SLOVENSKI STANDARD
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Leisure accommodation vehicles - 12 V direct current extra low voltage electrical installations - Part 2: Motor caravans

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Bewohnbare Freizeitfahrzeuge - Elektrische Anlagen für DC 12 V - Teil 2: Motorcaravans

Véhicules habitables de loisirs - Installations électriques a tres basse tension de 12 V en courant continu - Partie 2: Autocaravanes

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43.040.10	Električ na in elektronska oprema	Electrical and electronic equipment
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English version

Leisure accommodation vehicles - 12 V direct current extra low voltage electrical installations - Part 2: Motor caravans

Véhicules habitables de loisirs - Installations électriques à très basse tension de 12 V en courant continu - Partie 2: Autocaravanes

Bewohnbare Freizeitfahrzeuge - Elektrische Anlagen für DC 12 V - Teil 2: Motorcaravans

This European Standard was approved by CEN on 18 September 1997.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 245 "Leisure accommodation vehicles", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

The requirements of relative ISO/IEC and CENELEC publications were taken into consideration during the preparation of this European Standard.

This European Standard is one of a series covering the habitation aspects of leisure accommodation vehicles.

Requirements for 12 V direct current extra low voltage electrical installations for caravans are specified in prEN 1648-1.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies safety, health and functional requirements for 12 V direct current (DC) extra low voltage (ELV) electrical installations for habitation aspects of motor caravans.

It applies only to installations which are electrically connected with the electrical installation of the base vehicle or which can be electrically connected with it by means of change-over devices.

This European Standard also specifies the ELV output requirements of low voltage (LV) equipment that may be used to provide an ELV supply, but it does not specify safety, technical and functional requirements for LV appliances and installations. Requirements for LV installations are specified in HD 384-7-708 S1.

2 Normative references

This standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

prEN 1646-1
Leisure Accommodation Vehicles - Motor Caravans - Part 1: Habitation requirements relating to health and safety

EN 27418
Leisure accommodation vehicles - Vocabulary (ISO 7418:1989)

EN 50102
Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

EN 60335-1
Safety of household and similar electrical appliances - Part 1: General requirements

EN 60335-2-29
Safety of household and similar electrical appliances - Part 2: Particular requirements for battery chargers

EN 60529
Degrees of protection provided by enclosures (IP code) (IEC 529:1989)

HD 21.1 S2
Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements (IEC 227-1:1993)

HD 21.3 S3
Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 3: Non-sheathed cables for fixed wiring (IEC 227-3:1993, modified)

HD 21.4 S2
Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 4: Sheathed cables for fixed wiring

HD 21.5 S3
Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords) (IEC 227-5:1979, modified)

HD 22.1 S2
Rubber insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements (IEC 245-1:1980, modified)

HD 22.4 S3
Rubber insulated cables of rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables (IEC 245-4:1994, modified)

HD 384-7-708.S1
Electrical installations of buildings - Part 7: Requirements for special installations or locations - Section 708: Electrical installations in caravan parks and caravans

ISO 6309
Fire protection - Safety signs

ISO 6722-1
Road vehicles - Unscreened low-tension cables - Part 1: Test methods

ISO 6722-2
Road vehicles - Unscreened low-tension cables - Part 2: Requirements

ISO 8820-2
Road vehicles - Blade-type electric fuse-links - Part 2: Dimensions

3 Definitions

For the purposes of this standard the definitions given in EN 27418 shall apply.

4 Power supply

4.1 General

The power supply shall be a nominal DC 12 V obtained from an auxiliary battery, except in the case of a motor caravan where the overall length multiplied by the overall width does not exceed 8,5 m^2 plan area. In this case it is permissible to use only the base vehicle battery.

The supply of the auxiliary battery shall be obtained from the electrical installation of the base vehicle or one or more of the following sources:

a) Battery charger (see 7.4);

If the charger is combined with a transformer/rectifier unit, then individual current consumers can also be supplied with electricity directly from this rectifier unit.

b) Generator that is driven by any form of energy (see 4.3);

c) solar energy cells (see 4.3).

