

„A day without talking to a customer
is a day wasted.“

Walter Mennekes, Managing Director

Establishing
connections.
Staying
connected.



Family business

MENNEKES is a family-run business - like most of our customers' companies. Perhaps this is also the reason behind our legendary customer focus.



Neudorf plant



Nanjing plant (to serve the Chinese market)

At MENNEKES, an 800-strong global workforce produces plugs and sockets for international markets. From its headquarters in Kirchhundem and its Neudorf plant in the Erzgebirge. In addition, a production plant in Nanjing supplies the Chinese market exclusively.

We are strongly attached to our country and committed to our region. This is why we not only recruit an exceptionally high number of apprentices year for year, we are also involved in a wide range of organisations and professional associations and therefore lend our support to Germany as a place to do business.



Kirchhundem headquarters



Promoting new talent is nowadays one of the most important tasks we face and is a top priority at MENNEKES. Because young people are our future.

„As our customers, you deserve
superior service.“

Andreas Sprecker,
Managing Director, Sales and Marketing

Around the
clock.
Around the
globe.



Sales support

We don't just sell you a product. We will also give you all the help you need to sell it successfully. From training to sales promotion support. Whether you need planning advice or eye-catching material for your sales floor, in-depth knowledge about markets and products or promotional flyers for your customers – our service team will help you to increase your sales.



Advertising material:
Crucial for your sales
success story.



The MENNEKES Training
Centre: Get the know-
how you need to give
you that competitive
edge.



The MENNEKES website:
Accessible around the
clock. With online product
catalogue for quick
product searches, product
datasheets, downloadable
brochures, online
configuration programme,
contact details and much
more information to
support you in your
day-to-day business
activities.

Any questions, requests, suggestions? Contact our experts by phone at any time. We are also at your disposal at numerous trade fairs. And all information about our products and services is available around the clock on our website www.MENNEKES.de.

„We think ahead, so that you can keep a step ahead of the rest.“

Volker Lazzaro, Managing Director, Technology

Developing
the new.
Improving the
good.



Leap Forward

When we have developed a new product, this does not mean that our work is finished. Because only an ongoing development process ensures that you always get the best possible product. A good example of this is AMAXX®. Following its successful market launch we continued to develop the concept and rounded off the range with three new model variants: The smallest AMAXX®

combination has one segment and can be supplied in numerous configurations. The five-segment AMAXX® model is now also available as a large combination with all the familiar AMAXX® advantages. In addition, AMAXX® is the ideal receptacle combination for installation locations with restricted widths and depths; it can also be mounted on the side or installed to swivel.



Award-winning: Prestigious design prizes for MENNEKES products.



„You are our best developers.“

Stefan Gattwinkel, Head of Development

Practical
solutions based
on practical
experience.



A hands-on approach

Our ongoing, in-depth dialogue with you, our customers, tells us which products are needed in real-life situations. Our R&D department then makes sure that these requirements are realised. Innovations from MENNEKES always impress thanks to their well-conceived, practical details that make your work easier. Like the new PowerTOP Xtra plugs and connectors for the toughest conditions. The unique

rubber coating on the gripping surfaces ensures a firm hold even in damp or dirty environments or snowy conditions. In addition, it guarantees increased impact resistance. Screws are needed only for conductor connection. And, as the cable gland is always located directly on the plug and connector bodies and the seals are molded into the flip-lid and plug front, safe and clean operation is always ensured.



Protected:

PowerTOP Xtra 63A in IP 44 and IP 67,
while 125A is available in IP 67.



„We invest a lot of time,
so that you can save it.“

Günter Hecht, Head of Technical Field Sales

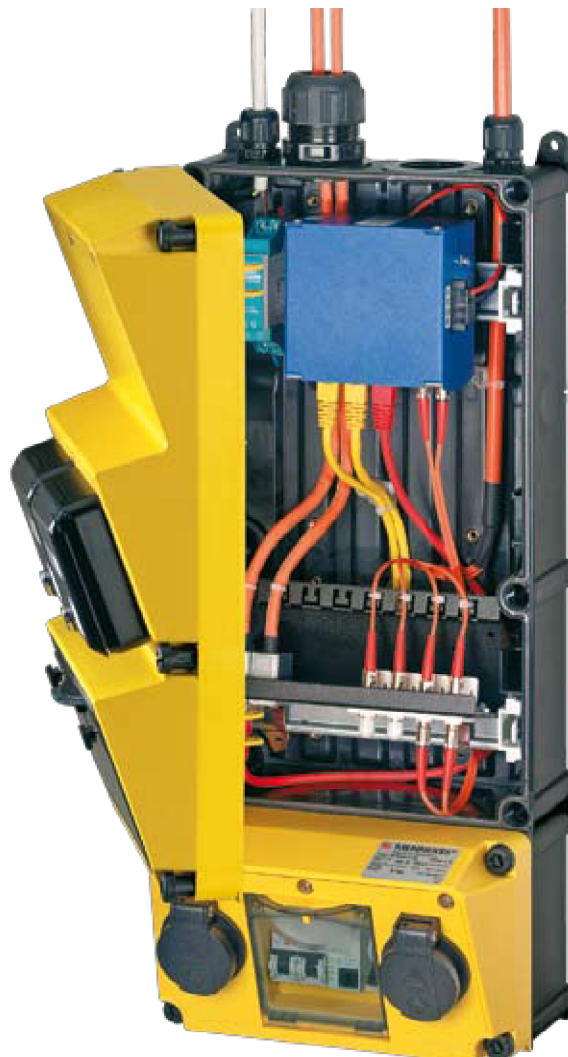
Seeking
solutions.
Finding
solutions.



Research work

Sometimes it takes a few years to get a development ready for the market. But we are happy to invest this time, if it means we can help you with your work. For example, with our products for industrial ethernet. The first step was to carry out several years of studies on data processing technology and an in-depth market survey. Based on

