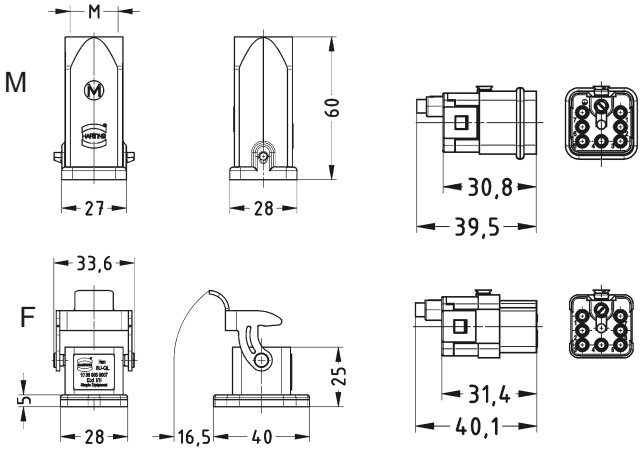
- Connector sets especially for explosion-hazardous applications
- Suitable for zone 1 and zone 2
- Hoods, housings and inserts in one set
- Inserts with compact design and a high number of connections
- Available with innovative Han-Quick Lock® termination technology

NOTICE **Industrial connectors of the Han® Ex series are designed exclusively for the use in intrinsically safe electrical circuits of categories "ia", "ib" and "ic"!**

- The explosion group is defined by the corresponding intrinsically safe equipment.
- Temperature class according to DIN EN 60079-11

Technical characteristics

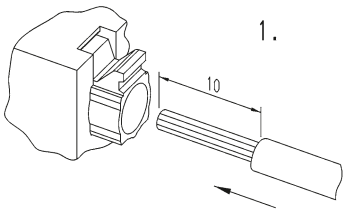
Specifications	DIN EN 60 079-0 DIN EN 60 079-11
Hoods/housings	
Material	Zinc die cast
Colour	RAL 5015 (blue)
Surface	Powder coated
Locking element	Stainless steel
Lever type	Netal lever
Seal	NBR
Limiting temperatures	-20 °C ... +40 °C
Protection degree acc. to DIN EN 60 529 in locked position	IP65 / IP67 is achieved with seal screw and cable gland
Inserts	
Number of contacts	4, 7, 8, 12
Pollution degree	3
Insulation resistance	≥ 10^{10} Ω
Material	Polycarbonat
Limiting temperatures	-20 °C ... +40 °C
Mechan. working life - mating cycles	≥ 500
Contacts	
Material	Copper alloy
Surface - hard-silver plated	3 µm Ag
Contact resistance	≤ 1 mΩ
Crimp termination	0.14 ... 2.5 mm² AWG 26 ... 14
Han-Quick Lock® termination	0.5 ... 2.5 mm² AWG 20 ... 14
Max. insulation diameter	3.6 mm

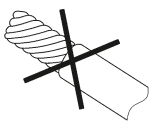
Identification	Part number	Size	Drawing	Dimensions in mm
Han® Ex 4A Quick Lock Set Han-Quick Lock®	10 36 004 0003	3 A		Contact arrangement view: termination side Panel cut out: 22 x 22 mm
Han® Ex 8D Quick Lock Set Han-Quick Lock®	10 36 008 0007	3 A		Panel cut out: 22 x 22 mm

Assembly manual

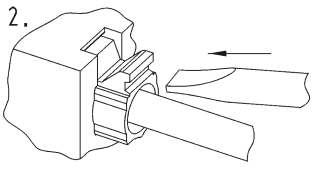
Remove cable jacket and strip the fine stranded wires.

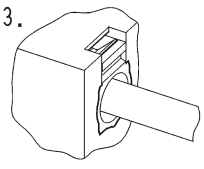
Do not twist the fine stranded wires!





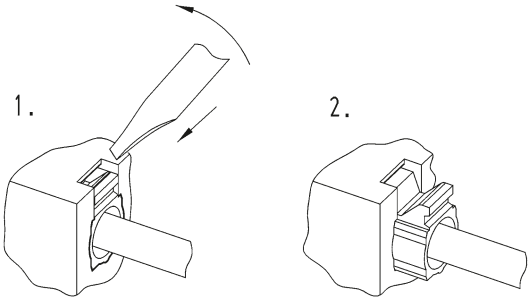
Push the fine stranded wires into the Han-Quick Lock® contact and push the blue slide with a screw driver[1] until it comes to a stop.



