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IEEE Standard Technical Specifications of a DC Quick Charger for Use with Electric Vehicles

IEEE Vehicular Technology Society

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USA

IEEE Std 2030.1.1™-2015

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Acknowledgments

Grateful acknowledgment is made to the CHAdeMO Association for permission to use the following source material in Annex A:

CHAdeMO 1.0.1 (21 May 2013), Technical Specifications of Quick Charger for the Electric Vehicle.

Abstract: Direct-current (dc) charging is a method of charging that facilitates rapid energy transfer from the electric grid to plug-in vehicles. This method of charging allows significantly more current to be drawn by the vehicle versus lower rated alternating-current (ac) systems. A combination of vehicles that can accept high-current dc charge and the dc supply equipment that provides it has led to the use of terminology such as “fast charging,” “fast charger,” “dc charger,” “quick charger,” etc.

DC charging and ac charging vary by the location at which ac current is converted to dc current. For typical dc charging, the current is converted at the off-board charger, which is separate from the vehicle. For ac charging, the current is converted inside the vehicle, by means of an on-board charger.

The location of the ac to dc conversion equipment, or converter, shapes the complexity of the equipment design. Regarding ac charging, as previously mentioned, the conversion is on board the vehicle. This allows the original equipment maker (OEM) designed systems to control the charging operation in its entirety. The on-board charger (converter) and battery controller solution is under direct control of the vehicle manufacturer.

For dc charging, an entirely new challenge exists for OEMs. The dc charger is now external to the vehicle and requires the vehicle engineers to control an external power device. For the reason of necessary interoperability, standards such as IEEE Std 2030.1.1 are provided to assist developers.

Keywords: automotive, CHAdeMO, dc charger, dc charging, electric vehicle, fast charger, fast charging, IEC 61851-23, IEEE, IEEE 2030.1.1™, rapid charging, SAE, SAE J1772, SAE J2836/2

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Introduction

This introduction is not part of IEEE Std 2030.1.1-2015, IEEE Standard Technical Specifications of a DC Quick Charger for Use with Electric Vehicles.

This standard defines requirements for the designs of electric vehicles and dc quick chargers that promote efficient and rapid charging between electric vehicles and dc quick chargers. This document specifies the collaborative actions between electric vehicles and quick chargers referencing relevant international specifications.

Contents

IEEE Standard Technical Specifications of a DC Quick Charger for Use with Electric Vehicles

1. Scope

This standard specifies the design interface of electric vehicles and direct current (dc) quick chargers that promote rapid charging of battery electric vehicles.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEC 61851-1, Electric vehicle conductive charging system—Part 1: General requirements.[1]

IEC 62196-3, Plugs, socket-outlets, vehicle connectors and vehicle inlets—Conductive charging of electric vehicles—Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c. /d.c. pin and contact-tube vehicle couplers.

[1] IEC publications are available from the International Electrotechnical Commission, Case Postale 131, 3 rue de Varembé, CH-1211, Genève 20, Switzerland/Suisse (http://www.iec.ch/). IEC publications are also available in the United States from the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (http://www.ansi.org/).