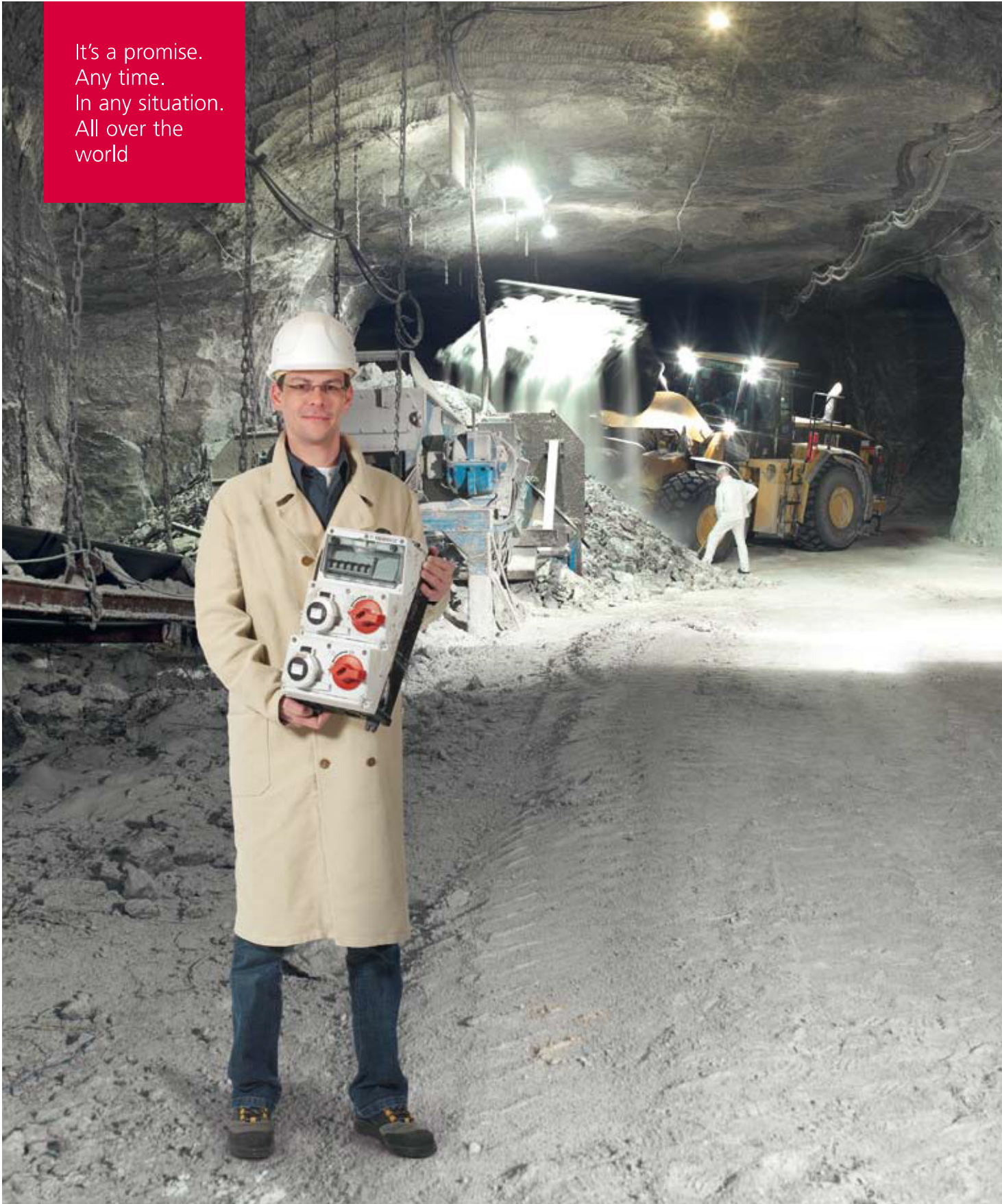
AMAXX®, our engineers then developed a new, easy to install, modular system solution for power and data, specially suited to decentralised industry networks. This means that in this expanding market segment too we can now offer you simple planning and high calculation reliability, as all components for power and data originate from a single source.



„It's tough out there. That's why our products have to be tougher.“

Stefan Klos, Head of Test Lab

It's a promise.
Any time.
In any situation.
All over the
world



Endurance test

When a MENNEKES product leaves our works, it has already survived the harshest testing. In our test lab it is exposed to cold, heat, dust and water over and over again. Only the products that withstand these tests are worthy of the name MENNEKES.

Our products are of course certified to national and international standards by renowned institutions. Like the MENNEKES company itself: Our international quality management system is certified to DIN EN ISO 9001.



Only the combination of first-class raw materials and advanced manufacturing processes guarantees a premium product. This is why we use only first-grade granules which are processed by a highly skilled workforce in state-of-the-art production facilities to create certified MENNEKES products.



As a specialist for plug and sockets devices, we have our own approved test lab where our products are tested again and again.

As long as it takes, until we are convinced that they can permanently withstand the harshest requirements of the everyday working environment.

Internationally
recognized
and certified.

Internationally
recognized
and certified.



MENNEKES plugs and sockets are well known all over the world – and comply with the relevant national and international standards. More than half of our products are destined for international markets. This is why MENNEKES also has a global presence, with subsidiaries and agencies in more than 90 countries. When plugs and sockets are being tested by independent testing authorities, such as the VDE Testing and

Certification Institute, the test reports are compiled according to CCA or CB-II procedures.

They then serve as the basis for approvals in other countries, such as those whose national test marks are shown below.

(For plugs and sockets for the USA and Canada please refer to the information in the separate catalogue.)



Argentina



Belgium



Denmark



Germany



Finland



France



Great Britain



Italy



Canada



Croatia



Netherlands



Norway



Austria



Poland



Russia



Sweden



Switzerland



Slovakia



Spain



South Africa



Czech Republic



Hungary



USA



People's Republic of China

■ Using our catalogue

This catalogue is intended exclusively for use by the trade. In this respect we draw attention to the "Joint Declaration on the Use and Installation of Electrical Equipment" published in May 1998 by the Federal Ministry of Labour, the Federal Agency for Occupational Health and Safety, the Electrical Engineering and Precision Fitters Employers' Liability Insurance Association, the German Electrical Engineering Commission at DIN and VDE (DKE), the German Electricity Association (VDEW), the Central Association of German Electricians (ZVEH), the "Safety in the Home" campaign (DSH) and the Central Association of Electrical and Electronics Industries "Zentralverband Elektrotechnik- und Elektronikindustrie (ZVEI)".

While correct to the best of our knowledge, the information we provide with respect to laws and regulations is in no way binding. Such information is provided purely by way of assistance and makes no claim to completeness. You cannot and should not relieve your electrician from his obligation to independently acquire information to enable him to conform to "the state of safety engineering in your country".

Our information is in accordance with the up to date situation on January 15, 2004.

The nature and composition of our appliances are exclusively as quoted in the product description to which the part numbers refer directly.



MENNEKES CEE plugs and sockets conform to the following standards de normen

IEC 60309-1

IEC 60309-2

EN 60309-1

EN 60309-2

DIN EN 60309-1/VDE 0623 part 1

DIN EN 60309-2/VDE 0623 part 20

Applications

CEE plugs and sockets can and, under certain circumstances, must be used in industry, in commerce, in agriculture, in parks, in damp and wet environments, outdoors, on building sites, in caravans, on boats and yachts, on camp sites, for dockside power supply installations (marinas), on works premises where there is a fire hazard, at markets and fairground booths and for trailers and mobile homes.

Using CEE plugs and sockets will usually enable the planners and builders of electrical installations to comply with the "regulations for the construction of low voltage systems as per DIN VDE 0100".

AMAPLAST

This plastic material used by MENNEKES (PA, PC) has the following outstanding characteristics: good electrical insulation, virtually unbreakable, wear resistant, abrasion resistant, dimensionally stable, self-extinguishing, heat resistant, highly resistant to cold temperatures, resistant to ageing, sea-water, oil and gasoline.

AMELAN®

This plastic material (PBT) combines outstanding mechanical, thermal and electrical properties with excellent dimensional stability and resistance to chemicals.

Enclosures and inserts

The enclosures and inserts of the currently available CEE plugs and sockets are moulded from AMAPLAST, a high quality thermoplastic material which is virtually indestructible. The long service life of the inserts means that there is no need to keep a stock of spares. Accordingly, spare inserts have not been included in this catalogue.

In areas where the presence of chemicals or other aggressive substances requires the use of another plastic material, MENNEKES propose a further top quality product line with enclosures moulded from high-grade **AMELAN®**.

CEE plugs and sockets with enclosures made of aluminium alloy are available for use in environments exposed to flying sparks or high thermal or mechanical stress.

Contact material, small parts

Female and male contacts are made of brass; screws, springs, etc. are made of rust-proof material or surface-coated steel.

Characteristics of CEE plugs and sockets

MENNEKES CEE plugs and sockets are distinguished by the following features, which facilitate installation and keep maintenance costs to a minimum:

- Easy to install
- Wiring space easily accessible
- Power screwdrivers can be used for installation
- Mostly fitted with Pozidriv screws (size 2)
- High contact pressure
- Low effort required for insertion and withdrawal
- Low transition resistance
- Easy-to-grip plugs

■ CEE plugs and sockets

Application

CEE plugs and sockets with operating voltages up to 690 VDC or AC, frequencies up to 500Hz and rated currents up to 250A, including plugs and receptacles for low voltage systems have become the standard all over the world. Basically suitable for indoor and outdoor applications in industry, they are also used on building sites, farms, commercial premises, for caravans, mobile homes, boats, yachts and in households. CEE plugs and sockets are polarised and non-reversible.