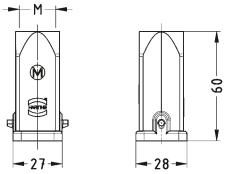
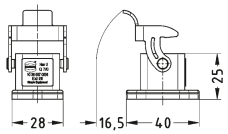
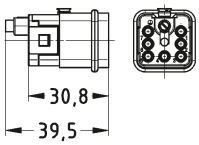
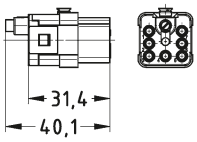
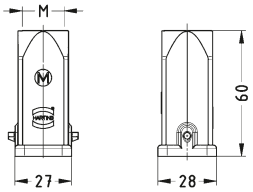
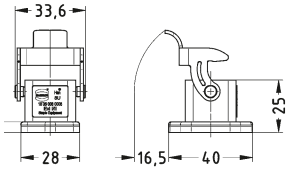
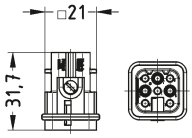
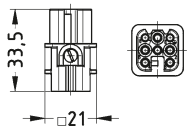
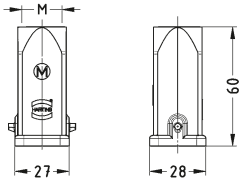
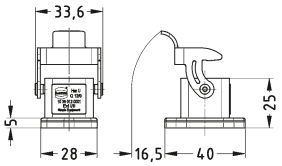
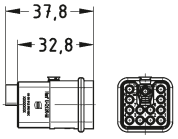
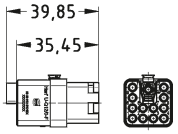


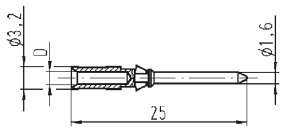
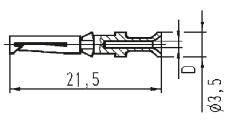
Removal manual

Insert the screw driver[1] at an angle of 45° into the opening and lever the blue slide out.



[1] Screw driver: 0.4 x 2.5 mm

Identification	Part number	Size	Drawing	Dimensions in mm
Han® Ex Q7 Set Order crimp contacts separately! 	10 36 007 0001	3 A	M  F  Panel cut out: 22 x 22 mm	  Contact arrangement view: termination side
Han® Ex 8D Set Order crimp contacts separately! 	10 36 008 0006	3 A	M  F  Panel cut out: 22 x 22 mm	 
Han® Ex Q12 Set Order crimp contacts separately! 	10 36 012 0001	3 A	M  F  Panel cut out: 22 x 22 mm	 

Identification	Wire gauge mm²	Part number Male contact	Part number Female contact	Drawing	Dimensions in mm
Crimp contact silver plated 	0.14-0.37 0.5 0.75 1.0 1.5 2.5	09 15 000 6104 09 15 000 6103 09 15 000 6105 09 15 000 6102 09 15 000 6101 09 15 000 6106	09 15 000 6204 09 15 000 6203 09 15 000 6205 09 15 000 6202 09 15 000 6201 09 15 000 6206		

Wire gauge		Ø mm	Stripping length
0.14-0.37 mm²	AWG 26-22	0.9	8 mm
0.5 mm²	AWG 20	1.1	8 mm
0.75 mm²	AWG 18	1.3	8 mm
1.0 mm²	AWG 18	1.45	8 mm
1.5 mm²	AWG 16	1.75	8 mm
2.5 mm²	AWG 14	2.25	6 mm

Connectors for explosion hazardous environments – standard sizes

Features

- Hoods and housings in the sizes 6 B, 10 B, 16 B, 24 B and 48 B
- Connectors especially for explosion hazardous applications
- Suitable for intrinsically safe circuits
- Inserts on basis of Han® E with 6 to 24 contacts
- Suitable for areas classed 1 und 2

⚠ WARNING! **Industrial connectors of the Han® Ex series are designed exclusively for the use in intrinsically safe electrical circuits of categories „ia“, „ib“ and „ic“!**

- The explosion group is defined by the corresponding intrinsically safe equipment.
- Temperature class according to DIN EN 60079-11

