

WALLBOX CHARGERS TEST

IEC 61851-1

DESCRIPTION: Report performing IEC61851-1 Test – Electric vehicle conductive charging system

MANUFACTURER – WallBox Chargers

MODEL – Wallbox Commander (WBCM-0-2-4-000-A)

SERIAL NUMBER –

- HW: Commander (Voltage and Current)
 - CT used during these tests was: EE-PRJ01-CT-V01-A-15
 - HV used during these tests was: EE-PRJ01-HV-V01-A-08
- FW: v106
- SW: 1.2.1



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Wallbox Report
EN 61851-1

Electric vehicle conductive charging system

Part 1: General requirements

- Standard: EN61851-1
- Result: Compliance with 61851-1

- Equipment: AC Charging station
- Rating: Input: 110-240Vac 50/60Hz 6-32A
- Rating: Output: 110-240Vac 50/60Hz 6-32A
- Manufacturer: Wallbox Chargers

Requirement	Description	Compliant
Rating of the supply a.c. voltage	Equipment shall operate correctly within +/-10% of the standard nominal voltage.	P
	The rated value of the frequency is 50Hz +/-1% or 60Hz +/-1%	P
Verification that the vehicle is properly connected	The EVSE shall be able to determine that the connector is properly inserted in the vehicle inlet and properly connected to the EVSE.	p
	Vehicle movement by its own propulsion system shall be impossible if the vehicle is physically connected to the EVSE as required in ISO 6469-2.	N/A
Continuous protective earth continuity checking	Equipment earth continuity between the EVSE and the vehicle shall be continuously verified.	P
Energization of the system	Energization of the system shall not be performed until the pilot function between EVSE and EV has been established correctly.	P
De-energization of the system	If the pilot function is interrupted, the power supply to the cable assembly shall be interrupted but the control circuit may remain energized.	P
Protection against electric shock	Hazardous live parts shall not be accessible.	P
	Protection in normal service (Provisions for basic protection), is defined in Annexes A and B of IEC 60364-4-41:2005. Measures for fault protections are defined in Clauses 411, 412 and 413, additional protection is defined in 415 of IEC 60364-4-41:2005	P
	Protection against direct contact shall consist of one or more provisions that under normal conditions prevent contact with hazardous-live parts. Protective bonding shall consist of connection of all exposed conductive parts to the EV earth terminal.	P
	When connected to the supply network, the EVSE shall not have any accessible hazardous live part, even after removal of parts that can be removed without a tool. Compliance is checked by inspection and according to the requirements of IEC 60529(IPXXB)	P

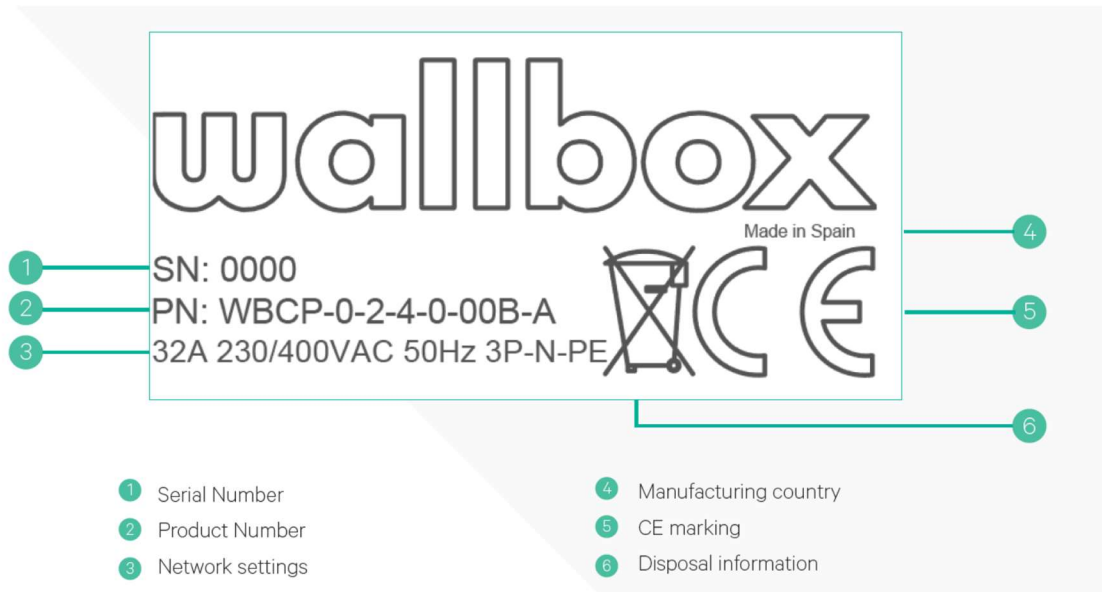
Fault protection	Protection against indirect contact shall consist of one or more recognized provision(s). According to IEC 60364-4-41:2005, recognized individual provisions for fault protection are:	P
	supplementary or reinforced insulation	
	protective equipotential bonding;	
	protective screening;	
	automatic disconnection of supply; simple separation.	
Supplementary measures	Where power supply circuits that are galvanically separated from mains and are galvanically isolated from earth, electrical isolation between the isolated circuits and earth, and between the isolated circuits and exposed conductive parts of vehicle and EVSE shall be monitored. When a fault condition related to the electrical isolation is detected, the power supply circuits shall be automatically de-energized or disconnected by the EVSE.	P
Connection between the power supply and the EV	For safety reasons, the contact sequence during the connection process shall be such that the earth connection is made first and the pilot connection is made last. The order of connection of the other contacts is not specified. During disconnection, the pilot connection shall be broken first and the earth connection shall be broken last.	P
	A standard earthing type plug, socket-outlet and vehicle coupler may be used for modes 1, 2 and 3, provided the pilot function is included for modes 2 and 3. Standard interfaces shall not be used on vehicles that do not comply with Clause 7.2.3.1.	P
	The basic interface may contain up to seven contacts, with standard physical configurations of contact positions either for single-phase or for three-phase or both.	P
Specific requirements for vehicle inlet, connector, plug and socket-outlet	The requirements of EVSE systems are specified in IEC 62196-1 (cases A2 and B2 in 6.3).	P
	Operating temperature is defined in accordance with IEC 60309-1, IEC 60309-2 and IEC 60884-1 (as examples A1 and B1 in 6.3) or IEC 62196-1 (cases A2 and B2 in 6.3)	P
Breaking capacity	The requirement shall be in accordance with IEC 62196-1.	P
	Acceptable breaking capacity is reached by breaker level for a.c. application AC22A or for d.c. application DC-21A contactor as defined in IEC 60947-3, or breaker level for a.c. application AC2 and for d.c. application DC-3 as defined in IEC 60947-6. Avoidance of breaking under load can be achieved by a specific means on the connector or a system with interlock.	
Charging cable assembly requirements	The anchorage force of the cable in the connector or plug shall be greater than the retaining device force, if used.	P
EVSE requirements	· All tests in this standard are type tests.	P
	· Unless otherwise specified, type tests shall be carried out on a single specimen as delivered and configured in accordance with the manufacturer's instructions.	
	· The tests in 11.12 may be conducted on separate samples at the discretion of the manufacturer. Unless otherwise specified, all	