Ambient temperature

CEE plugs and sockets are suitable for ambient temperatures between -25°C up to +40°C.

Chemical resistance of combination units and wall mounted receptacles, switched and interlocked; switched, fused

For the production of combination units and wall mounted receptacles, MENNEKES use a high quality polycarbonate material which has excellent optical and electrical insulating properties. It also has a very good resistance to mechanical and thermal stresses. However, in contact with very aggressive chemical materials, oils, leaches or solvents this polycarbonate material could be adversely affected. Therefore, under very aggressive conditions, we recommend the use of AMELAN®, a thermoplastic material with a high resistance to chemicals and aggressive substances. In chapters 7 and 10, you will find a selection of combination units and switched interlocked receptacles made from this material.

Material properties of solid rubber products

Solid rubber blends are preferably used wherever products are exposed to high mechanical and/or chemical loads. Solid rubber excels by its outstanding dimensional stability; it is largely resistant to acid and lye and has a high resistance to breakdown and leakage current.

Products made from solid rubber blends, e.g. MENNEKES EverGUM, are resistant to weather and ageing. Under UV radiation, colour pigments may fade with time. This is inevitable even to the latest state of the art yet it does not compromise the function in any way.

Cable glands

Since January 1, 2000, all PG cable gland sizes to DIN 40430 used so far are replaced by metric sizes to EN 60423 within the framework of European harmonisation. This switchover mainly affects bushings and sealing plugs, which are supplied as accessories with our enclosures. Cable glands with a metric thread comply with DIN EN 50262. Accordingly, MENNEKES is switching all glands over to metric sizes. However some devices with PG cable glands may still be sold by dealers. Users have no obligation to retrofit the new units; therefore devices with PG cable glands may be installed and operated as before. The following table offers information to facilitate conversion.

Please note the information in the dimensional drawings of the various items.

Metric	Typical sealing area	Typical capacity of terminal
M12	2.5 – 6.5	3.0 – 6.5
M16	2.5 – 8.0	3.5 – 8.0
M20	5.0 – 12.0	6.0 – 12.0
M25	9.0 – 18.0	12.0 – 18.0
M32	14.0 – 25.0	17.0 – 25.0
M40	18.0 – 32.0	20.0 – 32.0
M50	24.0 – 38.0	26.0 – 38.0
M63	30.0 – 44.0	30.0 – 44.0

Definitions to DIN EN 60309

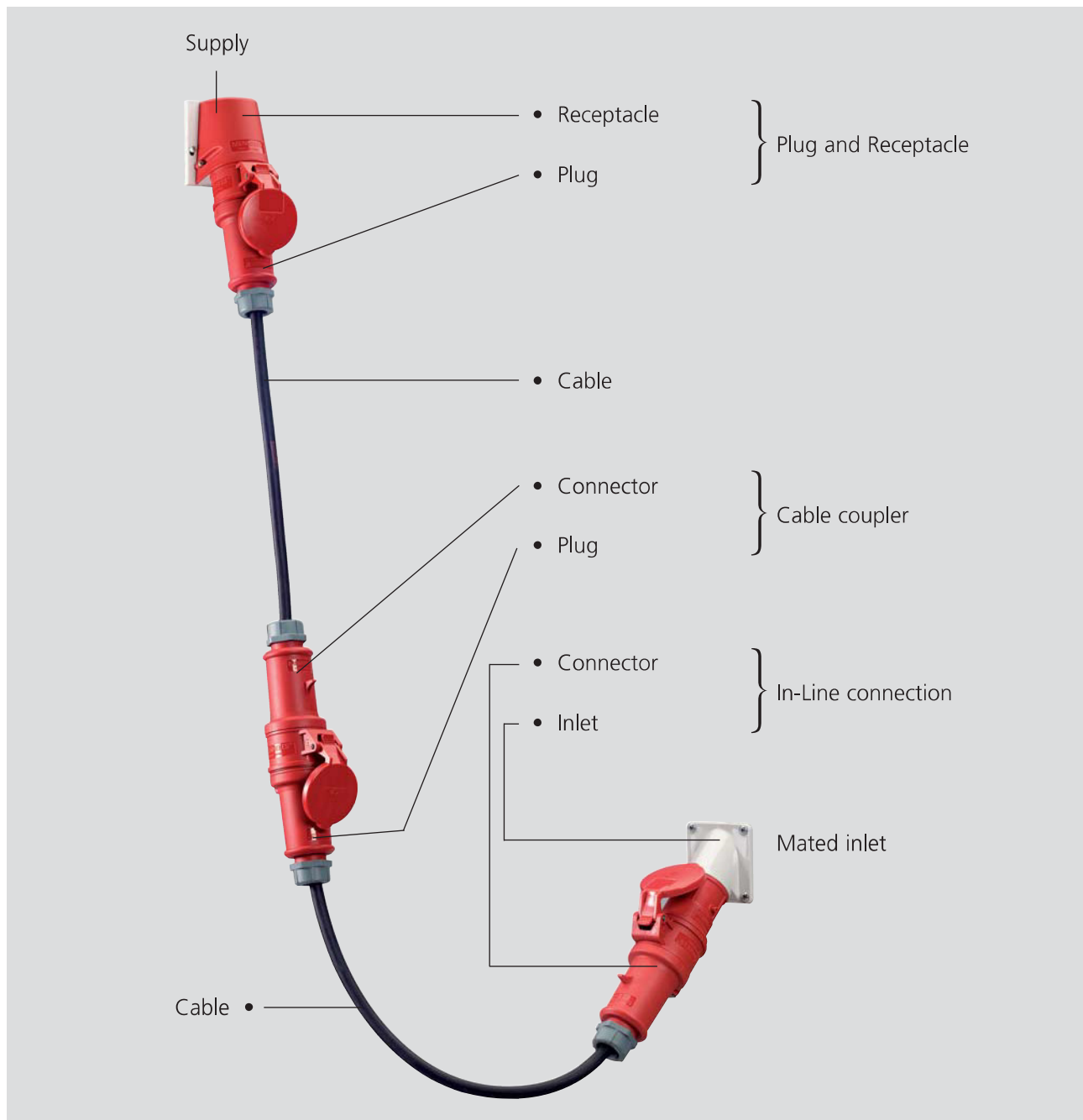
Throughout this catalogue, CEE plugs and sockets are named as provided for by DIN EN 60309-1 (VDE 0623 part 1):2000-05, paragraph 2.

Rated current is the current intended for the plugs and sockets by the manufacturer.

Insulation voltage is the voltage intended for the plugs and sockets by the manufacturer to which voltage testing, creep distance and clearance refer.

Rated operating voltage is the nominal voltage of the power source for which these plugs and sockets are intended.

The illustration shows how to use CEE plugs and sockets (DIN EN 60309-1:2000-05).



■ CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Standards and regulations

IEC

The **I**nternational **E**lectrotechnical **C**ommission is the world organisation for international standardisation of electrical equipment.

IECEE

IEC system for conformity testing for standards for safety of electrical equipment, formerly CEE. Now IECEE.

CEE

Now IECEE.

