

TR 25-3:2022
(ICS 43.120)

TECHNICAL REFERENCE

Electric vehicles charging system

– Part 3: High power charging



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Contents

	Page
Foreword _____	4
1 Scope _____	6
2 Normative references _____	6
3 Terms and definitions _____	7
4 High power charging using thermal management systems _____	10
4.1 General requirements (high power charging using thermal management systems) _____	10
4.2 Rating of the supply AC voltage (high power charging using thermal management systems) _____	13
4.3 Protection against electric shock (high power charging using thermal management systems) _____	13
4.4 Connection between the power supply and EV _____	13
4.5 Specific requirements for vehicle inlet and vehicle connector _____	14
4.6 Specific requirements for coolant used in liquid cooled cables _____	14
4.7 Specific requirements for high power DC EV supply equipment with thermal management system _____	15
4.8 Marking and instructions (high power charging using thermal management systems) _____	21
5 High power charging with an automated connection device _____	21
5.1 General requirements _____	21
5.2 Rating of the supply AC voltage _____	21
5.3 Charging modes and functions _____	21
5.4 Protection against electric shock _____	22
5.5 Automatic reclosing or protective devices _____	23
5.6 Emergency switching or disconnect _____	23
5.7 Marking and instructions (high power charging with an automated connection device) _____	24
5.8 Specific requirements for automated connection device _____	24
6 Maintenance of high power DC EV supply equipment _____	25
6.1 Scope of maintenance _____	25
6.2 Frequency of testing and inspection _____	25
6.3 Fault reporting procedure _____	27
6.4 Maintenance and documentation _____	27
Annexes:	
A (informative) Recommended data _____	28
B (normative) Specific information for configuration AA _____	29
C (normative) Specific information for configuration FF _____	30

	Page
D (normative) Checklist for new charger / parts replacement / modification for EV charging system _____	31
E (normative) Checklist for preventive maintenance for EV charging system (EVCS)	36
F (normative) Checklist for annual inspection for EV charging system (EVCS)_____	40
Tables	
1 Overview of the DC vehicle interface _____	13
2 Overview of the combined AC/DC vehicle interface _____	14
3 Interface overview _____	20
4 Frequency of testing and inspection required _____	26
Figures	
1 Case D connection _____	8
2 Case E connection _____	9
3 DC EV supply equipment with thermal sensing _____	11
4 DC EV supply equipment with thermal sensing, thermal transport and thermal exchange	12
5 Minimum clearances to accessible live parts _____	23
6 Hazardous voltage logo _____	24
Bibliography _____	42

Foreword

This Technical Reference (TR) was prepared by the Working Group on Electric Vehicles Charging System under the direction of the Manufacturing Standards Committee.

TR 25 was developed in 2010 to specify the technical specifications and safety requirements for electric vehicles charging systems in Singapore. In 2016, it was revised to further align with the international requirements IEC 61851 and IEC 62196 series of standards.

In this 2022 revision, the TR has been updated with new requirements to address low power charging, high power charging and battery swapping.

This standard consists of the following parts under the generic title “Electric vehicles charging system”:

- Part 1 – Electrical safety and general requirements
- Part 2 – Low power charging
- Part 3 – High power charging
- Part 4 – Battery swapping

This part gives the requirements on high power charging (a charging system with a power rating equal to or above 150 kW). Requirements for high power charging using thermal management systems and high power charging with an automated connection device are covered.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

Permission has been sought from the International Electrotechnical Commission (IEC) to reproduce materials from IEC TS 62196-3-1:2020, “Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system” (refer to footnotes in the standard).

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1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as “mature standards”. Mature standards will not be subject to further review unless there are requests to review such standards.*
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Electric vehicles charging system – Part 3: High power charging

1 Scope

This Technical Reference (TR) specifies the requirements for high power charging, with a power rating equal to or above 150 kW, using accessories and cable assemblies with the same configuration as specified in IEC TS 62196-3-1 with rated output DC voltage not exceeding 1500 V DC and a rated current not exceeding 500 A that employ:

- thermal sensing only; or
- thermal sensing with thermal transport and thermal exchange.

It also specifies the requirements for high power charging using an automated connection device (ACD) for conductive connection to the vehicle, with a rated supply voltage up to 1000 V AC or up to 1500 V DC and a rated output voltage up to 1500 V DC.

The DC charging systems with an ACD are based on:

- system A described in Annex AA of IEC 61851-23; and
- system C described in Annex CC of IEC 61851-23.

This TR applies to both automatic couplers of category 1 using a vehicle coupler and automatic couplers of category 2 using an electro-mechanical interface.

This TR includes the general requirements for the control communication between a DC electric vehicle (EV) charging station and an EV. The requirements for digital communication between the DC EV charging station and the EV for control of DC charging are defined in ISO 15118-2 and IEC 61851-24.

2 Normative references

The following referenced documents are indispensable for the application of this TR. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

TR 25-1:2022	Electric vehicles charging system – Part 1: Electrical safety and general requirements
EN 50696:2019	Contact interface for automated connection device
IEC 61851-23	Electric vehicle conductive charging system – Part 23: DC electric vehicle charging station
IEC 61851-24	Electric vehicle conductive charging system – Part 24: Digital communication between a DC EV charging station and an electric vehicle for control of DC charging
IEC 62128-1	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit – Part 1: Protective provisions against electric shock
IEC 62196-1:2014	Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements

IEC 62196-2:2016	Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 2: Dimensional compatibility and interchangeability requirements for AC pin and contact-tube accessories
IEC 62196-3:2014	Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 3: Dimensional compatibility and interchangeability requirements for DC and AC/DC pin and contact-tube vehicle couplers
IEC TS 62196-3-1:2020	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles – Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system
IEC 62477-1:2016	Safety requirements for power electronic converter systems and equipment – Part 1: General
IEC 62893-4-1	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV – Part 4-1: Cables for DC charging according to mode 4 of IEC 61851-1 – DC charging without use of a thermal management system
IEC 62893-4-2	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV – Part 4-2: Cables for DC charging according to mode 4 of IEC 61851-1 cables intended to be used with a thermal management system
ISO 13850	Safety of machinery – Emergency stop function – Principles for design
ISO 15118-2	Road vehicles – Vehicle-to-grid communication interface – Part 2: Network and application protocol requirements
OECD 301B	OECD guidelines for the testing of chemicals, Section 3, Test No. 301: Ready biodegradability, 17 Jul 1992
Globally harmonized system of classification and labelling of chemicals (GHS)	