TUNKIA

ELECTRIC VEHICLE CHARGERS MEASUREMENT AND TESTING

@Tunkia Calibration & Measurement

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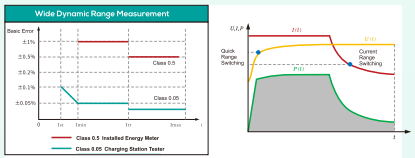
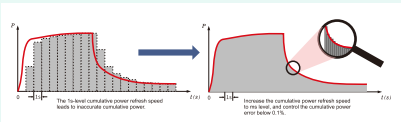
Why can TK4830 use electric vehicles as a load?

Combining wide dynamic range measurement technology and millisecond-level high-speed energy metering, it presents a more accurate reflection of charging equipment performance.

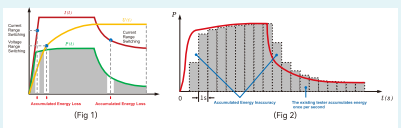




We have solved two challenges of using new energy vehicles as loads !

1. In a wide dynamic range, there is a risk of gear skipping, resulting in inaccurate accumulated electric energy (Fig 1) .

2. Dealing with fluctuating loads from new energy vehicles, where energy output changes rapidly. Traditional calibration devices refresh only 15 times per second, making cumulative energy accuracy hard to guarantee (Fig 2).



On-site Comprehensive Testing Solution

· Can be used with programmable resistive loads for full power testing.
· Three power supply methods: utility power, built-in lithium batteries, and power from the charging gun.
· Equipped with host computer software and interfaces to establish an automatic test system.
· Suitable for metrology organizations, power departments, and third-party testing organizations.

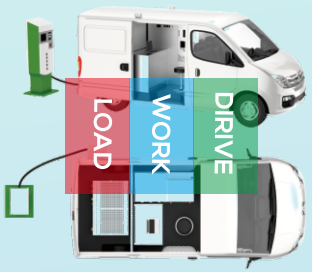
IEC 62196-2 IEC 62196-3 CHAdeMO ……

TD1320	Portable Tester for DC EV Chargers	· Metrology Verification · On-site Acceptance · Maintenance Inspection · Environmental Temperature Measurement · Clock Calibration Function · Traceabale Calibration
TD1330	Portable Tester for AC EV Chargers	
TK4830	Portable Tester for AC DC EV Chargers	

Vehicle-Mounted Testing Solution

· Applicable to the testing of DC charging stations up to **180 kW** and AC charging stations up to **63 A** according to GB/T standards.

· Test items: appearance inspection, insulation resistance test, working error, clock time error, communication protocol consistency test, interoperability test, functional test, safety test, electrical performance test and other inspection items.



Efficient Spatial Layout

Excellent Cooling Design

External Test Interface

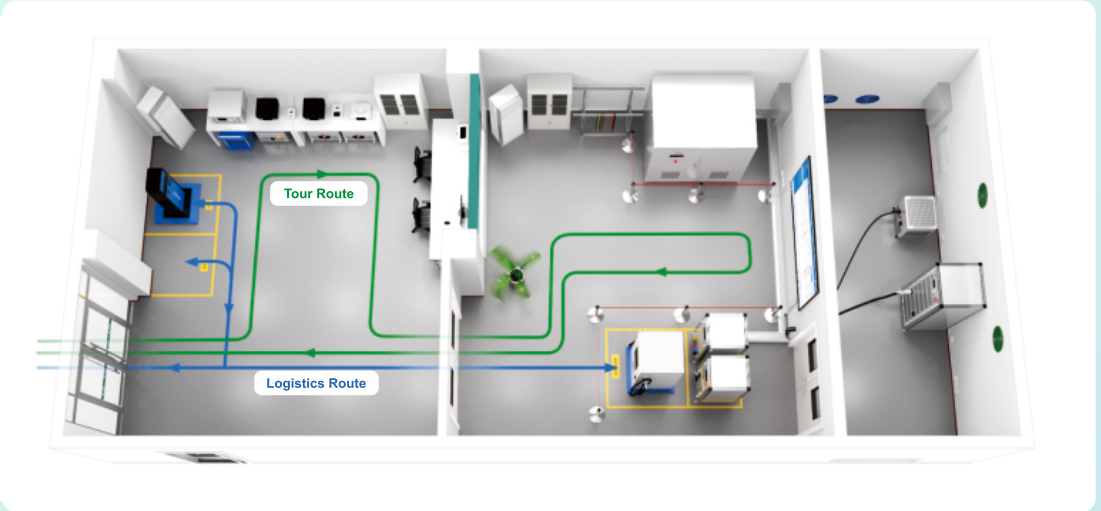
Automatic Testing Inside

Laboratory Comprehensive Performance Testing Solution

· Applicable to the testing of DC charging stations (with a maximum single-gun power of **180 kW**) and **16 A, 32 A, 63 A** AC charging stations.