CENELEC

Comité **E**uropéen de **N**ormalisation **E**lectrotechnique (European Electrotechnical Standardisation Committee).
CENELEC is made up of the national electrotechnical standards committees of Belgium, Denmark, Germany, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Austria, Portugal, Sweden; Switzerland, Spain, the Czech Republic and the United Kingdom. CENELEC members are obliged to adopt European standards (EN) without change.

CEE plugs and sockets

The following European standards have been published by CENELEC:

EN 60309-1:1999

EN 60309-2:1999

As all EU members are obliged to adopt European standards without change, the EN standards have been published in Germany as DIN EN standards and VDE regulations:

EN 60309-1 = DIN EN 60309-1
(VDE 0623 part 1):2000-05

EN 60309-2 = DIN EN 60309-2
(VDE 0623 part 20):2000-05

Both EN standards comply with the IEC publications IEC 60309-1:1999 and IEC 60309-2:1999 which were adopted by CENELEC without change.

Development of CEE plugs and sockets

The system for CEE plugs and sockets was devised by CEE, which gave the system its name.

CEE publication no. 17 (2nd edition) of April 1966 was the basis for IEC publications IEC 309-1:1988 and IEC 309-2:1992.

CEE publication no. 17 was published in Germany as VDE regulation VDE 0623/03.72, VDE 0623a/03.77 as well as

DIN 49462.....	part 1/02.72
	part 2/02.72
	part 3/02.72
DIN 49463.....	part 1/05.77
	part 2/05.77
DIN 49465.....	part 1/03.72
	part 2/03.72
	part 3/03.72
	part 4/03.72.

These standards are not applicable any longer. They were replaced by DIN EN 60309.

Current MENNEKES CEE plugs and sockets included in this catalogue comply with the new standards

EN 60309-1:1999

EN 60309-2:1999

Low voltage directive 73/23 EEC

plugs and sockets are subject to the EC low voltage directive 73/23 EEC and must therefore be provided with the CE mark to ensure free traffic of goods within the EU.

A manufacturer's declaration is available on request.

VDE test mark, certificates

Current plugs and sockets have been tested by the VDE Test and Certification Institute in Offenbach, Germany. Furthermore, various other certificates from international inspection authorities have been obtained. A copy of test certificates is available on request.

Hereafter, only the EN standards will be specified.

CEE plugs and sockets for rated operating voltages above 50V**Position of the earth contact**

plugs and sockets with rated voltages above 50V must have an earth contact. To prevent incorrect insertion, a nose on the plug fits into a keyway in the receptacle, thus ensuring that the earth contact pin or tube is correctly positioned in accordance with the required electrical standard.

The earth contact positions for the various frequencies and voltages are assigned a clockface position, in accordance with table 104 taken from EN 60309-2:1999 (see table 104 on the next page).

The diameter of the earth contact pin is larger than that of the phase contact pins, which prevents incorrect insertion.

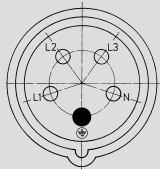
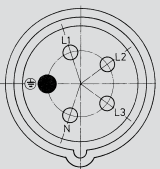
It must be impossible for the user to change the position of the earth contact or of any neutral contacts relative to the keyway of a receptacle or to the nose of a plug.

It also must be impossible to install a plug insert in the casing of a receptacle or connector.

CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Position of the earth contact sleeve with respect to the polarizing keyway for various voltages and frequencies, identified by clockface positions in accordance with table 104 taken from EN 60309-2:1999.

Type	Frequency Hz	Rated operating voltage V	Position of ground contact ¹⁾		Examples:
			16/20 A 32/30 A	63/60 A 125/100 A	
1P+N+⊕*	50 and 60 60	100 to 130 277	4 5	4 5	<p>Front view of receptacle</p>  <p>400V = 6^h</p>  <p>230V = 9^h</p>
2P+⊕	50 and 60	100 to 130 200 to 250 380 to 415 480 to 500 with isolating transformer	4 6 9 7 12	4 6 9 7 12	
	100 to 300 above 300 to 500	above 50 above 50	— 2	— —	
	DC	above 50 to 250 above 250	3 8	3 8	
2P+N+⊕*	50 and 60	125/250 single phase	12	12	
3P+⊕	50 and 60	100 to 130 200 to 250 380 to 415	4 9 6	4 9 6	
	60	440 to 460 ²⁾	11	11	
	50 and 60	480 to 500 600 to 690	7 5	7 5	
	50	380	3	—	
	60	440 ³⁾	3	—	
	100 to 300	above 50	10	—	
	above 300 to 500	above 50	2	—	
	50 and 60	57/100 to 75/130 120/208 to 144/250 200/346 to 240/415 277/480 to 288/500 347/600 to 400/690	4 9 6 7 5	4 9 6 7 5	
	60	250/400 to 265/460 ²⁾	11	11	
	50	220/380	3	—	
	60	250/440 ³⁾	3	—	
3P+N+⊕	100 to 300	above 50	—	—	
	above 300 to 500	above 50	2	—	
All types	All rated voltages and all frequencies not covered by other configurations.		1	1	

¹⁾ The position of the earth contact is given as a clockface number.

²⁾ Mainly for marine installations.

³⁾ Only for reefer containers (ISO standard)

Positions marked with a dash (-) are not standardised.

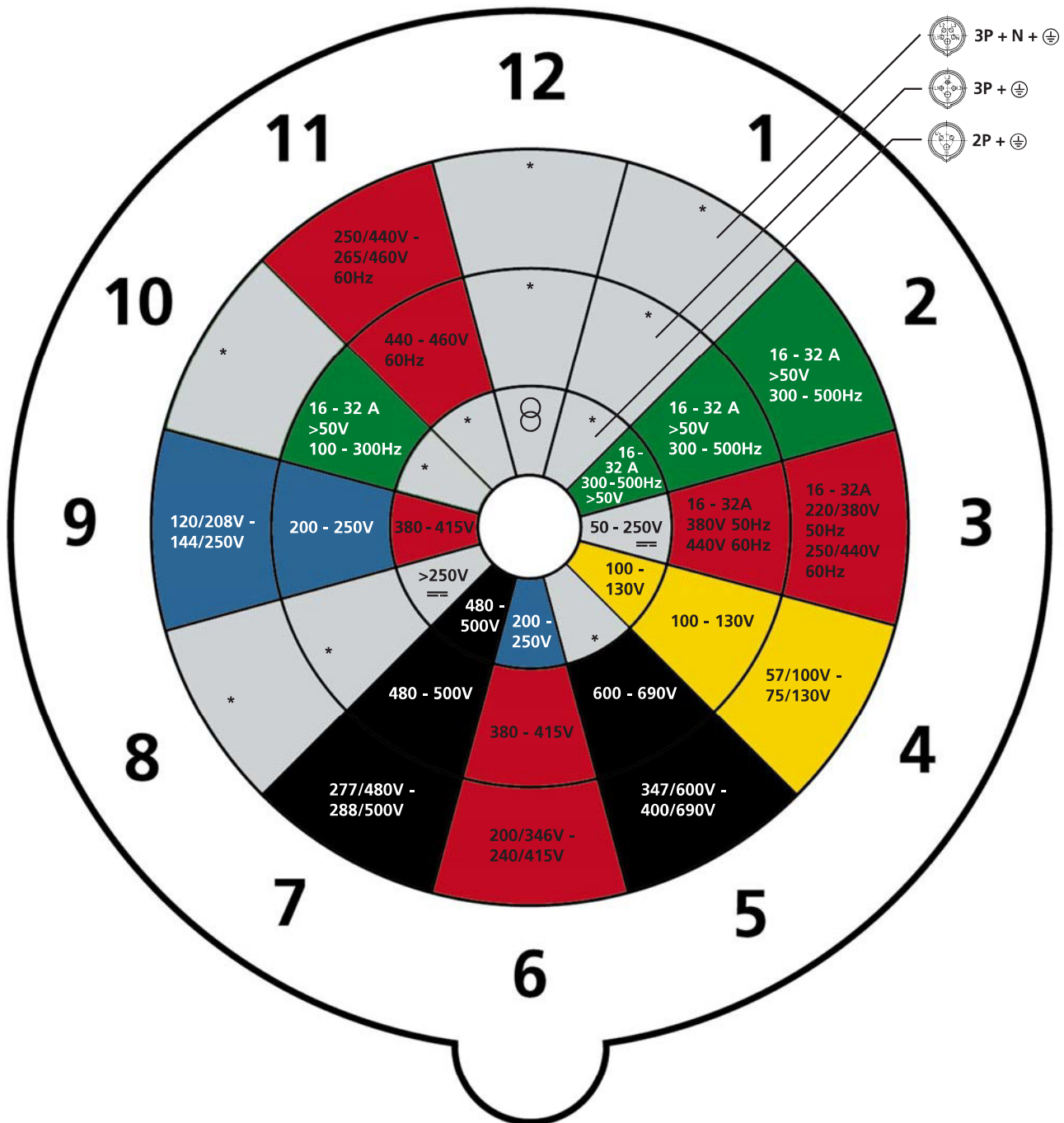
The 230/400V version (6 o'clock position) is specially marked in this catalogue by part numbers in bold.

