

JJG

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Calibrator of AC Charging Piles for Electric Vehicles (English Translation)

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1 Scope

This Regulation applies to the first verification, subsequent verification, in-use inspection of the calibrator of AC charging piles for electric vehicles.

2 Normative references

This procedure references the following documents:

JJG 597 Verification regulation of verification equipment for AC electrical energy meters

JJG 1085 Reference meters for electrical energy

JJG 1148 AC Charge spots for electric vehicles

JJF 1662 Calibration specification for clock testers

For dated references, only the dated version applies to this regulation; for undated references, its latest version (including all amendments) applies to this Regulation.

3 Overview

The calibrator of AC charging piles for electric vehicles (hereinafter referred to as the calibrator) is a device, which is used to calibrate the AC charging pile for electric vehicle. It is divided into a single-phase calibrator and a three-phase calibrator. It can measure the parameters, such as the electric energy, time, current, voltage, phase, frequency, etc., of the charging piles.

The principle diagram of the calibrator is as shown in Figure 1. It is mainly composed of a control unit, a charging gun port, a load interface, an AC power standard (including a monitoring unit), a clock unit, a display unit, a control guidance unit (provided by the load).

The calibrator simulates the charging demand of the electric vehicle through the receiving control guidance unit. The load interface connects the simulated load or vehicle, which simulates the charging demand of the electric vehicle. It monitors parameters such as voltage, current, phase, frequency, etc. The AC power standard phase calibrator shall not be less than 5 kWh; the accumulated electric energy error shall meet the requirements in Table 1.

4.2 Limit operating error

For a calibrator whose working temperature is higher than 40 °C, the power error at 50 °C shall meet the requirements in Table 1.

For a calibrator whose operating temperature is lower than -10 °C, the power error at -20 °C shall meet the requirements in Table 1.

4.3 Ports and display

4.3.1

The calibrator shall have pulse input and output ports; display the electric energy value and the number of pulses; the pulses shall be rectangular waves with a certain amplitude; it shall provide the pulse constant C [imp/ (kWh)] of the pulse output.

4.3.2

The calibrator shall display the accumulated electric energy value, which has at least 4 decimal places; the displayed electric energy error shall have at least 2 decimal places.

4.3.3 When the calibrator operates under the conditions of maximum working voltage

and maximum working current, its pulse frequency shall not be lower than the requirements in Table 2.

4.4 Repeatability of energy measurement

The electrical energy measurement repeatability of the single-phase and three-phase calibrator is characterized by the estimated value of the standard deviation of the electrical energy error, which shall meet the requirements in Table 3.

4.5 Indication error of monitoring unit

The indication error of the monitoring unit, which is configured for the calibrator, shall meet the requirements in Table 4.

4.6 Clock time error

The clock time error is better than ± 1 s.

5.1 Appearance and power-on inspection

The calibrator shall display the following information:

- Product name and model;
- Manufacturer and exit-factory number;
- Pulse constant C (imp/kWh);
- Accuracy level;
- Measuring range.

After the calibrator is powered on, the functions and software control shall be normal.

5.2 Insulation resistance

Apply a 1 kV DC voltage between the power supply terminal of the calibrator and the ground (metal case), the charging gun port terminal and the ground (metal case); the insulation resistance shall not be less than 10 Mohm.

5.3 AC withstanding voltage

The calibrator powered by AC is in the non-working state; the power switch is placed in the ON position; the voltage of AC 1.5 kV is applied between the input terminal of the power supply and the case, for a duration of 1 min. The leakage current is not greater than 10 mA,

meanwhile there shall be no spark discharge or breakdown.

All the lines, whose charging port voltage exceeding 40 V, are connected together as one point; the other point is the ground. The test voltage is applied between the two points, which shall be able to withstand the power frequency AC 2 kV withstanding voltage test, for a duration of 1 min. The leakage current is not greater than 10 mA, meanwhile the test voltage shall not have spark discharge or breakdown.

6.1 Test conditions

The reference value of environmental conditions and their deviation shall not exceed the provisions in Table 5.

6.2 Measuring standards and other equipment

6.2.1

For the measuring device used in the verification of the calibrator, the influence of the transfer or connection auxiliary device on the verification result shall be considered; the electric energy value shall be accumulated synchronously.

6.2.2 The accuracy level and standard deviation estimate of the measurement standard

shall not exceed the requirements in Table 6; during each measurement period, the load power stability shall not be lower than the requirements in Table 7.

(or uncertainty) of the measurement standard error limit shall not be greater than 1/3 of the absolute value of the calibrator's error limit.

6.2.4 Reference clock

The time error of the reference clock shall not be greater than 1/10 of the time error of the clock of the verified calibrator.

6.3.1 Verification items

The verification items of the calibrator are as shown in Table 8.

6.3.2.1 Appearance and power-on inspection

Check whether the appearance signs meet the requirements of 5.1.

Correctly connect the calibrator and measurement standard. Ground the equipment that needs to be grounded correctly. Power on and warm up according to the instructions.

Check whether the port and display of the calibrator meet the requirements of 4.3.