General description

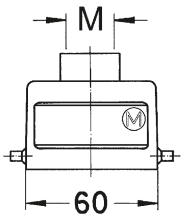
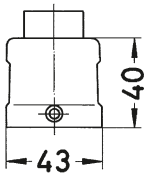
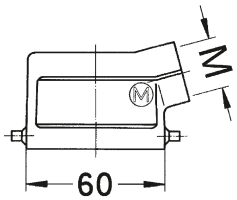
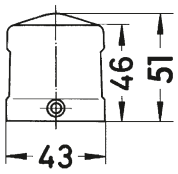
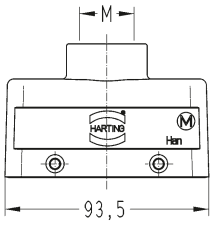
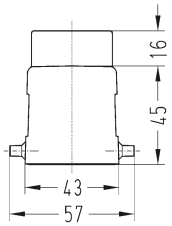
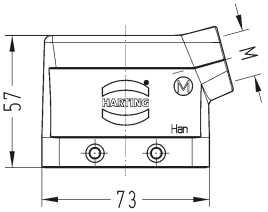
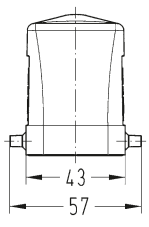
The connectors are designed to meet the intrinsic safety requirements for ignition protection class in explosion hazardous areas classed as 1 and 2. In intrinsically safe circuits, energy is limited in such a manner that even a potential spark cannot ignite an explosive environment.

The Han® Ex product portfolio offers complete connector systems consisting of housings and inserts, including housings made from an alloy that can be used in pulverised methane-coal dust atmospheres. They also offer ignition protection class 65 in the mated condition. The housing’s blue colour indicates that an intrinsically safe circuit is present. The contact inserts provide a high number of pins and meet the standards of the ignition protection class even in the tightest of spaces.

Technical characteristics

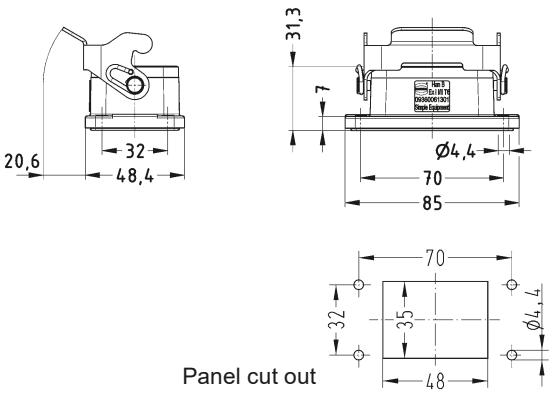
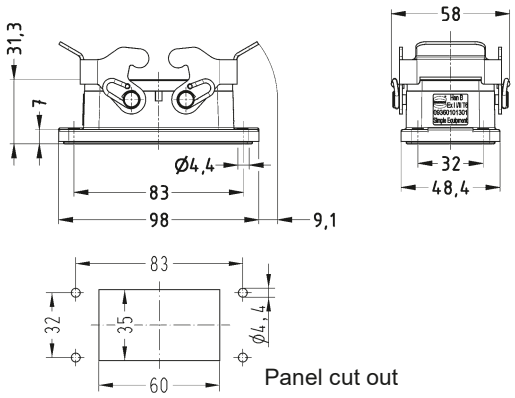
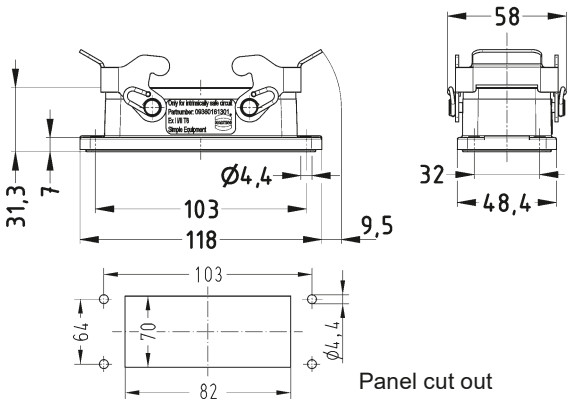
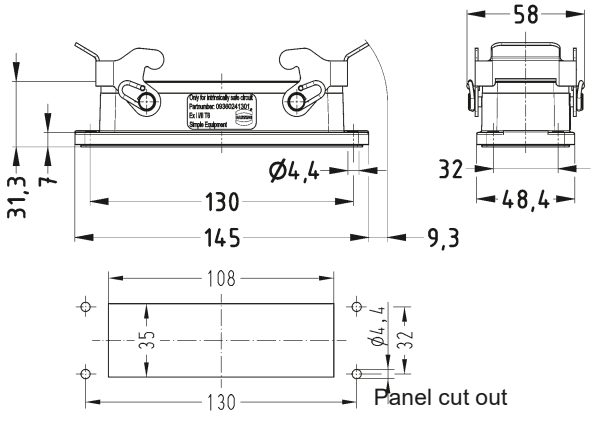
Specifications	DIN EN 60 079-0, -11, -14 DIN EN 60 664-1 DIN EN 61 984
Hoods/ housings	
Material	zinc die cast
Colour	RAL 5015 (blue)
Surface	powder coated
Locking element	stainless steel
Lever type	metal lever
Seal	NBR
Ambient temperature acc. to DIN EN 60 079-11	-20 °C ... +40 °C
Limit temperature for connectors	-40 °C ... +125 °C
Maximum surface temperature acc. to DIN EN 60 079-11	T6 = 85 °C
Protection degree acc. to DIN EN 60 529 in locked position	IP65 is achieved with cable gland
Inserts	
Number of contacts	6, 10, 16, 24
Rated current	16 A
Rated voltage	90 V
Insulation resistance	≥ 10^{10} Ω
Material	polycarbonate
Limiting temperatures acc. to DIN EN 60 079-11	-20 °C ... +40 °C
Mechan. working life - mating cycles	≥ 500
Contacts	
Material	copper alloy
Surface - hard-silver plated	3 µm Ag
Contact resistance	≤ 1 mΩ
Crimp termination	0.14 ... 2.5 mm² AWG 26 ... 14
Screw connection	0.75 ... 2.5 mm²
Tightening torque	0.5 Nm
Max. insulation diameter	3.6 mm

