# Informationen

## CERTIFICATION ACCORDING TO ISO 9001 : 2015

The PCE quality management system has been certified according to the standard ISO 9001 : 2015!


## CE-MARKING - LOW VOLTAGE GUIDELINE

Purpose:

- mainly a symbol for free trade in the European Community,
- if a product has been traded legally in one of the member countries, it can be traded legally in the whole Community,
- no quality mark or grade labelling,
- no sign of conformity to standards; to a certain extent a safety mark, because it indicates the compliance to the fundamental safety requirements.

The guidelines determine only basic requirements the products have to meet.

The essential points for the CE-identification are:

- it is obligatory for the producer or the EEC importer to put on the CE-identification label,
- the producer, EEC-importer must hold the engineering data for the disposal of the authorities.
- standard marks of conformity are permissible besides the CE-identification - but no longer necessary.

Applicable directives:

**RoHS DIRECTIVE 2011/65/EU** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of June 8th 2011on the restriction of the use of certain hazardous substances in electrical and electronic equipment

**EMC DIRECTIVE 2014/30/EU** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of February 26th 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

**LVD DIRECTIVE 2014/35/EU** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of February 26th 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

## APPROVALS - THE QUALITY MARKS

There has been created a CCA-method (CENELEC Certification Agreement) for mutual recognition of national approvals. PCE has tested all important products according to this method. An outline of certificates obtained is listed below for reference:

## CEE and IEC

The term „CEE" generally refers to Industrial Plugs and Sockets that comply with International Standard IEC 60309. CEE is the abbreviation of „International Commission on rules for the approval of Electrical Equipment".

## CONFORMITY TO STANDARDS

CEE plugs and sockets are internationally normalized by **IEC 60309-1** and **IEC 60309-2** equivalent to the **E**uropean **N**orms **EN 60309 part 1** and **EN 60309 part 2**.
IEC is the **„I**nternational **E**lectrotechnical **C**ommission" - which is the world organization for international standardization of electrical equipment.

## CENELEC

European Committee for Electrotechnical Normalization - members are the national electrotechnical committees from Austria, Belgium, Bulgaria, Czech Republic, Croatia, Cyprus, Denmark, Germany, Estonia, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Latvia, Lithuania, Luxemburg, Malta, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Slovakia, Sweden, Switzerland, Spain, Turkey and the United Kingdom.

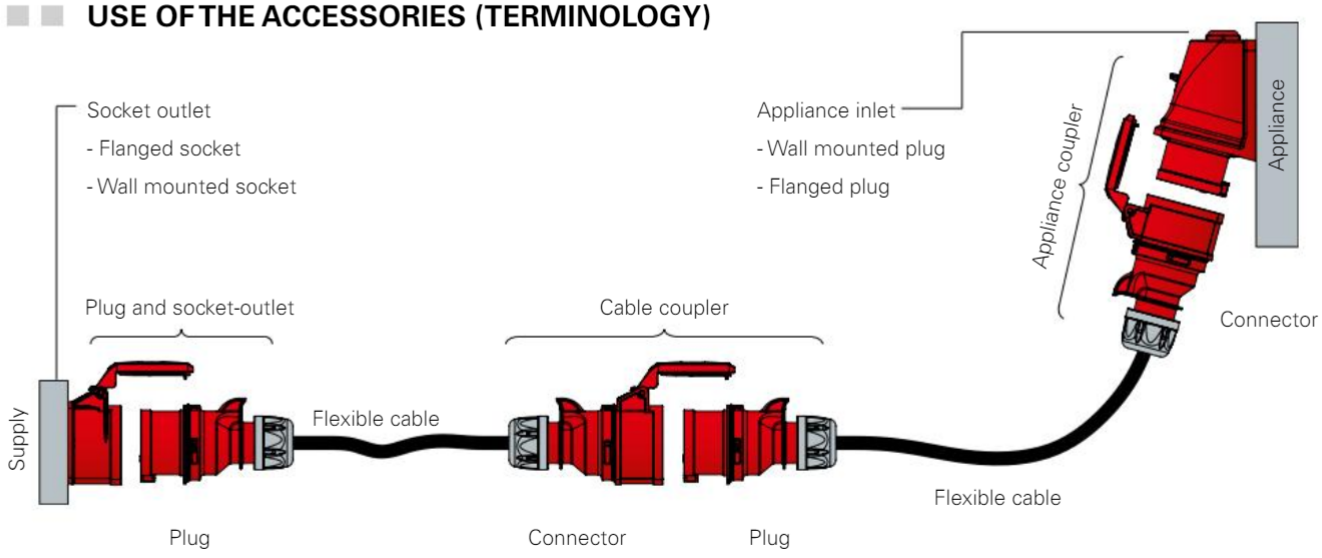
## SYSTEM

The standard CEE plugs and sockets according to EN 60309-2 respectively IEC 60309-2 are designed in their main dimensions in a way that plugs and sockets with the same rated currents, nominal working voltage ranges, the same number of poles and frequency of different producers are compatible.