* Devices of series II are mainly used in the US and in Canada.

Clock positions

acc. to EN 60309-2:1998, Series I (Europe)

Position of ground contact sleeve with respect to major keyway for various voltages and frequencies. The colour codes correspond to the nominal voltage.



* Clock positions not normed and free for use for special applications.

CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Marking and position of contacts

On rewirable plugs and sockets the contacts must be marked with symbols as follows:

- Where there are three phase conductors the phase contacts are to be marked L1, L2, L3 or 1, 2, 3; the neutral contact (if present) is to be marked N and the earth contact is to be marked \oplus .
- Where there is one phase conductor the live pole L/+ is to be marked with a symbol suitable for both (DC) and (AC) and with symbol \oplus for the earth contact, if applicable.

- For a defined transition period the markings R1, S2, T3 may be used instead of L1, L2, L3.

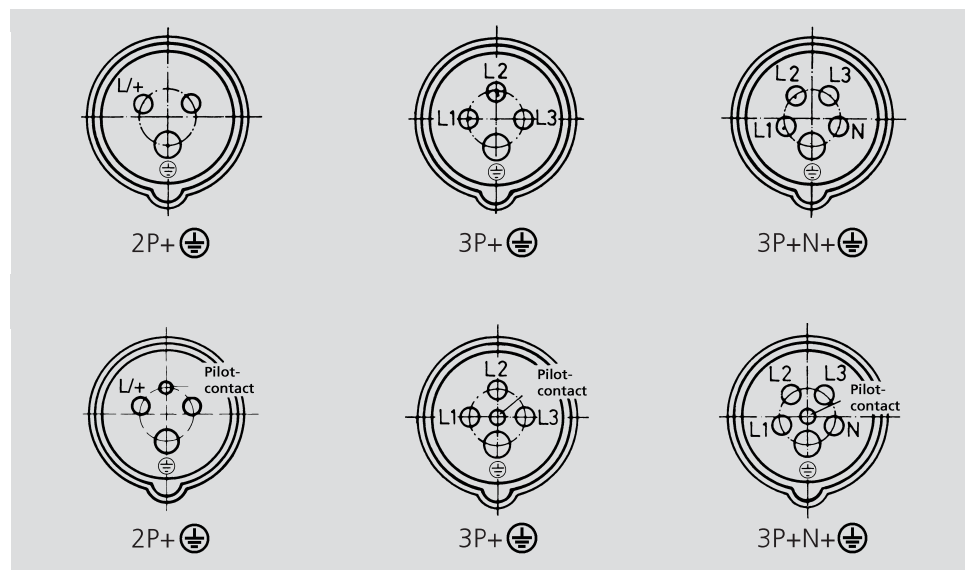
The contact tubes of receptacles and connectors with rated voltages above 50V must be arranged clockwise as viewed from the front.

Receptacles and connectors
U > 50V
(EN 60309-2:1999;
standard sheet 2-I).

16A and 32A

Receptacles and connectors
U > 50V
(EN 60309-2:1999;
standard sheet 2-III a).

63A and 125A



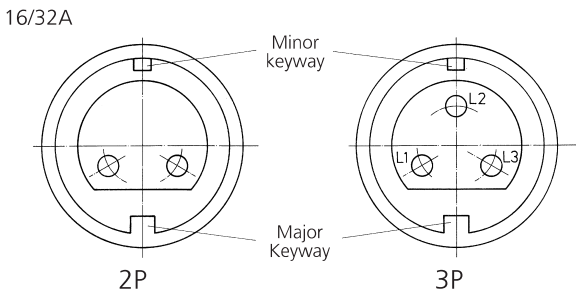
Viewed from the front, the pins of plugs and inlets must be arranged in the opposite way.

CEE plugs and sockets for rated voltages of up to 50V (low voltage)

Since no earth contact is required in plugs and sockets of rated voltage up to 50V, two keyways instead of one are provided the collar. They are accordingly termed the major and minor keyways. The major keyway is always in the

6 o'clock position. Depending on voltages and frequencies, the minor keyway is always in accordance with table 103 taken from EN 60309-2:1999, standard sheet 2-VIII (and in the following drawings).

Arrangement of the minor keyway (major keyway 6 o'clock) for various voltages and frequencies using clockface positions in accordance with table 103 taken from EN 60309-2:1999.



Drawing: receptacles and connectors U = 40 to 50V, 50 to 60Hz, minor keyway in 12 o'clock position

Rated operating voltage of plug or receptacle in V	Frequency Hz	Clockface position of keyway (major keyway = 6 o'clock)	Positions 1, 8 and 9 are reserved for future standards.
20 to 25	50 and 60	no minor keyway	
40 to 50	50 and 60	12	For design reasons, positions 5, 6 and 7 are not available for use.
	100–200	4	
	300	2	
	400	3	
	> 400–500	11	
20 to 25 and 40 to 50	DC	10	

Interlocks and breaking capacity

plugs and sockets without an interlock must have an adequate breaking capacity, i.e. it must be possible to insert and withdraw plugs in the manner specified and as often as specified. After testing they must exhibit no damage that would impair further use, and the holes for the plug contacts must not show any significant sign of damage.

Receptacles and connectors that do not meet the test requirements for breaking capacity and service characteristics must be fitted with an interlock.

An interlock is a mechanical or electrical device which ensures that voltage is only applied to the contacts of a plug once they have been inserted into a receptacle or connector as intended, which prevents a plug being withdrawn with the power switched on or which makes contacts voltage-free before disconnecting.

- A distinction is made between interlocked plugs and sockets with
- mechanical interlocks
 - electrical interlocks.

■ CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

In the case of receptacles and connectors $\geq 63/60A$, EN 60309-2 requires that a distinction is made between products used with or without interlocks.

As MENNEKES plugs and sockets have adequate breaking capacity, standard $\geq 63/60A$ versions are fitted with short contact tubes without pilot contact. In the 63A and 125A versions, the short contact tubes meet the finger-touch requirements of BGV A3 (VBG 4).

