ISO 20653 IPX9K High Pressure Hot Water Spray Test Chamber

Professional Technical Datasheet

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Standards: ISO 20653 / IEC 60529 / DIN 40050-9 (IPX9K)
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1. Product Overview

The KingPo IPX9K High Pressure Hot Water Spray Test Chamber is a professional testing system designed for road vehicle electrical equipment and industrial components. It accurately simulates high-pressure (80–100 bar) and high-temperature (80 ± 5 °C) water jet conditions in accordance with ISO 20653 and IEC 60529 to verify IPX9K ingress protection performance.

This chamber is widely used for sealing reliability testing of EV battery packs, charging systems, ADAS sensors, automotive lighting, and other high-protection electrical enclosures. By delivering repeatable high-pressure hot water spray testing, it helps manufacturers identify sealing weaknesses early, reduce field failure risks, and meet stringent international certification and OEM requirements.

2. Key Advantages

● High-Pressure Stability System
Italian-imported high-pressure plunger pump with closed-loop control, delivering stable 80–100 bar output. Benefit: Highly repeatable test conditions without pressure fluctuations.

● High-Temperature Closed-Loop Water System
70L reservoir with precise 80 ± 5°C control and real-time monitoring. Benefit: Accurately simulates real hot high-pressure cleaning conditions for EV and electronics sealing validation.

● IEC-Compliant Precision Spray System
Nozzles per IEC 60529 Figure 7 with servo positioning at 0°/30°/60°/90°. Benefit: Full international standard compliance, accepted by global certification bodies and OEMs.

● Intelligent Control System
Mitsubishi PLC + 7-inch touchscreen with real-time monitoring and data logging. Benefit: Easy operation, traceable records, reduced human error.

● Heavy-Duty Rotating Platform
φ400mm SUS304 turntable, 4–6 r/min, max 100kg load. Benefit: Tests full-size EV battery packs and three-electric modules directly.

● Expandable Metrology (Optional)
Impact force sensor interface with curve analysis software. Benefit: Quantitative R&D tool for in-depth seal performance analysis under dynamic load.

3. Technical Specifications

3.1 Performance Parameters

Parameter	Specification	Test Condition / Method
Pressure	80–100 bar (8–10 MPa)	Closed-loop regulated, pulsation-free
Water Temperature	80 ± 5 °C	Insulated heating, closed-loop control
Flow Rate	14–16 L/min	Real-time monitoring & closed-loop
Nozzle Distance	100–150 mm	Precision rail, adjustable
Spray Angles	0° / 30° / 60° / 90°	Exact positioning per IEC 60529 Fig. 7
Duration per Angle	30 seconds	ISO 20653 compliant cycle

3.2 Mechanical Structure

Parameter	Specification	Notes
Chamber Material	SUS304 Stainless Steel	Full corrosion resistance
Internal Dimensions (W×D×H)	1100 × 800 × 1000 mm	Standard working volume
Turntable Diameter	Ø 400 mm	SUS304, heavy-duty reinforced
Turntable Speed	4 – 6 r/min (nominal 5 rpm)	Variable, PLC controlled
Max. Load Capacity	100 kg	Suitable for large EV modules
Water Reservoir Volume	70 L	Deionized water recommended

3.3 Electrical & Control System

Parameter	Specification	Notes
Control Interface	7-inch Touchscreen HMI + PLC	Multi-language, intuitive operation
Control Architecture	Closed-loop PLC + VFD	Real-time pressure & flow regulation
Safety Systems	Leakage / Over-temp / Door Interlock / Short-circuit / E-Stop (Cat. 0)	Interlocked access, emergency power removal
Power Supply	AC 380 V ±10%, 50 Hz, 3-phase 5-wire	Approx. 25 kW installed power
Recommended Water Quality	Deionized or filtered (< 50 μS/cm)	Prevents nozzle clogging and scaling

All specifications are subject to continuous improvement. KingPo reserves the right to modify technical details without prior notice.

4. Test Procedure (ISO 20653 IPX9K)

1. Heat deionized water to 80 °C and stabilize with closed-loop temperature control.
2. Secure the test specimen on the center of the turntable and adjust nozzle distance to 100–150 mm.
3. Execute automatic cycle: 30 seconds spray at each angle (0°/30°/60°/90°), turntable rotating continuously.
4. Real-time monitoring and data logging; automatic alarm and safe shutdown on deviation.
5. After cycle, inspect specimen for water ingress and generate test report.

Fully compliant with ISO 20653 and IEC 60529 IPX9K high-pressure hot water spray test requirements.

5. Typical Applications

• EV Battery & Powertrain Systems — Battery packs, charging ports, inverters (high-voltage sealing validation)
• ADAS & Autonomous Sensors — LiDAR, cameras, radar modules (waterproof performance after car wash exposure)
• Automotive Lighting — LED headlamps, taillamps (pressure resistance & anti-fog testing)
• Chassis & Connectors — Wheel speed sensors, EPB actuators, high-voltage connectors (long-term durability)

6. Optional Modules & Models

Optional Upgrades:
• Impact force measurement & curve analysis module
• Advanced data logging and automatic report generation
• Remote monitoring & IoT integration

• ISO/IEC 17025 accredited calibration report

Standard Models:
• KP-IPX9K-1100 : Standard Model (Host + Pump + PLC/HMI + Factory Certificate)
• KP-IPX9K-FORCE : With Impact Force Calibration (sensor + analysis software)
• KP-IPX9K-CERT : Metrology-Ready (includes ISO 17025 calibration report)

7. Compliance & Manufacturer

This equipment is designed and manufactured in strict accordance with ISO 20653, IEC 60529, and DIN 40050-9. Factory calibration certificate included as standard. ISO/IEC 17025 third-party calibration available upon request.

Manufactured under ISO 9001 / ISO 14001 / ISO 45001 quality management systems and CE certified.

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