In order to prevent the insertion of plugs and sockets of different voltages and frequencies, 12 positions of the earthing contact are assigned to the polarizing slot of the skirt of a socket.

The number with the following letter „h" indicates the position of the earth contact tube, comparing the frontside of the socket or connector with the face of a clock. The keyway is situated at 6 o'clock (see page 9).

## USE OF THE ACCESSORIES (TERMINOLOGY)



# Informationen

## PILOT CONTACT

The pilot contact for levels of current from 63A to 125A is an auxiliary contact (with delayed close when inserted and leading open when pulled) and is used as an electrical interlock.
An interlock prevents inserting and pulling under load. CEE connectors and socket-outlets with pilot contact have longer phase contacts and do not guarantee safety from finger-touch. This must be done by an interlock.

| Technical data: | |
|---|---|
| Connection type: | Screw terminals |
| Wire flexible [mm²] | 1 - 2,5 |
| solid [mm²] | 1 - 4 |
| Contact screws [Ncm] | 100 Ncm |
| Rated current | 2A |

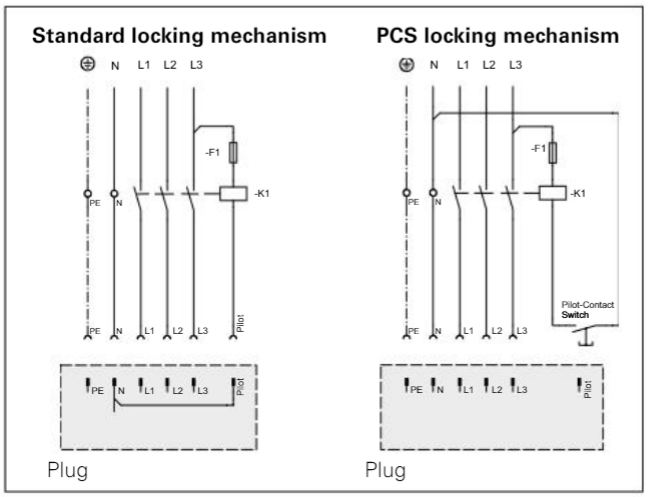
As PCE CEE plugs and sockets have sufficient switching capacity, the CEE couplings and socket-outlets are supplied as standard without a pilot contact and shorter phase contact with protection from finger-touch.

## PCS (PILOT CONTACT SYSTEM)

The PCS is a built-in auxiliary contact, used only for 63A and 125A connectors and socket-outlets, for protective electrical interlocking or for additional control purposes, with isolated connection in the socket-outlet. CEE connectors and sockets have longer phase contacts and guarantee no finger protection; this must be fulfilled by a locking.

The PCS provides the following advantages:
- no special cable required for the plug
- isolated inserting and pulling

Technical Datas:
- contacts: silver-coated
- wires: 2x YF 1.5qmm 450mm
- rated current: 2A




## TERMINAL CROSS-SECTION, DISMANTLING AND STRIPPING LENGTH

Recommended datas for PCE products

| | Terminal cross-section | | Dismantling lenth | Stripping length |
|---|---|---|---|---|
| Rated current | wire flexible [mm²] | wire solid (single or stranded) [mm²] | [mm] | [mm] |
| 16A - CEE | 1 - 2,5 | 1 - 4 | 50 | 10 - 12 |
| 32A - CEE | 2,5 - 6 | 2,5 - 10 | 50 | 12 - 14 |
| 63A - CEE | 6 - 16 | 6 - 25 | 100 | 15 - 18 |
| 125A - CEE | 16 - 50 | 16 - 70 | 100 | 24 - 27 |
| 16/32A - extra low voltage <50V | 1 - 10 | 1,5 - 10 | 70 | 14 - 16 |
| S-Nova | 1*) - 2x2,5 | 1 - 2x2,5 | | 8 - 10 |
| S-Nova (screwless) | 1*) - 2x2,5 | 1 - 2x2,5 | | 8 - 14 |
| P-Nova Plus | 1*) - 2x2,5 | 1 - 2x2,5 | | 8 - 10 |
| Taurus and TopTaurus plug | 0,75 - 2,5 | | 30 | 7 |
| Taurus and TopTaurus connector | 1 - 2,5 | | 30 | 7 |
| Taurus and Top Taurus 3-way connector | 1 - 2,5 | | 30 | 7 |
| Nautilus plug and connector | 1 - 2,5 | | 30 | 7 |
| Nautilus flanged socket | 1 - 2x2,5 | 1 - 2x2,5 | | 7 |

