SLOVENSKI STANDARD
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Conductive charging for electric vehicles - Part 2-2: A.C. charging station

Conductive charging of electric vehicles -- Part 2-2: A.C. charging station

Konduktive Ladung von Elektrofahrzeugen -- Teil 2-2: Wechselstrom-Ladestation

Charge conductive pour véhicules électriques -- Partie 2-2: Borne de charge courant alternatif

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Conductive charging of electric vehicles
Part 2-2: A.C. charging station

Konduktive Ladung von
Elektrofahrzeugen
Teil 2-2: A.C. Ladestation

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).

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CENELEC

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

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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.

CONTENTS

Pages

Introduction 4

1 Scope 5

2 Normative references 5

3 Definitions 6

4 General requirements 6

5 Prestandard conditions for operation in service and for installation 6

6 Rating of the a.c. electric vehicle charging station 6

7 General test provisions 7

8 Functional and constructional requirements 7

9 Electrical safety requirement for the a.c. charging station 8

10 Dielectric tests requirements 8

11 Environmental tests 11

12 Specific socket-outlet or connector requirements 12

13 Marking and instructions 14

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.

1 Scope

This prestandard, together with part 1, gives the requirements for a.c. electric vehicle charging stations for conductive connection to the vehicle, with an a.c. supply voltages per IEC 60038, up to 690 V.

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

The scope of this prestandard does not cover box type assemblies, with socket-outlets installed for the purpose of delivering energy to the vehicle, which have no charging control functions.

2 Normative references

This clause of part 1 applies with the following additional references.

EN 50160	1994	Voltage characteristics of electricity supplied by public distribution systems.
EN 60068-2-1 + A1 + A2	1993 1993 1994	Environmental testing - Part 2: Tests - Tests A: Cold (IEC 60068-2-1:1990 + A1:1993 + A2:1994)
EN 60068-2-2 + A1 + A2	1993 1993 1994	Part 2: Tests - Tests B: Dry heat (IEC 60068-2-2:1974 + A1:1993 + A2:1994)
EN 60068-2-62	1995	Part 2: Test Ef: Impact, pendulum hammer (IEC 60068-2-62:1991 + A1:1993)
EN 60309-1	1997	Plugs, socket-outlets and couplers for industrial purposes Part 1: General requirements (IEC 60309-1:1997)
EN 60439-1 + A1	1994 1995	Low-voltage switchgear and controlgear assemblies Part 1: Type-tested and partially type-tested assemblies (IEC 60439-1:1992 + A1:1995)
EN 60529	1991	Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)
EN 61180-1	1994	High voltage test techniques for low-voltage equipment Part 1: Definitions, test and procedure requirements (IEC 61180-1:1992)
HD 323.2.3 S2	1987	Environmental testing - Part 2: Tests - Test Ca: Damp heat, steady state (IEC 60068-2-3:1969)
HD 323.2.5 S2	1988	Part 2: Tests - Test Sa: Simulated solar radiation at ground level (IEC 60068-2-5:1975)
HD 323.2.14 S2	1987	Part 2: Tests - Test N: Change of temperature (IEC 60068-2-14:1984 + A1:1986)
HD 323.2.30 S3	1988	Part 2: Tests - Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle) (IEC 60068-2-30:1980 + A1:1985)
HD 323.2.52 S1	1987	Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52:1984)

HD 384.4.43 S1	1980	Electrical installations of buildings Part 4: Protection for safety Chapter 43: Protection against overcurrent (IEC 60364-4-43:1977; modified)
HD 384.5.54 S1	1988	Part 5: Selection and erection of electrical equipment Chapter 54:Earthing arrangements and protective conductors (IEC 60364-5-54:1980; modified)
HD 625.1	1996	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests (IEC 60664-1:1992; modified)
IEC 60364-4-443	1995	Chapter 44: Protection against over voltages Section 443: Protection against over voltages of atmospheric origin or due to switching.

3 Definitions

Clause 3 of part 1 applies.

4 General requirements

Any device installed in an enclosure and with special control charging functions, designed to deliver a.c. current to electric vehicles, is an a.c. electric vehicle charging station.

The connection of electric vehicles can be made in one of three different ways:

- case A: supply cable and plug permanently attached to the EV
- case B: separate flexible supply cable
- case C: supply cable and connector permanently attached to the charging station.

The a.c. electric vehicle charging station may have one or more socket-outlets/connectors.

The a.c. electric vehicle charging station shall be connected to the electric vehicle 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 is achieved by fulfilling the relevant requirements specified in this prestandard and compliance is checked by carrying out all relevant tests. General requirements for the a.c. electric vehicle charging station can also be found in EN 60439-1.

5 Prestandard conditions for operation in service and for installation

The rated value of the a.c. supply voltage is up to 690 V. Allowed variations of the voltage and frequency are defined in EN 50160.

The ambient temperature range during charging may be between -20°C and +40°C.

NOTE: In some countries different temperature ranges may apply.

The relative humidity is between 5% and 95%. The atmospheric pressure is between 860 hPa and 1060 hPa.

6 Rating of the a.c. electric vehicle charging station

The preferred value of the input voltage rating is 230/400 V and the maximum value is 690 V.

The preferred values of the output voltage and current rating are given in table 1. Lower currents are used.

Table 1: Preferred values of output voltage and current rating

Option	AC output
A	Single phase, 240 V, 63 A
B	Single/three phase, 230/400 V, 32 A
C	Three phase, 500 V, 250 A
D	Single phase, 230 V, 32 A

NOTE: Provision of this clause may be subject to revision.

7 General test provisions

7.1 All tests in this prestandard are type tests.

7.2 Unless otherwise specified, type tests shall be carried out on a single specimen as delivered and configured in accordance with the manufacturer's instructions.

7.3 Unless otherwise specified, the tests shall be carried out in the order of the clauses and sub-clauses in this document.

7.4 The tests shall be carried out with the specimen or any movable part of it placed in the most unfavorable position which may occur in normal use.

7.5 The tests shall be carried out in a draught free location and in general, at an ambient temperature of 20 °C ± 5 °C, unless otherwise specified.

7.6 The characteristics of the test voltages shall comply with EN 61180-1.

8 Functional and constructional requirements

8.1 Control functions

The a.c. electric vehicle charging station provides part of control functions listed in subclause 6.4 of part 1 of this prestandard, for mode 3 charging.

8.2 Emergency service

If required by national rules, an emergency disconnection device shall be installed to isolate all active conductive parts from the a.c. electric vehicle charging station in case of risk of electric shock, fire or explosion. Protection of the disconnection device should be provided in order to prevent accidental disconnection.

8.3 Permissible temperature

The maximum permissible temperature of parts of the a.c. electric vehicle charging station which may be touched but not hand grasped, at an ambient temperature of 40 °C, shall be:

- 60 °C for metal parts
- 85 °C for non-metal parts

8.4 Charging station protection degree (IP)

The a.c. electric vehicle charging station when socket-outlet access trap (if any) is closed, shall comply with IP 44 whether the station is energized or not, according to EN 60529.

Connecting means are dealt with in clause 12.

8.5 Location of the socket-outlet/connector

The socket outlet (cases A and B) at the end of the cable shall be located at a height between 0,4 m and 1,5 m, between the lower part of the socket-outlet or connector and ground level. In case C, the supporting location to house the connector when the charge is finished should also meet the foregoing requirements.