Medical Bed Side Rail Strength Tester

Model KP-6061B | IEC 60601-2-52 & YY 9706.252-2021 Compliant

Standards: IEC 60601-2-52, YY 9706.252-2021

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Product Overview

The KingPo KP-6061B Medical Bed Side Rail Strength Tester is a professional servo-driven test system designed for evaluating the mechanical strength and structural integrity of medical bed side rails, guardrails, and related components. It supports key test methods from IEC 60601-2-52 and YY 9706.252-2021, including side rail strength testing, guardrail push-pull force testing, and tensile rod dynamic testing.

The system applies controlled vertical (0–750 N) and lateral (0–500 N) forces using a high-precision force sensor and servo motor mechanism. It is ideal for medical bed manufacturers, R&D teams, and testing laboratories to verify compliance with mechanical safety requirements for hospital beds, nursing beds, elderly care beds, and rehabilitation beds.

Key Advantages

- **High-Precision Force Application & Measurement**
  Engineering: Equipped with a 1000 N force sensor (0.3% accuracy) and servo motor drive for precise vertical (0–750 N) and lateral (0–500 N) force application with real-time monitoring and peak force capture.
  Benefit: Delivers accurate, repeatable, and traceable strength data critical for compliance with IEC 60601-2-52 side rail mechanical safety requirements.
- **Automated Cycle Testing with Alarm**
  Engineering: PLC + 7-inch TFT touchscreen allows programmable test cycles (0–9999), force holding time, stroke (0–200 mm), and automatic stop with alarm upon completion or anomaly detection.
  Benefit: Improves test consistency, reduces operator error, and enables efficient long-duration durability testing with minimal supervision.
- **Flexible Force Application for Multiple Test Scenarios**
  Engineering: Supports vertical downward force, lateral push-pull force, and dynamic tensile rod testing on side rails and guardrails, with adjustable parameters for different bed designs and worst-case loading positions.
  Benefit: Provides comprehensive mechanical strength evaluation in a single system, covering key clauses of YY 9706.252-2021 (201.9.8.3.3.3 and 201.9.8.3.3.4).
- **Compact & Practical Design for Laboratory Use**
  Engineering: Aluminum profile frame with compact footprint (1500 × 1000 × 1800 mm), suitable for testing beds up to 1700 mm width and 1200 mm height, with protective features for safe operation.
  Benefit: Fits well in standard medical device testing laboratories while accommodating full-size medical beds for realistic strength testing.

Technical Specifications

3.1 General System Parameters

Parameter	Specification	Remark / Notes
Model	KP-6061B	Medical Bed Side Rail Strength Tester
Control System	PLC + 7-inch true-color TFT touchscreen	Intuitive parameter setting and monitoring
Drive System	Servo motor	Precise force and stroke control
Force Sensor	1000 N, accuracy 0.3%	Real-time monitoring + peak capture
Stroke	0–200 mm	Adjustable for different test requirements
Cycle Count	0–9999 adjustable	Automatic stop with alarm
Power Supply	AC 220 V, 50 Hz	Standard laboratory single-phase supply
Equipment Size (W×D×H)	1500 × 1000 × 1800 mm	Compact design for lab use
Max. Test Bed Size	Width 1700 mm / Height 1200 mm	Suitable for most full-size medical beds

3.2 Test Function Parameters

Test Function	Key Parameters	Standard Reference / Purpose
Vertical Side Rail Strength	Force: 0–750 N downward	YY 9706.252-2021 201.9.8.3.3.3 – Side rail strength test
Lateral Push-Pull Force	Force: 0–500 N (push-pull)	Guardrail lateral strength evaluation
Tensile Rod Dynamic Test	Stroke: 0–200 mm; Cycles: 0–9999	YY 9706.252-2021 201.9.8.3.3.4 – Dynamic loading test
Force Holding Control	Programmable holding time	Evaluate force stability and creep
Peak Force Capture	Automatic maximum force recording	Accurate strength data logging

Testing Principle

The KP-6061B applies controlled mechanical forces to medical bed side rails and guardrails to evaluate their structural strength and functional safety under representative loading conditions:

1. **Vertical Loading:** A servo-driven mechanism applies downward force (up to 750 N) at specified points on the side rail to assess bending strength and attachment integrity.
2. **Lateral Push-Pull Testing:** Controlled lateral forces (up to 500 N) are applied to simulate patient leaning or impact forces on guardrails.
3. **Dynamic Tensile Rod Testing:** Repeated stroke movement (0–200 mm) with programmable cycles evaluates fatigue resistance and dynamic loading performance of side rail components.

The system uses a high-accuracy force sensor for real-time data acquisition, peak capture, and holding control, ensuring precise and repeatable test execution aligned with the mechanical safety clauses of IEC 60601-2-52 and YY 9706.252-2021.

Typical Applications

- Medical bed manufacturers — Side rail and guardrail strength verification during design validation and production quality control
- Third-party testing laboratories — Compliance testing and certification support per IEC 60601-2-52 mechanical safety requirements
- R&D and engineering teams — Evaluation of new side rail designs, latch mechanisms, and structural improvements
- Quality assurance departments — Incoming inspection and batch testing of side rail assemblies
- Regulatory and compliance teams — Generation of strength and durability data for technical documentation

Typical Test Workflow

4. Position the medical bed sample and adjust height/rail position as required.
5. Confirm side rail position and alignment with the force application mechanism.
6. Set test parameters (force, holding time, stroke, cycles) on the touchscreen.
7. Verify sensor status, mechanism alignment, and safety guard.
8. Start the automatic test sequence and monitor force data in real time.
9. System stops automatically with alarm; record results and inspect for deformation, loosening, or failure.

Compliance & Manufacturer

This equipment supports test methods aligned with IEC 60601-2-52 and YY 9706.252-2021 for side rail strength (clause 201.9.8.3.3.3) and tensile rod dynamic testing (clause 201.9.8.3.3.4). It is designed to assist manufacturers and laboratories in evaluating the mechanical strength and safety of medical bed side rails and guardrails.

Note: Full compliance evaluation requires complete application of the relevant standards, including product design, risk management, and laboratory procedures. The system provides test capabilities aligned with specific mechanical strength test needs; final compliance determination remains the responsibility of the

manufacturer and accredited testing bodies.

Factory verification of loading, motion, and safety functions is performed before delivery. Regular calibration of the force sensor and verification of stroke accuracy are recommended. Fixture customization and test report adaptation are available upon request. Manufactured under ISO 9001, ISO 14001, and ISO 45001 quality management systems.

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