*) End sleeves must be used!

## POSITION OF THE EARTHING CONTACT ACC. TO IEC 60309-2 – SERIE I

| Voltage | Frequency | 2P+E | | 3P+E | | 3P+N+E | |
|---|---|---|---|---|---|---|---|
| V | Hz | 16+32A | 63+125A | 16+32A | 63+125A | 16+32A | 63+125A |
| 57/100 to 75/130 | 50 and 60 | | | | | 4 | 4 |
| 100 to 130 | 50 and 60 | 4 | 4 | 4 | 4 | | |
| 120/208 to 144/250 | 50 and 60 | | | | | 9 | 9 |
| 200 to 250 | 50 and 60 | 6 | 6 | 9 | 9 | | |
| 200/346 to 240/415 | 50 and 60 | | | | | 6 | 6 |
| 220/380<br>250/440 | 50<br>60 | | | | | 3 | 3 |
| 250/440 to 265/460 | 60 | | | | | 11 | 11 |
| 277/480 to 288/500 | 50 and 60 | | | | | 7 | 7 |
| 347/600 to 400/690 | 50 and 60 | | | | | 5 | 5 |
| 380 to 415 | 50 and 60 | 9 | 9 | 6 | 6 | | |
| 380<br>440 | 50<br>60 | | | 3 | 3 | | |
| 440 to 460 | 60 | | | 11 | 11 | | |
| 480 to 500 | 50 and 60 | 7 | 7 | 7 | 7 | | |
| 600 to 690 | 50 and 60 | | | 5 | 5 | | |
| 1000 | 50 and 60 | | | | 8 | | |
| > 50 | 100 to 300 | 10 | 10 | 10 | 10 | 10 | 10 |
| > 50 | >300 to 500 | 2 | 2 | 2 | 2 | 2 | 2 |
| > 50 to 250 | DC | 3 | 3 | | | | |
| > 250 | DC | 8 | 8 | | | | |
| supply by isolating transformer | 50 and 60 | 12 | 12 | 12 | 12 | 12 | 12 |
| All rated operating voltage and/or frequencies not covered by other configurations. | | 1 | 1 | 1 | 1 | 1 | 1 |

