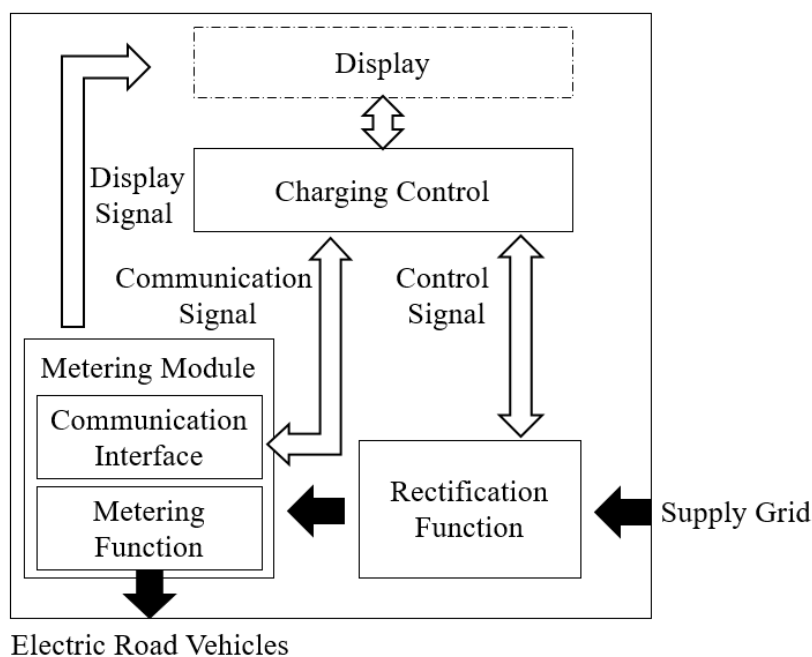
	Technical Specification for the Verification and Inspection of Electric Vehicle Supply Equipment		S/N	CNMV 207
			Rev.	2
1. This technical specification is developed pursuant to the stipulations in Paragraph 2 of Articles 14 and Paragraph 2 of Articles 16 in the Weights and Measures Act.				
2. The date of promulgation, document number, date of enforcement and content of amendment are listed as follows:				
Rev.	Date of Promulgation (Ching-Piao-Szu-Tsu)	Document No.	Date of Enforcement	Content of Amendment
1	2022-05-16	No. 11140003290	2023-01-01	
				1. The Document review procedure has been added. Test compliance documents of 3 test items for each type shall be provided before the first submission for verification.
2	2022-10-12	No. 11140007570	2023-01-01	2. Revise the initial verification test items.
3. This specification is formulated with reference to the following international regulations and specifications:				
(1) IEC 62052-11:2020 Electricity metering equipment – General requirements, tests and test conditions – Part 11 : Metering equipment.				
(2) IEC 62053-21:2016 Electricity metering equipment (a.c.) – Particular requirements –Part 21 : Static meters for active energy (classes 1 and 2).				
(3) IEC 62053-41:2020 Electricity metering equipment – Particular requirements –Part 41 : Static meters for DC energy (classes 0,5 and 1).				
(4) National Institute of Standards and Technology Handbook 44, §3.40, 2019.				
(5) PTB-A 50.7 Anforderungen an elektronische und softwaregesteuerte Messgeräten und Zusatzeinrichtungen für Elektrizität, Gas, Wasser und Wärme.				
(6) CNS 15511-1:2021 Electric vehicle conductive charging system – Part 1: General requirements + Amendment 1				
(7) CNS 14607:2017 Static electricity meters				
Date of Promulgation 2022-10-12	Bureau of Standards, Metrology and Inspection, Ministry of Economic Affairs		Date of Enforcement 2023-01-01	

NO GUARANTEE ON THE TRANSLATION

In case of discrepancies between the English translation and Chinese text, the Chinese text shall govern.

1. Scope: This technical specification applies to electric vehicles (EV) supply equipment for charging electric vehicles, with a rated supply voltage up to 1,000 V_{ac} or 1,500 V_{dc} and a rated output voltage up to 1,000 V_{ac} or 1,500 V_{dc} that shall be subject to verification and inspection. The structure diagram of electric vehicle supply equipment is as follows. Electric vehicles cover all road vehicles, including plug-in hybrid electric vehicles (PHEV), that derive all or part of the energy from on-board rechargeable energy storage systems (RESS).