· Able to complete type tests, factory inspections, and acceptance on arrival as required by standards from the **Energy Bureau, verification regulations, and industry standards for electrical enterprises**.

· Testing items include metrology verification, interoperability testing, communication protocol consistency testing, electrical performance testing, functional testing, and safety performance testing.



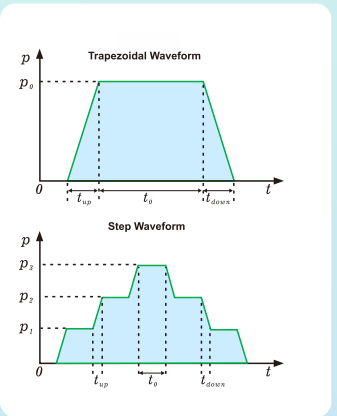
Traceability for Charging Station Testing Instrument

· High-precision traceability equipment ensures the utmost accuracy for charging station testing instruments.

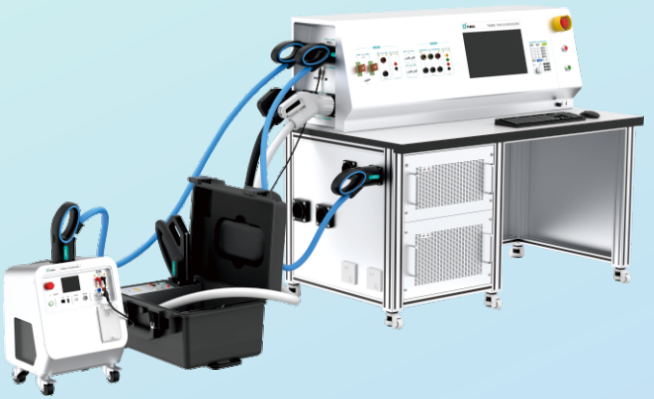
· Traditionally, traceability relied on standard meter calibration, using pulse methods for operational error checks and only supporting steady-state calibration under constant voltage or current.

· **Our cutting-edge traceability solution keeps up with the latest requirements, adding cumulative energy error calibration under fluctuating loads and utilizing millisecond-level energy refreshing technology, achieving static accuracy as low as 0.01% and dynamic accuracy as low as 0.02%.**

· The calibration device includes dedicated calibration gun cable, gun head metrology, current channel switching, and fully automatic software, offering a more professional and convenient on-site calibration traceability.



Dynamic Energy Metering Diagram



TK4800A	DCV: 100 V ~ 1150 V DCI: 1 A ~ 300 A	10 ms refresh	Accuracy: 0.01% (static) 0.02% (dynamic)
TK4800B	ACV: 220 V ± 20% ACI: 0.1 A ~ 80 A	20 ms refresh	
TD1545	DCV Output: 100 V~1150 V DCI Output: 1 A~600 A		Accuracy: 0.02%, 0.05%
TD1300	DCV Measurement: 100 V ~ 1150 V DCI Measurement: 1 A ~ 120 A		Accuracy: 0.01%, 0.02%

TK4830 Portable Tester for AC DC EV Chargers

- TK4830 is an comprehensive AC and DC charging station calibration tool. With an impressive accuracy of 0.05% in AC and DC power measurement, it proficiently conducts working error and clock time tests for both types of charging stations.
- This versatile device is capable of using new energy vehicles as loads or applying resistive loads for testing. Leveraging advanced technologies like wide dynamic range measurement and millisecond-level high-speed electric energy refresh, it ensures precise measurement of accumulated energy during the entire charging process.