It shall be ensured that the auxiliary battery will be automatically disconnected from the 12 V power supply of the base vehicle when the motor of the base vehicle is turned off.

4.2 Auxiliary batteries

4.2.1 General

An auxiliary battery shall only be intended for the electric power supply of the living area.

4.2.2 Type of battery

An auxiliary battery shall be of the rechargeable type.

Non-rechargeable batteries are not auxiliary batteries according to 4.2. They may be used in motor caravans, provided that they are used in circuits separated from other sources of electrical supply.

4.2.3 Capacity

An auxiliary battery shall have a nominal capacity of at least 60 ampere-hours (Ah) at 20 h discharge rate.

NOTE: It is recommended to use a battery designed to be discharged over long periods at a relatively low current.

4.2.4 Terminals

Auxiliary battery terminals shall be clearly and durably marked "+" and "-". Connections to auxiliary battery terminals shall be securely clamped or bolted to ensure continuous contact and shall be insulated unless the auxiliary battery is provided with an insulating device.

4.2.5 Location

If an auxiliary battery is not installed in the engine compartment, it shall be placed in a separate compartment, with easy access for maintenance and/or removal and secured to prevent movement of the battery, e. g. when the motor caravan is in motion.

4.2.6 Auxiliary battery compartment

A tray shall be installed under an auxiliary battery if the electrolyte of this battery is liquid.

The interior of an auxiliary battery compartment shall be ventilated and protected against the corrosive effect of acid-laden gases, either by

a) installing a sealed auxiliary battery that incorporates an external ventilating kit that is taken to the exterior of the motor caravan; or

b) installing an auxiliary battery in an enclosed battery compartment that is protected internally against corrosion and is ventilated to the exterior of the motor caravan by means of a suitable tube with a minimum inside diameter of 10 mm at the top of the auxiliary battery compartment in accordance with the battery manufacturer's instructions or as supplied by the manufacturer of the auxiliary battery; or

c) ventilating the compartment at low-level and high-level to the exterior of the motor caravan and constructing the interior of the compartment, including the sides of the ventilator openings, of acid-resistant material or providing it with an anti-corrosive finish. If the compartment opens into the interior of the motor caravan, the lid shall provide an air seal.

The requirements concerning the protection against corrosion and ventilation are not applicable if batteries with bound electrolytes are used.

If an auxiliary battery is not provided, then the position and instructions for the installation of the battery and compartment, in accordance with a), b) or c), shall be included in the User's Handbook according to clause 8 and a notice shall be fixed in or near the proposed location stating:

"For instructions on auxiliary battery installation, see User's Handbook."

When the manufacturer makes no provision for the installation of an auxiliary battery, the following statement shall be made in the User's Handbook:

"This motor caravan has not been designed to accommodate an auxiliary battery. Do not fit one."

4.2.7 Warning notice

A warning notice shall be fixed in a prominent position near the auxiliary battery or displayed on the lid of the auxiliary battery compartment. This warning shall be in the official language(s) of the country in which the motor caravan is to be sold and shall state:

"Switch off all appliances and lamps before disconnecting the auxiliary battery."

The auxiliary battery compartment shall be additionally marked "Smoking prohibited" in accordance with ISO 6309 and in the language(s) of the country in which the motor caravan is to be sold.

4.3 Other sources of supply

4.3.1 Generators and transformer/rectifiers unit

If a supply is obtained from a generator or from a low voltage supply via a transformer/rectifier unit, the extra low voltage at the output terminals of the supply unit shall be maintained between 11 V min. and 14 V max. with applied loads varying from 0,5 A min. up to the max. rated load of the supply unit. Over the same load range, alternating voltage ripple shall not exceed 10 %.