Receptacles and connectors $\geq 63/60A$ for electrical interlocking (standard part number + index P, e.g. 1454 P) are fitted with long contact tubes and pilot contact for leading and lagging. The interlock makes up for the lack of finger-touch safety.

Plugs and sockets with mechanical interlocks

Mechanical interlocks for plugs and sockets with a rated operating voltage greater than 50V must conform to EN 60309-2:1999, standard sheet 2-V. The mechanical switch of a mechanically interlocked receptacle or connector must not be operational until the proper plug has been inserted. Built-in switches for mechanical interlocking of switched AC receptacles must have a breaking capacity conforming at least to DIN EN 60947-3 (VDE 0660 part 107), utilisation category AC 22. The breaking capacity must be suitable for the appliance connected.

Plugs and sockets with electrical interlocks

In the case of plugs and sockets $\geq 63/60A$ with a rated operating voltage greater than 50V intended for electrical interlocking (part no. + index "P"), a built-in pilot contact can be used to switch off power to a receptacle or connector. The requisite switch can either be provided in the receptacle or on the corresponding circuit distribution board. In the case of receptacles with an integrated auxiliary switch fitted behind the pilot tube, the switch is triggered by the pilot pin of the plug. The advantage of this solution is that the pilot tube itself is not live (PCS interlock).

Plugs and sockets for isolating and switching purposes

DIN VDE 0100-460 requires provision to be made for the isolation of any electrical circuit from the live conductors of the power supply system. This also applies to any item of electrical equipment that has to be isolated from the power supply by means of a built-in or assigned switch. The terms "isolate" and "disconnect" are both used in this context. Electrical equipment usually has to be isolated from the main supply whenever mechanical or electrical maintenance is carried out.

According to DIN VDE 0100-537, plugs and sockets isolating all conductors are suitable for the disconnection of power for maintenance purposes if they are able to switch off the load current in the electrical equipment in question. A plug and socket connection is a simple way of satisfying the requirement for "visible isolation".

Shock hazard protection



Shock hazard protection must be achieved in accordance with EN 60309-1:1999 section 9 by designing plugs and sockets in such a way that, when engaged properly, no live parts of receptacles, connectors, plugs and inlets are exposed so that they may be touched.

It must also be impossible to establish a connection of plugs and connectors while any of the contacts are exposed to touch.

Neutral contact tubes and pilot contacts of receptacles and connectors are deemed to be live parts.

Protection type

Plugs and sockets used to be classified according to the degree of protection against the entry of moisture:

splashproof -> drop in a triangle 
watertight -> 2 drops 

Today, complete IP protection according to IEC 60529, EN 60529 is specified for plugs and sockets, as they are tested in line with this standard.

IP 44 = Protection from solid bodies with a diameter ≥ 1 mm, splashproof

IP 67 = Protection from dust ingress, protection against immersion

Information on IP protection (IP code) can be found in DIN EN 60529:2000-09 (VDE 0470 part 1).

Having been properly installed, receptacles and connectors must provide the degree of protection defined by the rating, whether the plug is inserted or not.

The protection type for plugs and inlets only applies if they are in contact with the matching piece of the connector or with a fixed cover, if applicable.

Plugs and sockets must be IP 44 or IP 67.
Plugs and sockets with rated currents of 100/125A must be IP 67.

100/125 A receptacles that are fastened to an enclosure or form a structural unit with the enclosure can be IP 44.

For receptacles IP 67, a bayonet system has been adopted as the standard in order to simplify their use especially under rough working conditions.

IP 44 or IP 67 is indicated on the appliances.

Notice for the use of mobile power distribution boxes:

Please consider when using SCHUKO® receptacles that due to the construction the degree of protection is achieved only when the lid is closed. Otherwise the ingress of water at the ground contact area may not be prevented (see DIN VDE 0620-1 and DIN 49440 et seq.)

Notice for the use of mobile power distribution boxes with RJ45 data sockets:

The installed data sockets without lid and the Micro Lynx lamps have a degree of protection of IP 20 which is reducing the degree of the whole unit accordingly.


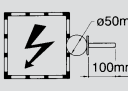

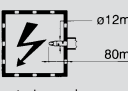

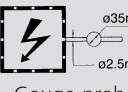

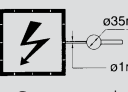


CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

IP protection types for enclosures in accordance with IEC 60529, EN 60529, DIN EN 60529 (VDE 0470 part 1)



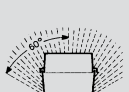

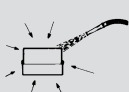
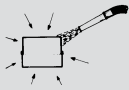
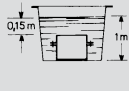
1st number of the code:

Protection against the ingress of foreign bodies and shock hazard protection.

Code	Description			
	Enclosure protected against ingress of:	Test	Protection against contact with:	Test
0				
1	Solid body larger than 50 mm	 Gauge plug diameter 50 mm	Back of hand	 Gauge probe diameter 50 mm
2	Solid body larger than 12 mm	 Gauge plug diameter 12.5 mm	Finger	 Jointed metal finger
3	Solid body larger than 2.5 mm	 Gauge plug diameter 2.5 mm	Tool	 Gauge probe diameter 2.5 mm
4	Solid body larger than 1 mm	 Gauge plug diameter 1 mm	Wire	 Gauge probe diameter 1 mm
5	Dust in harmful quantities	 Talc		
6	Dust overall	 Talc		

2nd number of the code:

Protection against the ingress of moisture.

Code	Description	
	Protection against adverse effects from:	Test
0		
1	Drop of water falling vertically	
2	Drop of water falling vertically on enclosure inclined by up to 15°	
3	Water spray	
4	Splash water	
5	Water jet	
6	Strong water jet	
7	Temporary immersion	
8	Continuous immersion	By arrangement between manufacturer and user. Extra severe test conditions as compared to code 7

Retaining device

A retaining device is a mechanical device which, after a plug or connector has been inserted, holds it in position and prevents inadvertent withdrawal. plugs and sockets must be equipped with retaining devices in accordance with table 109 taken from EN 60309-2:1999.

Rated Current (A)	Moisture protection	Receptacles and connectors		Plugs and inlets	
		Retaining device	Standard sheet		Standard sheet
			Rated operating voltage over 50V	Rated operating voltage up to 50V	Rated operating voltage over 50V
16/20 and 32/30	IP 44 (splashproof)	Hinging lid	2-I continuation 1	2-VIII continuation 1	2-II continuation 1
	IP 67 (watertight)	Bayonet system	2-I continuation 2	2-VIII continuation 2	2-II continuation 2
63/60	IP 44 (splashproof)	Hinging lid and bayonet system	2-III continuation 1	–	2-IV continuation 1
	IP 67 (watertight)	Bayonet system	2-III continuation 2	–	2-IV continuation 2
125/100	IP 67 (watertight) ¹⁾	Bayonet system	2-III continuation 2	–	2-IV continuation 2

¹⁾ 125/100 receptacles that are fastened to an enclosure or form a structural unit with the enclosure can be IP 44.

Markings and symbols in accordance with EN 60309-1:1999, section 7

The following information must be marked on plugs and sockets:

- Rated current in amperes
- Rated operating voltage(s) or voltage range(s)
- Symbol denoting type of current if the plug or socket is not rated for both AC and DC, or if it is rated for AC with frequencies other than 50 or 60Hz, or if voltage is different for AC and DC.
- Rating frequency if greater than 60Hz
- Name or trademark of manufacturer or dealer
- Type reference or part number
- IP protection type
- Symbol indicating the position of the ground contact or keyway, if existing
- Optionally, insulating voltage may be indicated

The following symbols are used:

- A Ampere
- V Volts
- Hz Hertz
- ~ Alternating current
- Direct current
- ⊕ Ground
- IP XX Type of protection to EN 60529

On CEE plugs and sockets these markings are easily visible after installation and connection and when in service as intended.