	<p>other tests shall be carried out in the order of the clauses and sub-clauses in this part.</p> <ul style="list-style-type: none"> · The tests shall be carried out with the specimen, or any movable part of it, placed in the most unfavourable position which may occur in normal use. · Unless otherwise specified, the tests shall be carried out in a draught-free location and at an ambient temperature of $20 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$. · The characteristics of the test voltages in 11.4 shall comply with IEC 61180-1. <p>Additional specific requirements for the: – AC charging station (EVSE) are specified in IEC 61851-22,</p>	
Classification	· outdoor use;	P
	· indoor use.	P
IP	54	P
Protection against electric shock	– vehicle inlet mated with connector: IPXXD;	N/A
	– plug mated with socket outlet: IPXXD;	N/A
	– connector intended for mode 1 use, not mated: IPXXD (1);	N/A
	– connector intended for mode 2 and mode 3 use, not mated: IPXXB;	P
	– socket-outlet not mated: IPXXD (2).	N/A
	Energy transfer from vehicle to grid:	N/A
	– vehicle inlet not mated: IPXXD (3);	N/A
	– plug not mated: IPXXD (3).	N/A
Dielectric withstand voltage The dielectric withstand voltage at power frequency (50 Hz or 60 Hz) shall be applied for 1 min as follows:	For a class II charger $2 \cdot (U_n + 1 \text{ 200 V})$ r.m.s. in common mode (all circuits in relation to the exposed conductive parts) and differential mode (between each electrically independent circuit and all other exposed conductive parts or circuits) as specified in 5.3.3.2.3 of IEC 60664-1. For both class 1 and class 2 a.c. supply equipment, if the insulation between the mains and the extra low voltage circuit is double or reinforced insulation, $2 \cdot (U_n + 1 \text{ 200 V})$ r.m.s. shall be applied to the insulation. – 28 – 61851-1 O IEC:2010	P
	Impulse dielectric withstand (1,2/50 ms)	P
	The dielectric withstand of the power circuits at impulse shall be checked using values as indicated in Table F.1 of IEC 60664-1 Category III. The test shall be carried out in accordance with the requirements of IEC 61180-1. Test conditions for supply voltages in excess of 400/690 V shall use the values indicated in the IEC 60664-1 for an overvoltage category III	P
	Insulation resistance	P
	The insulation resistance with a 500 V d.c. voltage applied between all inputs/outputs connected together (power source included) and the accessible parts shall be: – for a class I station: $R > 1 \text{ MW}$; – for a class II station: $R > 7 \text{ MW}$. The measurement of insulation resistance shall be carried out after applying the test voltage during 1 min and immediately after the damp heat test.	

