
Terra DC Wallbox specifications

Revision01



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1 Scope

This document has the aim to provide information on the minimum requirements for DC Wallbox EV Chargers up to 22,5 kW

2 Quality systems

DC Wallbox chargers shall be produced in a facility under ISO 9001 and ISO 14001.

3 Standards

The Wallboxes shall be CE certified by an independent notified body.

Manufacturer must provide for each charger product/family a Declaration of Conformity (DoC), this is the self-declaration of conformity with the CE requirements.

For chargers, the CE requirements contain 3 Directives to be observed:

- 2014/30/EU the European Directive on EMC, Electro-Magnetic Compatibility
- 2014/35/EU the European Directive on LVD, Low Voltage Directive (LVD, for Safety)
- 2014/53/EU the European Directive on RED, Radio Equipment Directive

Also in line with:

2011/65/EU Restriction of the use of certain hazardous substances (RoHS)

Third party competent body such as TÜV Rheinland shall verify compliance with these Directives, and following standards.

The range of DC charger shall include models compliant with UL standard.

EMC

Emission:

EN 301489-1 V 2.2.0: 2017

EN 301489-1 V 1.9.2: 2011

EN 301489-52 V 1.1.0: 2016

EN 301489-3 V 2.1.1: 2017

EN 61000-6-1:2007

EN 61000-6-2: 2005

EN 61000-6-3: 2005 + A1

EN 61000-6-3: 2007 + A1

EN 61000-6-4: 2007 + A1

EN 61000-3-11: 2000

EN 61000-3-12: 2011

IEC 61851-21-2:2018

Wallbox shall have EMC emission tested for compliancy according to FCC Part 15 Class B and IEC 61000-6-3 Class B. for any public charging stations placed in proximity to residential and multi-family dwelling areas, where the general public has exposure and greater risk. No warning to end-users with pace makers shall be required.

Note:

In April 2018, a new product standard on EMC was released by IEC: IEC 61851-21-2 Electric vehicle conductive charging system – Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply – EMC requirements for off-board electric vehicle charging systems.

LVD / Safety

EN 60529: 1991+A1+A2

EN 61851-1: 2011

EN 61851-23: 2014

EN 62311: 2008

IEC 61851-1: 2010

IEC 61851-23: 2014

RED

EN 301511 V 9.0.2:2003

EN 301908-2 V 11.1.2: 2017

EN 300330 V 2.1.1 2017

Charging standards - General

EN 61851-1 (2011) covering AC and DC charging

-Installation of charging stations must be according to IEC 60364-7-722 and/or any applicable national rules

4 General characteristics

DC charger shall be designed for use in locations with no restricted access, to be suitable for residential purpose.

Wallbox shall be designed for supply form AC network for charging mode 4 according to IEC 61851-1 standard.

DC wallbox shall have in visible position label for operation instruction including essential information of the rated voltage (V), frequency (Hz), current (A).

5 Environmental conditions

DC wallbox shall be suitable for outdoor or indoor installation with air temperature between -40°C and +45°C (ambient temperature), without temperature de-rating.

Manufacturer shall provide a temperature de-rating of DC wallbox according to ambient temperature, to guarantee performance and avoid mechanical degradation. For ambient temperature between 45°C and 50°C DC charger shall be able to supply up to 80% of rated output

power. For ambient temperature between 50°C and 55°C DC charger shall be able to supply up to 60% of rated output power.

It shall be possible to storage DC charge at temperature between -40°C and +55°C (ambient temperature).

DC wallbox chargers shall be suitable for installation up to 2,500 meters above sea level (a.s.l.).

DC charger shall be suitable for residential installation with level of noise less than 60dB.

6 Mechanical characteristics

DC wallbox shall have a minimum degree of protection of IP54, both for indoor and outdoor installation

Robustness shall be ensured by degree of protection against mechanical impact equal to IK10 according to IEC 62262, while HMI shall have a minimum degree of mechanical impact of IK08 according to same IEC standard.

Compact design shall allow installation of DC charger even in small spaces; maximum dimension of wall box shall be 770x584x294mm (H x W x D).

DC charger shall have a maximum weight of 60kg, excluding back-plate and cables.

It shall be possible to mount the DC charger either on wall or on pedestal, to ensure flexible installation in each location.

Pedestal shall be provided with side support able to host up to 2 gun-holders on each side, pedestal metal frame shall include a conduit for easy cable connection from the bottom.