Applications

- **Working Error:** The working error test can be completed in real time during the charging process through the pulse method or the accumulated electric energy method. It supports two methods of testing: using new energy vehicles as loads or programmable resistive loads as loads.
- **Clock Verification:** It has time verification function, real-time clock display, and clock time error test of the charger.
- **Temperature verification:** Equipped with a wired temperature probe, which can complete on-site temperature testing.

Test with resistive load as load

Specifications

DC Measurement Function			
DC Voltage	Measuring Range		200 V ~ 1000 V
	Measurement Uncertainty (k=2)		0.025%*RD
DC Current	Measuring Range		1 A ~ 250 A
	Measurement Uncertainty (k=2)	5 A ≤ I ≤ 250 A	0.025%*RD
		1 A ≤ I < 5 A	0.05%*RD
Power/Energy	Measurement Uncertainty (k=2)	5 A ≤ I ≤ 250 A	0.05%*RD
		1 A ≤ I < 5 A	0.1%*RD
AC Measurement Function			
AC Voltage	Measuring Range		three-phase 200 V ~ 480 V
	Measurement Uncertainty (k=2)		0.025%*RD
AC Current	Measuring Range		three-phase 0.1 A ~ 80 A
	Measurement Uncertainty (k=2)		0.025%*RD
Power/Energy	Measurement Uncertainty (k=2)		0.05%*RD
Clock Function			
Clock	Timing Mode		GPS Clock timing
	Time Error		≤ 1s
Temperature Function			
Temperature	Measuring Range		-30 ℃ ~ 60 ℃
	Maximum Permissible Error		0.5 ℃
General Specification			
Power Supply Mode	(1) Utility power: support 85 V ~ 265 V, 47Hz ~ 63 Hz (2) Charging gun head takes power (3) Removable built-in lithium battery		
Communication Interface	USB, LAN, Bluetooth or WiFi		

TD1320 Portable Tester for DC EV Chargers

- TD1320 is a portable instrument dedicated to on-site testing of EV (electric vehicles). The instrument can be combined with TK4710 DC resistive load to complete the metrology characteristic test, interoperability test and communication protocol conformance test of DC charging stations.

- DCV measurement: **30 V ~ 1150 V** ; DCI measurement: **0.5 A ~ 300 A**
  DC energy measurement accuracy: **0.05% , 0.1%**
  Temperature measurement: -30 ℃ ~ 60 ℃, accuracy: **0.5 ℃**
  Clock function: GPS clock timing, accuracy: **1 s/d**

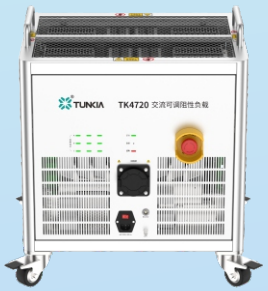
TD1330 Portable Tester for AC EV Chargers

- TD1330 is a portable instrument dedicated to on-site testing of AC EV charging stations. The instrument can be combined with TK4720 AC adjustable resistive load to complete the metrology characteristics test and interoperability test of AC charging station.

- Three-phase ACV measurement: **30 V ~ 300 V**; Three-phase ACI measurement: **10 mA ~ 78 A**
  AC energy measurement accuracy: **500 ppm, 0.05% , 0.1%**
  Frequency range: **45 Hz ~ 65 Hz**; Phase range: **0.000° ~ 359.999°**
  Temperature measurement: -30℃ ~ 60℃, accuracy: **0.5 ℃**
  Clock function: GPS clock timing, accuracy: **1 s/d**

Adjustable Resistive Loads

TK4710 DC Adjustable Resistive Load
Rated power: 20 kW, 60 kW



TK4720 AC Adjustable Resistive Load
Rated power: 9 kW (single-phase), 45 kW (three-phase)

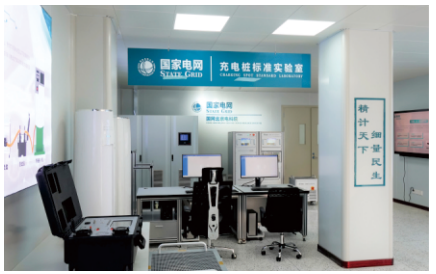
TK4730 AC DC Adjustable Resistive Load
Rated power: 5 kW, 10 kW, 20 kW

CUSTOMER CASE

Charging Station On-Vehicle
Comprehensive Testing System

Tesla Supercharger Verification

EV Charger On-site Testing in Macao



Charging Station
Full-Performance Laboratory