This technical specification also applies to electric vehicle supply equipment supplied from on-site storage systems (e.g. buffer batteries).



Note: The display can be installed externally or internally in the electric vehicle supply equipment.

2. Definition

2.1 Electric vehicles (EV) supply equipment

Equipment or a combination of equipment, providing dedicated functions to supply electric energy from a fixed electrical installation or supply network to an electric vehicle for the purpose of charging.

2.2 AC electric vehicles supply equipment (AC EV supply equipment)

Electric vehicles supply equipment that supplies alternating current to an electric vehicle.

2.3 DC electric vehicles supply equipment (DC EV supply equipment)

Electric vehicles supply equipment that supplies direct current to an electric vehicle.

2.4 Charging

Adjusting all functions of voltage and/or current provided by the AC or DC supply network to assure the energy supply to the rechargeable energy

storage systems (RESS).

2.5 Rated current, I_n

The maximum output current of each vehicle connector that can meet the accuracy requirements of this technical specification.

2.6 Display

A device that can display the content stored in the memory, and the measured or recorded data can be read easily.

2.7 Percentage error

Metering percentage error of supply equipment (%) = $\frac{\text{Indication} - \text{Standard value}}{\text{Standard value}} \times 100\%$

3. Document review

When the electric vehicles supply equipment of each type is first submitted for verification, it shall provide the test certificate documents issued by the laboratory which shall be accredited and granted an accreditation certificate issued by a signatory of the ILAC MRA (International Laboratory Accreditation Cooperation Mutual Recognition Arrangement) on behalf of the Republic of China and the test certificate documents shall compliance with Section 3.1, 3.2 and 3.3.

3.1 Accuracy test

Accuracy test of electric vehicles supply equipment shall conform to the following requirements of Table 1 and Table 2. The test shall be conducted 3 times under each test conditions, and shall conform to the following requirements of Table 1 and Table 2 every time.

Table 1 Electric energy test error for AC electric vehicles supply equipment

Electric vehicles supply equipment output current (A)	Power factor	Maximum permissible test error (%)
0.85 I_n	1	± 1
0.1 I_n		± 1

Table 2 Electric energy test error for DC electric vehicles supply equipment

Electric vehicles supply equipment output current (A)	Maximum permissible test error (%)
0.85 I_n	± 1
0.1 I_n	± 1

3.2 Repeatability test

The accuracy test of electric vehicle supply equipment shall be carried out for 3 times consecutively under the same loading conditions. Percentage error of the minimum value subtracted from the maximum value shall not exceed one-fourth of the maximum permissible test error.

3.3 Time-keeping accuracy

Where the electric vehicles supply equipment and additional equipment have the internal time clock (equipment time clock) for time-keeping, depending on the purpose, there are different requirements as following:

- (1) When the national standard time is used to determine the exact time of registration and transmission of data, for example, the data is stored with a time stamp, the equipment time clock must can be converted to the national standard time. The equipment time clock shall operate synchronized so that its deviation from the national standard time shall less than 3 % of the measurement time, and the maximum value of measurement shall not exceed 27 seconds.
- (2) The time interval of the measurement, for example, when determining the average interval time based on the time stamp, this case only represents the time series of the measurement value, and does not necessarily have to be based on the legal time. The time interval of the measurement shall only deviate from the setting value by less than 1 %.

4. Test apparatus of verification and inspection

4.1 Test apparatus of verification and inspection including:

- (1) The power analyzer includes current shunt (or current sensor), AC: 1,000 V and greater than or equal to 600 A (200 A for each phase); DC: 1,500 V and greater than or equal to 600 A, accuracy within ± 0.1 %.
- (2) Timing equipments: resolution of time measurement ≤ 0.1 seconds.

4.2 Test apparatus in Section 4.1 shall have traceability and evaluation of uncertainty reports, that the valid calibration documents are traceable to national standards or international standards.