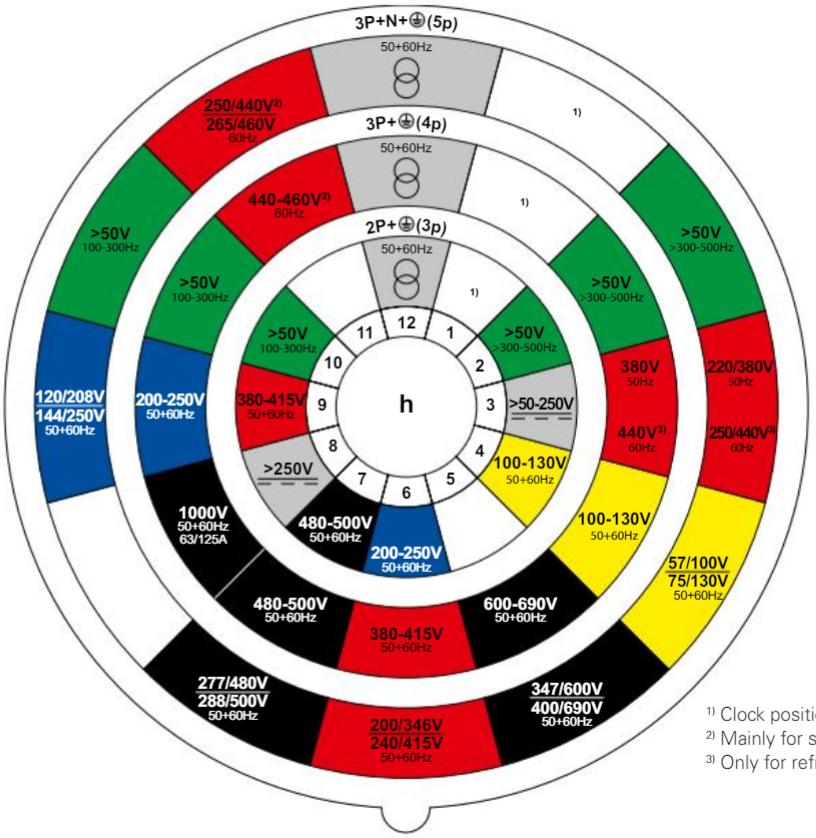
## COLOUR CODES

For ease of identification of the various voltages and frequencies all CEE plugs and sockets are colour coded:

| Rated operating voltage: | Colour code: |
|---|---|
| 20-25V | violet |
| 40-50V | white |
| 100-130V | yellow |
| 200-250V | blue |
| 380-480V | red |
| 500-1000V | black |
| >50V (100-500Hz) | green |
| no colour code | grey |

## INTERNATIONAL RATING – SERIE I

for appliances >50V – details see table above

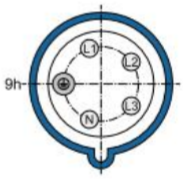



Position of the earthing contact.
View: frontside socket or connector

Example:

400V 5p = 6h


230V 5p = 9h




1) Clock position not standardized and free for use for special applications
2) Mainly for ship installations
3) Only for refrigerated containers

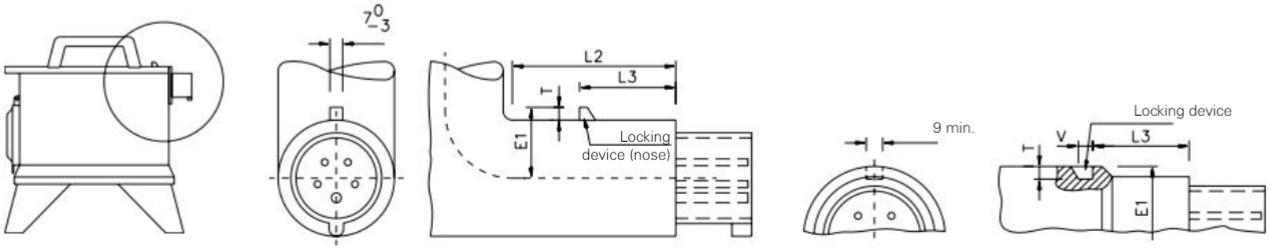
# Informationen

## LOCKING DEVICE

A locking device prevents unintended withdrawal by locking the hinged lid in a lug/cavity or a bayonet system with a bayonet ring. According to IEC/EN 60309-2 the following locking devices have to be provided:

| rated current | protection degree | sockets and connectors | plugs and appliance plugs |
|---|---|---|---|
| 16A and 32A | IP44 | hinged lid | lug/cavity |
| 16A and 32A | IP67 | bayonet system | lug/cavity and bayonet ring |
| 63A and 125A | IP67 | bayonet system | bayonet ring |

Exstract from the standard EN60309 for plugs and flanged plugs:




Positioning table (in mm):

| | | E1 | L2 | L3 (IP44) | L3 (IP67) | T | V |
|---|---|---|---|---|---|---|---|
| **16** | **3** | 29-31 | ≥75 | 40-41 | 37-38 | ≥4 | ≥8 |
| **16** | **4** | 33-35 | ≥80 | 46-47 | 43-44 | ≥5 | ≥8 |
| **16** | **5** | 37-39 | ≥90 | 52-53 | 49-50 | ≥7 | ≥8 |
| | | | | | | | |
| **32** | **3** | 39-41 | ≥90 | 53-54 | 50-51 | ≥7 | ≥8 |
| **32** | **4** | 39-41 | ≥90 | 53-54 | 50-51 | ≥7 | ≥8 |
| **32** | **5** | 44-46 | ≥105 | 58,5-60 | 55,5-57 | ≥8 | ≥9 |

## CONTACTS

The contacts are made of a copper-zinc alloy. The most important features are:

- high electric conducting capacity 15 MS/m / (m/Ω mm²);
- high resistance to extension up to 500 N/mm² (MPa);
- high corrosion resistance in areas of: industrial atmosphere, agriculture , . . .
- with nickel-plated contacts increased corrosion resistance in areas of: seawater, steam, sulphur hydrides, agriculture, dairies.
- conform to RoHS-directiv 2011/65/EU

PCE sockets 63A and 125A have a CuBe lamellar spring for a well contacting and anti-corrosion contacts.