	Equipment intended for outdoor use shall be designed to operate in an environment with a minimum pollution degree 3 and overvoltage category III. The equipment shall be evaluated when mounted in its enclosure, as intended by the manufacturer.	P
	The touch current shall be measured after the damp heat test (see 11.8.3), with the a.c. electric vehicle charging station connected to a.c. supply network (mains) in accordance with Clause 6 of IEC 60990. The supply voltage shall be 1,1 times the nominal rated voltage.	P
	The touch current between any a.c. supply network poles and the accessible metal parts connected with each other and with a metal foil covering insulated external parts, measured in accordance with IEC 60950-1, shall not exceed the values indicated in Table 2.	P
Environmental tests During the following tests, the electric vehicle charging station shall function at its nominal voltage with maximum output power and current. After each test, the original requirements shall still be met.	The electric vehicle charging station shall be designed to operate within the temperature range $-25\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$ for outdoor unit and $-5\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$ for indoor. The ambient air temperature does not exceed $+40\text{ }^{\circ}\text{C}$ and its average over a period of 24 hours does not exceed $+35\text{ }^{\circ}\text{C}$.	P
	The electric vehicle charging station shall be designed to operate with a relative humidity rate between 5 % and 95 %. One of the two types of tests below shall be conducted. 1) Damp heat continuous test The test shall be carried out in accordance with IEC 60068-2-78, test Ca, at $40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and 93 % relative humidity for four days. 2) Damp heat cycle test The test shall be carried out in accordance with IEC 60068-2-30, test Db, at $40\text{ }^{\circ}\text{C}$ for six cycles	P
	The electric vehicle charging station shall be designed to operate at an atmospheric pressure between 860 hPa and 1 060 hPa.	P
	The maximum permissible surface temperature of the EVSE that is hand-grasped for lifting, carrying and holding for the means of operation, at the maximum rated current and at ambient temperature of $40\text{ }^{\circ}\text{C}$, shall be: – $50\text{ }^{\circ}\text{C}$ for metal parts; – $60\text{ }^{\circ}\text{C}$ for non-metallic parts. For parts which may be touched but not grasped, maximum permissible surface temperature under the same conditions shall be: – $60\text{ }^{\circ}\text{C}$ for metal parts; – $85\text{ }^{\circ}\text{C}$ for non-metallic parts.	P
Environmental conditions	The EVSE shall be designed to resist the effect of normal automotive solvents and fluids, vibration and shock, material flammability standards and other conditions appropriate to the	P
Mechanical environmental tests After the following	1) the IP degree is not affected;	P
	2) the operation of the doors and locking points is not impaired;	P

tests, no degradation of performance is permitted	3) the electrical clearances have remained satisfactory for the duration of the tests;	P
	4) for a charging station having a metallic enclosure, no contact between live parts and the enclosure has occurred, caused by permanent or temporary distortion.	N/A
	For a charging station having an enclosure of insulating material, if the conditions above are satisfied, then damage such as small dents or small degrees of surface cracking or flaking are disregarded, provided that there are no associated cracks detrimental to the serviceability of the charging station.	
Mechanical impact The electric vehicle charging station body shall not be damaged by mechanical impact as defined below. Compliance is checked according to the test procedure described in IEC 60068-2-75	A solid smooth steel ball, approximately 50 mm in diameter and with a mass of 500 g ± 25 g, is permitted to fall freely from rest through a vertical distance (H) of 1,3 m onto the sample (vertical surfaces are exempted from this test). In addition, the steel ball is suspended by a cord and swung as a pendulum in order to apply a horizontal impact, dropping through a vertical distance (H) of 1,3 m (horizontal surfaces are exempted from this test). Alternatively, the sample is rotated 90° about each of its horizontal axes and the ball dropped as in the vertical impact test.	P
Electromagnetic compatibility tests	Emission testing is conducted according to IEC 61000-6-3.	P
	Immunity testing is conducted according to IEC 61000-6-1.	P
	Specific performance criteria are defined in IEC 61851-22 and IEC 61851-23.	P
Latching of the retaining device	An interlock may rely on the retaining device to avoid disconnection under load if this function is not provided by the connector.	N/A
Service	The socket-outlet should be designed so that a certified technician could remove, service and replace it if is necessary.	N/A
Marking and instructions	The markings required by this standard shall be legible with corrected vision, durable and visible during use. Compliance is checked by inspection and by rubbing the marking by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit. After all the tests of this standard, the marking shall be easily legible; it shall not be easily possible to remove marking plates and they shall show no curling.	P
	The station shall bear the following markings in a clear manner:	
	– name or initials of manufacturer;	
	– equipment reference;	
	– serial number;	
	– date of manufacture;	
	– rated voltage in V;	
	– rated frequency in Hz;	
	– rated current in A;	
	– number of phases;	
	– 61851-1 IEC:2010	
– IP degrees;		
– "indoor use only", or the equivalent, if intended for indoor use only;		

	<p>– for a class II station, the symbol shall clearly appear in the markings;</p> <p>– some minimal additional information can possibly appear on the station itself (phone number, address of contractor).</p> <p>Compliance is checked by inspection and tests.</p>	
Telecommunication network	Tests on any telecommunication network or telecommunication port on the EVSE, if present, shall comply with IEC 60950-1.	P




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