5. Structures

5.1 The items marked on the nameplate of the output terminal of the electric vehicle supply equipment are as follows. The nameplate shall be fixed at the position of each output terminal of the electric vehicle supply equipment body:

- (1) The manufacturer's name, initials, trademark or distinctive marking.
- (2) Type designation or identification number or any other means of identification, making it possible to obtain relevant information from the manufacturer of the electric vehicles supply equipment.
- (3) Serial number or manufacturing number.
- (4) Identification of manufacturing date.
- (5) Type of electric current.
- (6) Frequency and number of phases in case of alternating current.

- (7) Rated voltage (input and output respectively, if not the same).
- (8) Rated current (input and output respectively, if not the same).
- 5.2 The display of the electric vehicles supply equipment shall indicate legibly, definitely, accurately, and easy to read under normal conditions of operation.
- 5.3 Electric vehicles supply equipment may be connected with on external display (wired or wireless), and the display can be used by two or more electric vehicles supply equipment. Where an external display is being used, the display and the electric vehicles supply equipment are regarded as an integrated equipment and shall not be replaced or removed arbitrarily.
- 5.4 The display shall be installed such that the users can read the indication easily. Moreover, it shall indicate clearly which equipment and vehicle connector has been used.
- 5.5 The unit of electric energy measurement for charging electric vehicles shall be indicated and recorded in kilowatt-hour (kWh) and decimal subdivisions thereof. In addition, time indication shall include year, month, day, hour, minute, and second.
- 5.6 The smallest metering unit of recorded energy delivery by an electric vehicles supply equipment shall be 0.001 kWh.
- 5.7 The output voltage and output current of the electric vehicle supply equipment shall be adjusted in accordance with the verification and inspection requirements, and can provide a time signal output to facilitate the implementation of the verification and inspection.
- 5.8 The software version of the energy metering software of electric vehicles supply equipment shall be identified.
- 6. Verification, Inspection, and maximum permissible errors
 - 6.1 Initial verification
 - 6.1.1 Accuracy test

The electric vehicle supply equipment installed (including the past to the implementation date) that shall be tested at least 3 times under any loading condition, and each test shall be conducted not less than 15 seconds. Each test of electric vehicles supply equipment shall conform to the following requirements of Table 3 and Table 4.

Table 3 Electric energy verification error for AC electric vehicles supply equipment

Electric vehicles supply equipment output current (A)	Power factor	Maximum permissible verification error (%)
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Any current	1	± 1
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Table 4 Electric energy verification error for DC electric vehicles supply equipment

Electric vehicles supply equipment output current (A)	Maximum permissible verification error (%)
Any current	± 1

6.2 Re-verification and inspection

Re-verification or inspection after initial verification may be conducted under any loading condition, and each test shall be conducted not less than 15 seconds. In addition, the test data shall be recorded at least 3 times, and errors shall be less than or equal to twice the maximum permissible errors of initial verification.

7. Verification mark and certificate

7.1 The validity period of the verification is starting from the date on which the verification mark is attached to two years after the first day of the month following the month of the date on which the verification mark is attached.

7.2 Electric vehicle supply equipment shall apply for re-calibration if the adjustment of software, hardware or component maintenance affects the measurement results.

7.3 Where the electric vehicles supply equipment of multiple vehicle connectors verified under the same verification certificate has been repaired, adjusted or modified, all of the vehicle connectors shall apply for re-verification. After passing the verification, each vehicle connector will be attached with a verification mark. In the case that the original verification certificate of has been removed and some adjustments have been made to the electric vehicles supply equipment, when the verification personnel on-site confirms that the adjustment is only made for a specific vehicle connector, the verification may be performed only for the specific vehicle connector and the verification mark could be attached. When the electric vehicles supply equipment of multiple vehicle connectors using the same verification certificate is unqualified after inspection, its verification mark shall be removed. Besides, a mark of not in service shall be attached, and the shared verification certificate shall not be removed.

7.4 The verification mark shall be attached with a physical adhesive

tamper-evident on the opening of outer covering of the metering module to prevent tampering with metering functions. The physical adhesive tamper-evident shall be attached to the adequate place depending on the opening method of the equipment, and the verification mark shall be attached on the obvious place on the front of the electric vehicles supply equipment.