The marking indicating insulation voltage is on the insert and not visible after installation and connection and when in service as intended.

CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Colour coding

If the rated operating voltage is indicated by a colour coding in addition to compulsory markings, such colour coding must be in accordance with DIN EN 60309-1:1999, table 2:

Rated operating voltage	Colour code	RAL*
20 to 25 V	violet 	4001
40 to 50 V	white 	7035
100 to 130 V	yellow 	1021
200 to 250 V	blue 	5007
380 to 480 V	red 	3013
500 to 690 V	black 	9005
over 60 to 500 Hz	green 	6010

* RAL determined by MENNEKES, as in EN 60309-1:1999 no specification is provided for.

Over-current protection devices

In accordance with DIN VDE 0100-550:1988-04, over-current protection of circuits with receptacles must account for the permissible load of the cable and the rated current of the receptacle and be based on the lower value. Over-current protection of cables and lines must conform to DIN VDE 0100-430.

Test marks and certificates

VDE test mark

Most plugs and sockets featured in this catalogue have been tested and certified by VDE-Prüf- und Zertifizierungsinstitut, Offenbach (VDE Test and Certification Institute in Offenbach, Germany). Their marking includes the VDE test symbol to demonstrate that an independent testing and certification board has confirmed that the plug or receptacle concerned meets all the relevant standards.

CCA-CENELEC

The CENELEC Certification Agreement (CCA) obliges its signatories to mutually recognize test reports issued for electrical equipment included in their field of responsibility and in conformity with harmonised standards. After successful testing in Germany, e.g. by VDE Prüf- und Zertifizierungsinstitut, an application for a CCA certificate can be filed, on the basis of which a national test mark of one of the CENELEC member countries can be awarded.


IECEE system

The IECEE system promotes world-wide mutual recognition of test results published by testing and certification boards in the member countries in the interests of simplifying certification internationally. Electrical equipment is tested for conformity with IEC standards, the relevant standard for CEE plugs and sockets being IEC 60309. The manufacturer is awarded a CB certificate together with a test report.

CE mark

When EC directive 93/68/EEC was published, the EC low voltage directive 73/23/EEC was included in the group of directives that prescribe the CE mark. Since January 1, 1997 the CE mark is compulsory. The CE mark on a low voltage electrical device indicates that the manufacturer has issued a voluntary written declaration to the effect that the product conforms to the low voltage directive. Conformity with all applicable European Community directives is a prerequisite for placing the product on the market within the European Union (EU).

The CE mark is not a substitute for the VDE test mark. The VDE test mark may be used together with the CE mark.

All MENNEKES CEE plugs and sockets comply with the low voltage directive. The CE mark  is provided on the product and/or on the packaging.

Choice and installation of plugs and sockets

In accordance with DIN VDE 0100-550:1988-04, only the following plugs and sockets must be used to connect electrical equipment to the main supply:

- plugs and sockets conforming to DIN VDE 0620,
- plugs and sockets conforming to EN 60309,
- plugs and sockets for special applications.

For three-phase current only plugs and sockets conforming to EN 60309 must be used. Exemptions are only granted for installations in private households, commercial buildings, hotels, etc.

Five pole CEE plugs and sockets conforming to EN 60309 are to be used for the connection of unspecified three-phase appliances of up to 32A, 400V; 50Hz, e.g. on building sites, in loading areas, on farms and on other sites serving mobile electrical equipment.

Three-phase extension cables of up to 32A for such sites must be 5 core with 5 pole plugs or receptacles at either end.

■ CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Operating areas subject to fire hazards

DIN VDE 0100-482:2003-06 applies to selection and construction of electrical installations in operating areas subject to fire hazards. Plugs and sockets conforming to DIN VDE 0620 and EN 60309-2 may be used. Type of protection:

- Fire hazard due to combustible dust or/and easily inflammable materials (fibres): IP 5X
- Fire hazard due to easily inflammable solid matters other than dust or/and easily inflammable materials: IP 4X

The required protection type IP 4X is complied with using CEE plugs and sockets IP 44, type IP 5X is complied with using CEE plugs and receptacles IP 67.

Building sites

On building sites, DIN VDE 0100-704:2001-05 expressly recommends the use of plugs and receptacles to DIN EN 60309-2 (VDE 0623 part 20):


All circuits with plugs and sockets up to 32A must be protected

- using RCDs with a release current of $I_{\Delta N} \leq 30\text{mA}$ or
- be supplied with extra low voltage (SELV)
- be supplied individually using isolating transformers (one winding per receptacle).

Farms and market gardens

DIN VDE 0100-705:1992-10 applies to the installation of electrical equipment.

DIN VDE 0105-15:1986-02 provides information on plugs and sockets allowed for the operation of such installations.

- 2 pole earthed plugs and sockets conforming to DIN VDE 0620-1:2002-01, appendix B for severe operating conditions, symbol  in designs as per to DIN 49440, DIN 49441, DIN 49442 and DIN 49443

- CEE plugs and sockets to EN 60309

The enclosures of these plugs and sockets must be made of insulating material.

Type of protection at least:

- IP 44, if not exposed to dust,
- IP 54, if exposed to dust

in accordance with EN 60529.

All circuits with plugs and sockets must be protected using RCDs with a release current of $I_{\Delta N} \leq 30\text{mA}$.

Circuits for receptacles with a rated current $\leq 63\text{A}$ must be protected using a circuit breaker or a combination of RCD/circuit breaker.

Camp sites

DIN VDE 0100-708 applies to the installation of electrical equipment. For power supply to each space a receptacle with earth contact conforming to EN 60309-2 must be installed. The rated current of plugs and sockets must be at least 16A. For AC voltage supply of 230V, 16A, plugs and sockets 230V, 16A, 2p + PE according to EN 60309-2, standard sheet 2-I must be used. For each vehicle at least one receptacle must be provided. Each receptacle must have its own overload protection. It must be equipped with a residual current-operated device (RCD) with a rated residual current $I_{\Delta N} \leq 30\text{mA}$ which also switches off the neutral conductor.

Extension cables must be fitted with earthed connections and plugs conforming to EN 60309. In case of a nominal current of 16A, a H07RN-F type electric cable with a minimum cross section of 2.5 mm^2 must be used.

Caravans

The installation of electrical equipment for caravans must comply with DIN VDE 0100-754. Connections for caravans must be made by means of an earthed inlet conforming to EN 60309. The connection point must be on the outside of the caravan and must be covered by a lid. Plugs and sockets exposed to weathering must be IP 55, or they must be installed in a place where this type of protection is achieved.

Boats and yachts, dockside power supply (marinas)

DIN VDE 0100-721 applies to the installation of electrical equipment. For power supply to each berth a receptacle with earth contact conforming to EN 60309-2, standard sheet 2-I, i.e. 200 to 250V, 16A, 2p + PE, IP 44 must be provided.

Boats must be fitted with inlets conforming to EN 60309-2, standard sheet 2-II, with receptacle data marked on them. Connection and extension cables must be fitted with an earthed plug as per EN 60309-2, standard sheet 2-II and an earthed connector as per EN 60309-2, standard sheet 2-I with data marked as above.

Market and fairground booths, trailers and mobile homes

DIN VDE 0100-722 applies to the installation of electrical equipment. For power supply to one circuit earthed receptacles conforming to EN 60309-2, standard sheet 2-I, i.e. 200 to 250V, 16A, 2p + PE, IP 44 must be provided.