## TEMPERATURES

**Ambient temperature:** IEC/EN 60309 applies to CEE plugs and sockets which are used at an ambient temperature that does not normally exceed the range from -25°C to +40°C.

**Temperature resistance:** PCE CEE plugs and sockets themselves have a temperatur resistance of -25°C to +80°C (100°C for 1 hour).

## IK-CODE:

The IK code is a coding system according to EN 50102 respectively IEC 62262, which defines the degree of protection provided by an enclosure against damaging mechanical loads.

Each characteristic numerical group of the IK Code represents a load energy value as per the table:

| IK-Code | IK01 | IK02 | IK03 | IK04 | IK05 | IK06 | IK07 | IK08 | IK09 | IK10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Load energy in joule | 0,14 | 0,2 | 0,35 | 0,5 | 0,7 | 1 | 2 | 5 | 10 | 20 |

## PLASTIC MATERIAL

Our plugs and sockets are produced from POLYAMIDE 6 as well as PC/ABS.
The main characteristics of these materials are:

- excellent impact resistance combined with high rigidity and solidity
- high thermal stability (self-extinguishing)
- very good insulating qualities
- high disruptive strength
- high abrasion resistance
- high weathering resistance
- UV-resistance according ISO 4892-2
- very good chemical resistance to various chemicals
- free from cadmium and halogen (fluorine, chlorine, bromine, jodine, astatine)
- conform to RoHS-directiv 2011/65/EU

PCE – overview chemical resistance:

| Chemicals | Concentration | Resistance | |
|---|---|---|---|
| | | PA6 | PC/ABS |
| Aceton | | + | - |
| Aldeyhde | | o | - |
| Alcohol | | + | + |
| Formic acid | 4-5% | - | o |
| Formic acid pure | | - | x |
| Formic acid hydrous | | - | x |
| Amine | | + | - |
| Ammonia | 5% | + | o / - |
| Ammonia hydroxyde | | + | x |
| Ammonia hydroxide solution | 15% | x | o |
| Ammonia chlorid | 35% | + | - |
| Ammonium compound (except persulphate) | | + | x |
| inorganic salts | | + | o |
| Benzine | | + | - |
| Benzene | | + | o |
| Chlorine | | o | o |
| Diethyl ether | | + | x |
| Acetic acid | 5% | o | + |
| Ester | | + | o |
| Ethanol | 4% | + | + |
| Ethyl ether | | + | o |
| Grease | | + | o / + |
| Hydrofluoric acid | | - | o |
| Formaldehyde | 5% | + | - |
| Formaldehyde pure | | + | x |
| Formaldehyde hydrous | | + | x |
| Formalin | 3-4% | + | - |

| Chemicals | Concentration | Resistance | |
|---|---|---|---|
| | | PA6 | PC/ABS |
| Glutaraldehyde | | o | x |
| Glycol | | o | o |
| Glyoxylic acid | | o | x |
| Glycerin | | + | o |
| Pozassium hydroxide | 50% | o | - |
| Ketone | | + | - |
| Petrol | | + | o / - |
| Cresol | 30% | - | - |
| Methane | | + | x |
| Mineral oil | | + | + |
| Sodium chlorid | | + | + |
| Caustic soda | 10% | + | x |
| Caustic soda solution | 2-8% | + | - |
| Nitrobenzene | | + | - |
| organic acids | 1% | o/- | + |
| Oil | | + | + |
| peracetic acid | 2% | - | - |
| Phosphoric acid | 10% | - | o |
| Propanol | | + | o |
| Nitric acid | 2% | - | + |
| Hydrochloric acid | 2% | - | o |
| Sulphuric acid | 50% | - | + |
| propellants (propane-butane mixture) | | x | - |
| petroleum ether | | x | o |
| Water | | + | + |
| Hydrogen peroxide | 30% | o | + |
| Citric acid | 20% | o | + |

+ resistant  o conditionally resistant  - not resistant  x not specified

The information about the resistance is valid with ambient temperature and can lead in coincidence of different medias to different resistances.
These indications do not exempt from own tests to determine the actual suitability of the products for the intended use.
Source: Saechtling Kunststoff pocket book; Carl Hanser Verlag Munich, Vienna; DSM Engineering plastics; PCE internal tests/investigations
Status: Nov. 11, 2016