



SLOVENSKI STANDARD
SIST ENV 50275-1:2002
01-september-2002

Conductive charging for electric vehicles - Part 1: General considerations

Conductive charging for electric vehicles -- Part 1: General considerations

Konduktive Ladung von Elektrofahrzeugen -- Teil 1: Allgemeine Überlegungen

Charge conductive pour véhicules électriques -- Partie 1: Généralités

Ta slovenski standard je istoveten z: ENV 50275-1:1998

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
EUROPÄISCHE VORNORM

ENV 50275-1

October 1998

ICS 43.120

English version

**Conductive charging for electric vehicles
Part 1: General considerations**

Konduktive Ladung von
Elektrofahrzeugen
Teil 1: Allgemeine Überlegungen

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This European Prestandard (ENV) was approved by CENELEC on 1998-09-14 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CENELEC will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard (EN).

CENELEC members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Prestandard was prepared by the Technical Committee CENELEC TC 69X, Electrical systems for electric road vehicles, in accordance with the decision taken by CLC/TC 69X at its sixth meeting held on 17 September 1997.

The following date was fixed:

- latest date by which the existence of the ENV
has to be announced at national level (doa) 1998-12-15

This European Prestandard is to be used in conjunction with several specific European Prestandards listed in the scope.

Annexes designated « normative » are part of the body of the standard.
Annexes designated « informative » are given for information only.

In this standard, annexes A and B are normative.

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Introduction

This European Prestandard - Conductive Charging for Electric Vehicles - is published in separate parts according to the following structure:

Part 1 of this prestandard - General considerations - is a general description and contains general requirements for charging electric vehicles.

Part 2 of this prestandard covers the physical, electrical and performance requirements concerning devices for the charging system, when they are not already standardized.

Part 2 is further subdivided into parts which are published as European Prestandards:

Part 2-1: Connection of an electric vehicle to an a.c./d.c. supply.

Part 2-2: A.C. charging station.

Part 2-3: D.C. charging station.

Part 2-4: Communication protocol between off-board charger and electric vehicle.

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1 Scope

This European Prestandard applies to the equipment for charging class I electric road vehicles (EV) at standard a.c. supply voltages per IEC 60038, up to 690 V and d.c. voltage up to 1000 V, and for providing electrical power for any auxiliary services on the vehicle if required, when connected to the supply network.

The aspects covered include:

- characteristics and operating conditions of the supply device
- connection of the vehicle
- operators and third party electrical safety
- characteristics to be complied with by the vehicle with respect to the a.c./d.c. electric vehicle supply equipment.

This prestandard defines different charging modes, but does not prescribe the choice of the charging mode which depends on national requirements and practice.

NOTE 1: Class II vehicles are not forbidden but the lack of information on this type of vehicle means that the requirements for the prestandard are unavailable at present.

NOTE 2: This prestandard applies to electric vehicle supply equipment (EVSE) with on-site storage capability.

This prestandard does not cover all safety aspects related to maintenance.

This prestandard is not applicable to trolley buses, rail vehicles, industrial trucks and vehicles designed primarily for use off-road.

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2 Normative references

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This European Prestandard 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 European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 50160	1994	Voltage characteristics of electricity supplied by public distribution systems
ENV 50275-2-4	1998	Conductive charging for electric vehicles Part 2-4: Communication protocol between off-board charger and electric vehicle
EN 60529 + corr. May 1993	1991	Degrees of protection provided by enclosures (IP Code) (IEC 60529 : 1989)
		NOTE : Basic Safety Publication
HD 22	series	Rubber insulated cables of rated voltage up to and including 450/750 V
HD 384.4.41 S2	1996	Electrical Installations of buildings Part 4 : Protection for safety Chapter 41 : Protection against electric shock (IEC 60364-4-41:1992; modified)

HD 384.5.54 S1	1988	Electrical installations of buildings Part 5: Selection and erection of electrical equipment Chapter 54: Earthing arrangements and protective conductors (IEC 60364-5-54:1980, modified)
IEC 60038	1983	IEC standard voltages
IEC 60755	1983	General requirements for residual current operated protective devices
+ A1	1988	
+ A2	1992	

3 Definitions

For the purpose of this prestandard, the following definitions apply:

- 3.1 **electric (road) vehicle (EV):** Any vehicle propelled by an electric motor drawing current from a rechargeable storage battery or other portable energy storage devices (rechargeable using energy from a source off the vehicle such as residential or public electric service), which is manufactured primarily for use on public streets, roads or highways.
- 3.2 **battery (assembly) (energy store):** Secondary cells or monoblocs, one or several battery trays and such auxiliary appliances as battery fuses, automatic topping-up equipment, intercell connectors, battery monitoring devices.
- 3.3 **charger:** A power converter that performs the necessary functions for charging a battery.
- 3.4 **on-board charger:** A charger mounted on the vehicle which is fitted to it as a standard equipment and designed to operate only on the vehicle.
- 3.5 **off-board charger:** A charger connected to the premise wiring of the a.c. supply network and designed to operate entirely off-board the vehicle. In this case, direct current electrical power is delivered to the vehicle.
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- 3.6 **dedicated off-board charger:** An off-board charger dedicated to a specific type of electric vehicle, which may have control charging functions or communication.
- 3.7 **class I Charger:** A charger having functional (basic) insulation throughout, whose conductive accessible parts are connected to the protective earthing conductor and provided with an earthing terminal or connection to the vehicle.
- 3.8 **class II Charger:** A charger having double insulation and/or reinforced insulation throughout. It may have a lead-through protective conductor for grounding the EV chassis.
- 3.9 **EV supply equipment (EVSE):** All the fittings, devices, conductors, power outlets, attachment plugs, cable and electric vehicle connectors permanently attached, specifically installed for the purpose of delivering energy from the premise wiring to the EV and allowing communication between them if required.
- 3.10 **charging:** All functions necessary to condition standard voltage and frequency a.c. supply current to a regulated voltage/current level to assure proper charging of the EV traction battery and/or supply of energy to the EV traction battery bus-bars for operating on-board electrical equipment in a controlled manner to assure proper energy transfer.
- 3.11 **cable assembly:** The piece of equipment which is used to establish the connection between the electric vehicle and the electric vehicle supply equipment. It may be fixed and included into one of these device or detachable. It includes the flexible cable and the connector and/or plug that are required for proper connection (see figures 1 to 3).
- 3.12 **exposed conductive part:** A conductive part of electrical equipment (e.g. an electric vehicle) that may be touched and which is not normally energized but which may be in case of a fault.
- 3.13 **direct contact:** Contact of persons or live stock with live parts.
- 3.14 **indirect contact:** Contact of persons or live stock with exposed conductive parts made live by an insulation failure.

3.15 **class I electric vehicle:** An electric vehicle the protection of which against electric shocks when connected to a.c. network does not rely only on the functional insulation, but includes a supplementary safety measure, consisting of connecting all exposed conductive parts to the electric vehicle earth terminal.

3.16 **class II electric vehicle:** An electric vehicle in which protection against electric shock does not rely on basic insulation only but in which additional safety precautions, such as double insulation or reinforced insulation, are provided, there being no provision for protective earthing or reliance upon installation conditions.

3.17 **earth terminal:** The accessible connection point for all exposed conductive parts electrically bound together.

3.18 **a.c. electric vehicle charging station (a.c. charging station):** All equipment for delivering a.c. current to electric vehicles, installed in an enclosure(s) and with special control functions.

3.19 **d.c. electric vehicle charging station (d.c. charging station):** All equipment for delivering d.c. current to electric vehicles, installed in an enclosure(s), with special control functions and communication and located off the vehicle.

3.20 **plug and socket-outlet:** A means of enabling the connection at will of a flexible cable to fixed wiring. It consists of two parts :

3.20.1 **socket-outlet:** the part intended to be installed with the fixed wiring.

3.20.2 **plug:** The part integral with or intended to be attached to the flexible cable connected to the socket-outlet.

3.21 **vehicle coupler:** A means of enabling the connection at will of a flexible cable to an electric vehicle. It consists of two parts :

3.21.1 **vehicle connector:** The part integral with or intended to be attached to the flexible cable connected to the supply.

3.21.2 **vehicle inlet:** The part incorporated in, or fixed to the EV or intended to be fixed to it.

3.22 **retaining device:** A mechanical arrangement which holds a plug or connector in position when it is in proper engagement, and prevents its unintentional withdrawal.

NOTE: The retaining device can be electrically or mechanically operated

3.23 **in-cable control box:** A device which is incorporated in the cable assembly and which performs control functions.

3.24 **control pilot :** The control conductor in the cable assembly connecting the in-cable control box or the fixed part of the EVSE, and the EV earth through the control circuitry on the vehicle. It may be used to perform several functions.

3.25 **auxiliary circuit:** Under consideration

4 General requirements

The electric vehicle shall be connected to the EV supply equipment so that in normal conditions the charging function operates safely, indoors or outdoors, causing no danger to persons or surroundings, even in the event of carelessness that may occur in normal use.

In general, this principle is achieved by fulfilling the relevant requirements specified in this standard and compliance is checked by carrying out all relevant tests.

5 Rating of the supply voltage

The rated value of the a.c. voltage supplied by public distribution systems is 230/400 V. Allowed variation of the voltage and frequency are defined in EN 50160. Industrial a.c. voltage of 690 V may be used to supply off-board chargers.