If there is more than one circuit, a special distribution board as per EN 60439-4 (VDE 0660 part 501) with plugs and sockets as per EN 60309 must be provided. Trailers must be fitted with inlets as per EN 60309-2, standard sheet 2-II. Connection and extension cables must be fitted with an earthed plug as per EN 60309-2, standard sheet 2-II and with an earthed connector as per EN 60309-2, standard sheet 2-I. Due to the required electrical output of trailers and mobile homes, CEE plugs and sockets as per EN 60309, i.e. 380 to 415 V, 3p + N + PE with a rated current of 32A or 63A, IP 44 may be used.

Damp and wet areas and rooms, outdoor equipment

DIN VDE 0100-737 applies to the installation of electrical equipment. Plugs and sockets as per DIN VDE 0620 and EN 60309 may be used. The class of protection of plugs and sockets depends on their application. A minimum protection class of IP 44 is recommended.

■ CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Applicable law

The European Union (EU), the German Federal Government which is responsible for translating EU directives into national law, the Federal Lands as well as the employers' liability insurance associations place requirements on safety and design of electrical equipment. As part of the information provided by this catalogue it seems appropriate to include excerpts from legal norms containing such safety requirements.

Act on Power and Gas Supply (Energy Management Act) dated Nov. 10, 2001.

Excerpt:

§ 1 Scope

The scope of the act is to achieve secure, value for money and environmentally compatible line-conducted electricity and gas supply in the public interest.

§ 2 Definitions

(1) Electricity and gas are defined as energies in so far as these are used for line-conducted energy supply.

(2) Electrical energy equipment is used for the generation, transmission or distribution of energy unless it merely serves for the transmission of signals.

§ 16 Requirements of electrical energy equipment

(1) Electrical energy equipment must be erected and operated in such a way as to ensure technical safety. In addition to legal provisions, generally accepted rules of engineering practice must be observed.

(2) Compliance with generally accepted rules of engineering practice is assumed if the technical directions below are complied with:

1. Equipment for the generation, transmission and distribution of electricity - technical directions of VDE Verband der Elektrotechnik Elektronik Informationstechnik e.V.

2. Equipment for the generation, transmission and distribution of gas - technical directions of Deutscher Verein des Gas- und Wasserfachs e.V.

Ordinance on the General Terms and Conditions for Electricity Supply to Customers at Fixed Rates (AVBEltV) dated June 21, 1979.

Excerpt:

§ 12

(4) Materials and equipment used must conform to the state of safety engineering applicable in the European Community. The mark of an officially accredited test centre (e.g. VDE mark, GS mark) indicates that this condition has been fulfilled.

First Ordinance on the Equipment Safety Law (Gerätesicherheitsgesetz) dated June 11, 1979, amended as of Sept. 25, 1995

Excerpt:

§ 2

(1) Electrical equipment may only be placed on the market if

1. it complies with the state of safety engineering applicable in the European Community.

§ 3

(1) Placing on the market requires that the electrical equipment is provided with the CE mark by means of which the manufacturer confirms that safety requirements according to § 2 are complied with and that conformity assessment procedures according to appendix IV of directive 73/23 EEC have been carried out.

**EC Low Voltage Directive RL 73/23 EEC
dated Feb. 19, 1973
(amended as of July 22, 1993 – RL 93/68 EC)**

Excerpt:

Article 2:

(1) The member states take all expedient measures to ensure that electrical equipment is only placed on the market if it is manufactured in conformity with the state of safety engineering applicable in the community in such a way as not to put at risk the safety of persons, livestock or property when properly installed, maintained and used as intended.

**Ordinance on health and safety protection
when providing and using working equipment,
on safety in operation of equipment that
needs to be supervised and organisation of
occupational health and safety procedures
(ordinance on occupational safety – BetrSichV)
dated Sept. 27, 2002.**

§ 1 Scope

(1) This ordinance applies to the provision of working equipment by employers and the use of working equipment by employees in their work.

§ 2 Definitions

(1) Working equipment in the sense of this ordinance includes tools, equipment, machines or plants. Plants in the sense of sentence 1 are composed of various interdependent functional units the safe operation of which is considerably determined by their interdependency; e.g. plants that have to be supervised in the sense of § 2 clause 2a of the Equipment Safety Law (Gerätesicherheitsgesetz).

(2) Provision in the sense of this ordinance incorporates all measures that the employer has to take so as to ensure that employees are provided with working equipment in compliance with this ordinance.

The provision in the sense of sentence 1 also comprises installation, e.g. the assembly of working equipment including installation in the manner required for safe operation.

(3) Operation in the sense of this ordinance incorporates all measures concerning working equipment, e.g. testing, putting into operation, shutdown, use, repair and maintenance, testing, safety measures in the case of failure, modification, dismantling, and transportation.

§ 4 Requirements on the provision and use of working equipment

(1) The employer must take all measures required in line with the principles of § 4 of the Labour Protection Law so as to provide employees with working equipment which is suitable for the conditions prevailing at the workplace and for which health and safety protection are ensured when used as intended. If it is impossible to ensure full health and safety protection of employees, the employer shall take appropriate measures to ensure that risks are minimised. Sentences 1 and 2 apply accordingly to installation of working equipment the safety of which is dependant upon assembly.

(3) The employer shall ensure that working equipment is only operated if it is suitable for the intended purpose according to the provisions of this ordinance.

■ CEE plugs and sockets

Brief particulars on standards, regulations and guidelines

Accident Prevention Regulation "Electrical Plant and Equipment" BGV A2 (VBG 4) dated April 01, 1979

Excerpt:

§ 2

(2) Sentence 1 "The rules of electrical engineering in the sense of this accident prevention regulation are the generally accepted rules of electrical engineering practice stipulated in the VDE regulations to which the Employers' Liability Insurance Associations refer in their information bulletin".

§ 3

(1) "The employer must ensure that electrical plant and equipment is installed, modified and maintained in accordance with the rules of electrical engineering practice by a qualified electrician or under the supervision of a qualified electrician. The employer must also ensure that the electrical plant and equipment is operated in accordance with the rules of electrical engineering practice."

The appendix to the instructions for the implementation of these regulation lists, among other things, the following regulations: VDE 0100, VDE 0101, VDE 0105, VDE 0620 and EN 60309 (VDE 0623) etc.

In connection with the Equipment Safety Law, a **"Joint Declaration"** was made on April 25, 1978 by the leading representative bodies in trade and industry. This declaration was replaced by the Product Liability Act of December 15, 1989 and the Product Safety Act of April 22, 1997. Both acts translate EU directives into German law.

Joint Declaration on the Use and Installation of Electrical Installation Material dated May 1998

Various organisations (BMA, BAuA, BFE, VDE, DKE, VDEW, ZVEH, DSH, ZVEI) have formulated their safety objectives in a joint declaration.

Excerpt:

- Plants for production, transmission and distribution of electricity must comply with the safety engineering standards applicable in the EU. These standards will be met when complying with the VDE regulations.
- Electrical equipment may only be installed, extended, modified and operated by authorised persons. In addition to energy supply companies these are registered electricians.
- The only material and equipment which may be used is that which has been produced according to the standards of safety engineering applicable in the EU.

Persons in positions of responsibility should note:

The laws, ordinances and accident prevention regulations all make reference to the VDE regulations. When action is taken either by public authorities (Labour Inspectorate) or by the Employers' Liability Insurance Association inspectors, they take full account of the VDE regulations.

Disclaimer

While correct to the best of our knowledge as of January 15, 2004, this information is given without commitment.

Please note the information provided on page 1 of this chapter.