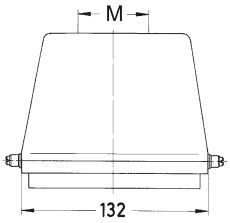
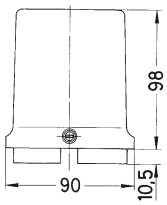
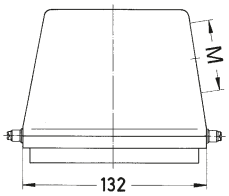
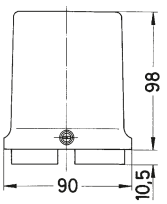
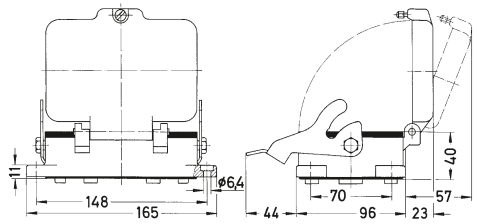
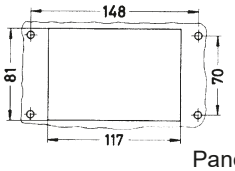
Hoods and Housings – Sizes 6 B, 10 B, 16 B, 24 B, 48 B

Identification	Part number	Cable entry	Drawing	Dimensions in mm
Hood 6 B top entry 	19 36 006 1440 19 36 006 1441	M20 M25		
Hood 6 B side entry 	19 36 006 1540 19 36 006 1541	M20 M25		
Hood 10 B top entry 	19 36 010 1420 19 36 010 1421	M20 M25		
Hood 10 B side entry 	19 36 010 1520 19 36 010 1521	M20 M25		

Hood 16 B top entry 	19 36 016 1421 19 36 016 1422	M25 M32
Hood 16 B side entry 	19 36 016 1521 19 36 016 1522	M25 M32
Hood 24 B top entry 	19 36 024 1421 19 36 024 1422	M25 M32
Hood 24 B side entry 	19 36 024 1521 19 36 024 1522	M25 M32

Hoods and Housings – Sizes 6 B, 10 B, 16 B, 24 B, 48 B

Identification	Part number	Drawing	Dimensions in mm
Housing, bulkhead mounted 6 B 	09 36 006 1301		
Housing, bulkhead mounted 10 B 	09 36 010 1301		
Housing, bulkhead mounted 16 B 	09 36 016 1301		
Housing, bulkhead mounted 24 B 	09 36 024 1301		

Identification	Part number	Cable entry	Drawing	Dimensions in mm
Hood 48 B top entry 	19 36 048 0447 19 36 048 0448	M32 M40		
Hood 48 B side entry 	19 36 048 0547 19 36 048 0548	M32 M40		
Hood 48 B with cover 	09 36 048 0301		  Panel cut out	

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