EV Plug & Connector High-Current Temperature Rise Test System

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1. Executive Summary

The **EV Connector Temperature Rise Test System** is a heavy-duty, high-precision thermal validation platform engineered by **KingPo** for the rigorous evaluation of next-generation electric vehicle charging interfaces. This system is specifically designed to quantify the thermal behavior of plugs, sockets, and terminals under extreme high-current loads up to **6500A**, ensuring safety and efficiency for High-Power Charging (HPC) and Megawatt Charging Systems (MCS).

2. Advanced Technical Specifications

Electrical Power & Current Regulation

Parameter	Detailed Specification	Remark / Notes
Output Current Range	DC 200 – 6500 A	Continuously adjustable constant current

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Parameter	Detailed Specification	Remark / Notes
Ripple Factor	< 1%	Ensures high stability for precision testing
Maximum Output Voltage	DC < 15 V	Optimized for low-impedance high-current loops
Current Control Accuracy	±(0.25% reading + 0.25% range)	Industry-leading precision for thermal audits
Setting Resolution	1 A	Fine-grained control for targeted current loading

Thermal Acquisition & Environment

Parameter	Detailed Specification	Remark / Notes
Measurement Channels	16 Independent Channels	Includes dedicated ambient temperature tracking
Sensor Type	K-type Thermocouples	Supports high-resolution thermal mapping
Temperature Range	0 – 260 °C	Covers extreme thermal stress scenarios
Temperature Accuracy	±0.3% of reading + 1 °C	Laboratory-grade measurement integrity
Test Scenarios	Continuous / On-Off / Auto	Fully programmable timing and thermal cycles

System Hardware & Interface

Feature	Specification	Remark / Notes

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Feature	Specification	Remark / Notes
Control Architecture	15" Industrial Touchscreen + PC	Dual-interface for local and remote control
Data Processing	Professional Analysis Software	Real-time curve plotting & report generation
Chassis Dimensions	1000 × 1300 × 1800 mm	Heavy-duty mobile design for lab flexibility
System Weight	≈ 400 kg	Robust structural integrity for high-power use

3. Engineering Excellence & Technical Precision

The system is constructed to withstand the immense thermal and electromagnetic stresses of high-current operation:

- **High-Conductivity Architecture:** Utilizes an oversized copper busbar system to minimize internal parasitic resistance.
- **Intelligent Thermal Management:** Employs a multi-stage forced-air cooling mechanism to ensure the test system remains stable during prolonged 6500A runs.
- **Closed-Loop Feedback:** Advanced sensors provide real-time current regulation with ultra-low ripple, maintaining consistent output even as the resistance of the test sample changes with temperature.
- **Data Integrity:** The 16-channel acquisition system features automatic ambient temperature compensation to ensure all "rise" data is normalized and accurate.

4. Testing Principle & Methodology

The tester delivers a stabilized high current to the EV connector assembly while monitoring temperature at critical contact points, including terminals, housing interfaces, and cable crimps. By recording the thermal gradient over time, the system identifies potential overheating risks, evaluates contact resistance quality, and confirms the safety of liquid-cooled or air-cooled charging couplers under continuous or cyclic loading.

5. Industrial Applications & Strategic Value

- **HPC & MCS Developers:** Essential for validating Megawatt Charging System components designed for heavy-duty electric vehicles.
- **EVSE Manufacturers:** Thermal profiling of High-Power Charging infrastructure to ensure long-term operational reliability.
- **Third-Party Laboratories:** Facilitates traceable compliance testing for international

certification standards.

- **Automotive R&D:** Early-stage identification of thermal bottlenecks in vehicle inlet and charging gun designs.

6. Strategic Procurement & Global Support

- **Compliance Excellence:** Manufactured under ISO 9001, ISO 14001, and ISO 45001 quality frameworks with CE certification.
- **Metrological Assurance:** Every system undergoes factory calibration in our Dongguan facility, ensuring immediate readiness for laboratory deployment.
- **Full Lifecycle Support:** Backed by a one-year comprehensive warranty and responsive lifetime technical engineering assistance.

Operational Excellence Tip: For the most accurate results at currents exceeding 2000A, ensure high-current cables are strictly sized to standard requirements and thermocouples are secured with professional thermal conductive adhesive to prevent measurement lag.