4.3.2 Regenerative sources

Regenerative energy sources, such as wind energy, solar energy etc., shall be applied only for charging batteries.

They shall only be operated with a device which prevents overcharging of the battery(ies).

4.4 Protective measures

The ELV installation shall be so installed that the protective measures of the LV installation against direct contact, or in case of indirect contact are not impaired.

It shall be ensured that the protective conductors of the LV installation are not loaded by operating currents of the ELV installation.

5 Wiring

5.1 Cable and fixed wiring cross-sectional areas

The cross-sectional areas of the fixed wiring shall be in accordance with annex A. Annex A does not apply to sensor and data lines.

5.2 Fixed wiring

5.2.1 Cables

All circuits from the auxiliary battery shall consist of a feed and a return cable (two-core line). The return (negative) cable shall be connected to the negative terminal of the battery. The feed (positive) cable shall be connected to the positive terminal of the battery.

Providing that voltage drop is not increased the return path of a circuit may be by means of the chassis/bodywork of the base vehicle rather than by cable.

5.2.2 Type of cable

Cables shall be of stranded construction and shall conform to HD 21.1 S2, HD 21.3 S3, HD 21.4 S2 and HD 21.5 S3 or HD 22.1 S2 and HD 22.4 S3 or ISO 6722-1 and ISO 6722-2.

5.2.3 Cable installation

Cables may be run either visibly or concealed. Cables shall be protected by suitable means against mechanical damage, thermal overload and chemical reaction.

Cables of ELV circuits and cables of other circuits (cables for LV current) may be run together, if the cables of the individual circuits are designed for the highest voltage which is likely to occur.

5.2.4 Supporting of cables

Cables shall be supported at maximum intervals of 400 mm for vertical runs. Horizontal runs, unless run in conduits or ducts shall be supported at maximum intervals of 250 mm. In the case of horizontal runs of a cable on a fixed substructure, cables shall be supported at maximum intervals of 400 mm.

5.2.5 Connections

All cable connections shall be accessible and insulated.

Connections of external cables shall be enclosed to provide protection by equipment that complies with grade IP 34 of EN 60529.

5.2.6 Auxiliary battery cables

Cables from an auxiliary battery shall be protected by additional sheathing or taping up to the overcurrent protective device (see 6.1).

5.2.7 Prohibited cable runs and LPG installations

Cables shall not be run through a compartment or housing intended for liquefied petroleum gas storage cylinders at a height of less than 500 mm above the base of the cylinders, and they shall be protected against mechanical damage by installation within a continuous gas tight conduit or duct through the compartment.

When installed, this conduit or duct shall be able to withstand an impact equivalent to IK08 of EN 50102 without visible physical damage.

ELV cables and electrical equipment shall only be installed within the LPG cylinder compartment or housing if the installation serves the operation of the gas cylinders (e.g. indication of empty gas cylinders) or is for use within the compartment or housing. Such electrical installations and components shall be constructed and installed so that they are not a source of ignition and shall be in accordance with the appropriate standards for any hazardous area classification of the compartment or housing.

6 Overcurrent protection

6.1 Protection of positive conductors

The ELV installation shall be protected by at least one overcurrent protective device for each circuit which disconnects the circuit in the case of overload or short circuit. The nominal current I_n of this protective device shall not exceed the permissible current rating I_z of the cable.

The overcurrent protective device for the power supply from the base vehicle shall be fitted at the end of the connecting cable and before the fixed installation. The overcurrent protective device for the auxiliary battery shall be fitted at the end of the battery cable and before the fixed installation. The ELV output of the transformer/rectifier unit and of the DC generator shall be provided before distribution with an overcurrent protective device unless this is already incorporated within the device.

6.2 Types of device

Overcurrent protective devices shall be either fuse links according to ISO 8820-2 or suitable miniature circuit breakers.

6.3 Installation of fuses

Fuses shall be enclosed to prevent accidental damage.