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Contact Interface for Automated Connection Device

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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ICS 43.120

English Version

Contact Interface for Automated Connection Device

Interface de contact pour les dispositifs de connexion
automatisésKontaktschnittstelle für ein automatisches
Kontaktierungssystem

This European Standard was approved by CENELEC on 2021-01-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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European foreword

This document (EN 50696:2021) has been prepared by CLC/TC 23H, WG 5, "Contact interface for automated connection devices (ACD)".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-01-11
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2024-01-11

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This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Introduction

The electrical interface for charging electrically propelled vehicles with plugs, socket-outlets, vehicle connectors and vehicle inlets is described in EN 62196 series and EN 61851-23. For heavier vehicles such as buses and trucks, requirements of short charging times with high energy present a problem of handling, and safety with hand-held connecting devices. For these high current charging applications, an automated connection device (ACD) is of interest.

An automated coupler consists out of a mobile assembly with electrical contacts, called ACD and fixed electrical contacts, called ACD counterpart. Automated couplers allow an unmanned connection of high-current contacts and signal/control contacts.

This document contains requirements for all type of ACDs. Its annexes describe specific implementations and specific requirements. This document is expected to be read in conjunction with IEC 61851-23-1:—¹.

¹ Under preparation. Stage at time of publication: IEC CDV 61851-23-1:2020.

1 Scope

This document is applicable to ACDs of standardized configuration, intended for use in electric vehicle conductive charging systems which incorporate control means, with rated operating voltage up to 1 500 V DC.

This document applies to high power DC interfaces intended for use in isolated conductive charging systems, for circuits specified in IEC 61851-23-1:—¹.

The ACDs covered by this document are used only in charging mode 4, according to IEC 61851-23-1:—¹, 3.1.201 Case D or 3.1.202 Case E.

This document describes the requirements for an ACD in regard of safety, function and testing. This document describes basic parameters that can be standardized for different ACDs. ACDs following these standardized parameters will have the benefit of being compatible, even if they are based on different technologies.

This document does not apply to solutions based on a vehicle connector described in EN 62196-3 driven by an automated mechanism, as, for instance, a robotic arm.

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1652, *Copper and copper alloys - Plate, sheet, strip and circles for general purposes*

EN 12163, *Copper and copper alloys - Rod for general purposes*

EN 12167, *Copper and copper alloys - Profiles and bars for general purposes*

EN 16005, *Power operated pedestrian doorsets – Safety in use – Requirements and test methods*

EN 50124-1, *Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment*

EN 60068-2-11, *Environmental testing - Part 2: Tests - Test Ka: Salt mist (IEC 60068-2-11)*

EN 60309-1:1999, *Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements (IEC 60309-1:1999)*

EN 60512-2-2, *Connectors for electronic equipment - Tests and measurements – Part 2-2: Electrical continuity and contact resistance tests - Test 2b: Contact resistance – Specified test current method*

EN 60512-5-1, *Connectors for electronic equipment - Tests and measurements - Part 5-1: Current-carrying capacity tests - Test 5a: Temperature rise (IEC 60512-5-1)*

EN 60512-5-2, *Connectors for electronic equipment - Tests and measurements - Part 5-2: Current-carrying capacity tests - Test 5b: Current-temperature derating (IEC 60512-5-2)*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 60664-1, *Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests (IEC 60664-1)*

EN 61140, *Protection against electric shock - Common aspects for installation and equipment (IEC 61140)*

EN IEC 61851-1:2019, *Electric vehicle conductive charging system - Part 1: General requirements (IEC 61851-1:2017)*

EN 61984:2009, *Connectors - Safety requirements and tests (IEC 61984:2008)*

IEC 61851-23-1:—,² *Electric vehicle conductive charging system – Part 23-1: DC charging with an automated connection system*

IEC 62196-1:2014, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements*

ISO 17409:2020, *Electrically propelled road vehicles — Conductive power transfer — Safety requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61851-23-1:—¹ and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

working position

position reached when the ACD and the fixed ACD counterpart have mated and when the physical contact is established, and energy transfer is allowed

3.2

home position

position where the ACD is not engaged with its counterpart and where safe clearance is present with street and infrastructure

3.3

keep-out zone

space above and around automated coupler

4 Electrical requirements

4.1 Voltage and current requirements

4.1.1 Number of contacts

For systems described in IEC 61851-23-1:—¹, Annexes AA, BB and CC:

Four contacts: DC+, DC-, PE and CP (IEC 61851-23-1:—¹, Figure AA.1, IEC 61851-23-1:—¹, Figure BB.1 and IEC 61851-23-1:—¹, Figure CC.14)

For systems described in IEC 61851-23-1:—¹, Annex KK:

three contacts: DC+, DC-, PE (IEC 61851-23-1:—¹, Figure KK.14)

² Under preparation. Stage at time of publication: IEC CDV 61851-23-1:2020.