Wallbox shall be supplied with cable for socket outlet with a length of 3.5 meters as standard, in case of request manufacturer shall provide wallbox with cable with a length of 7 meters.

7 Electrical characteristics

DC wallbox shall be suitable for installation in AC networks suitable for following characteristics of power supply input

AC Input power connection	CE Models: 3P + N + PE. UL Models: 1 phase: 2 wire (e.g. L1 - N, L1 - L2) + PE. 3 phase: 3P, N, PE
Input voltage range	CE Models: 400 V _{AC} +/- 10% (50 Hz or 60 Hz) UL Models: 200 - 240 VAC +/-10 % (50/60 Hz)
Max. rated input current & power	CE Models: 3 Phase, 40A UL Models: 1 Phase 100A 3 Phase, 40A
Power factor (full load)	>96% at nominal output power

DC charger shall be equipped with proper controller of batteries so that THD of the input current remains within the acceptable harmonic distortion limits of the distribution system, THD current shall be less than 8% in full output power operating mode.

DC wall box shall have DC output characteristics as follow in order to ensure compatibility with current and future Electrical vehicles:

DC output power	<p>CE Models: 0 to 22.5 kW nominal 24 kW at peak</p> <p>UL Models:</p> <ul style="list-style-type: none"> - 1 phase 19.5 kW @208 V and V 22.5 kW @240 V - 3 phase: 0 to 22.5 kW nominal 24 kW at peak
Simultaneous DC on 2 outlets:	Not applicable
DC output voltage range	CCS 150 - 920 VDC CHAdeMO: 150 - 500 VDC
Max. DC output current	60 A

DC charger shall be available with following socket outlets combinations:

- Single outlet CCS1
- Single outlet CCS2
- Dual outlet CCS1 + CHAdeMO
- Dual outlet CCS2 + CHAdeMO

DC wallbox shall have an average energy efficiency level at full power of at least 92%.

DC charger shall have a capability of standby power of 80,000 hours and a LED shall clearly indicate standby mode.

DC chargers shall be highly *immune* to disturbances from external sources and comply with EMC immunity standards on industrial level.

Finishing product with powder coated shall be used to limit damage from rusting in the long run.

8 Safety

DC charger shall have in-built current limiting, ground fault and surge protections to ensure maximum safety of people and vehicles.

Each charging station must be individually protected via a separate upstream RCD (Residual Current Device) at least of type A with a rated residual operating current not exceeding 30 mA, in compliance with IEC 60364.

DC wallbox shall be designed to avoid occurrence of any DC ground fault current larger than 6mA at AC side upstream, so that RCD type B is not required, unless required by local standard.

-Fuses or equivalent circuit breaker rated to respect the charger specifications must be used in compliance with IEC 61851-1.

For installation in North American Countries, each charging station must be connected via a separate GFCI (Ground Fault Circuit Interrupter /or equivalent RCD device) for the personal

protection from the hazard of electric shock. The protection must be proven to withstand the presence of DC currents >6mA not blinding the leakage detection (type B RCD or equivalent leakage detection).

For safety, DC charger shall include a emergency push button.

In order to keep the DC wallbox charger safe and usable in case of water flooding, it shall be possible installation in the wall or on a pedestal with enough clearance from the ground.

9 User interface and communication

For ease of use, DC charger shall have a daylight readable 7" full screen Touchscreen display, for user-friendly experience.

Language shall be English as standard, but other languages shall be available via software updates.

DC wallbox shall offer different connectivity options for easy integration in existing infrastructure, it shall be ready for cellular connectivity 3G/4G and shall be provided with 2 RJ45 ports for ethernet connection.

DC wallbox shall support open protocol OPCC 1.6 for communication between Electric Vehicle, EV Charger and Charging central management system to balance load demand and reduce infrastructure costs.

For user authentication, it shall be possible to use either RFID card system (ISO 14443 A + B to part 4 and ISO/IEC 15693 Mifare, NFC, Calypso, Ultralight, PayPass, HID), or on-screen PIN code authentication, or payment mode compliant with ISO 15118.

DC charger shall be designed for future, being possible to upgrade software.

Manufacturer shall provide web tools and cloud platform to enable and manage authentication, payment, monitoring, remote diagnosis and repair for reliable asset management and payment control.

DC charger shall include a Connected 24/7/365 remote monitoring and diagnostic, receiving up-dates over-the-air to support every new EV on the road.

Manufacturer shall proof that end-to-end data security is certified against ISO 27001.