

Computer Servo Compression Nail Penetration Test Machine

Item Number: DA08



Introduction

Computer controlled servo compression and nail penetration tester simulates lithium battery abuse conditions with adjustable 1 to 20 kN force programmable displacement voltage monitoring safety containment remote data acquisition and automated protective response for demanding cell safety laboratory research programs.

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Application	Description	Key Benefit
Power lithium battery cell development	Compresses development cells between two plates or performs controlled tungsten carbide needle penetration while monitoring voltage and temperature.	Helps R&D teams observe potential cell behavior under defined mechanical abuse conditions.
EV traction battery safety evaluation	Simulates compression scenarios associated with battery use and applies selectable force, voltage-drop, or deformation-based conditions.	Supports repeatable safety evaluation using programmable load and return logic.
Battery quality assurance laboratories	Verifies samples against internal compression or penetration procedures with computer-based acquisition and Excel document output.	Creates traceable data records for comparison, reporting, and printout.
Failure analysis and abuse-test research	Uses staged displacement, dwell periods, controlled speed, and voltage monitoring to examine changes during progressive mechanical loading.	Allows researchers to isolate loading sequence and hold-time variables in a single procedure.
Cell manufacturing process validation	Tests representative cells after production or design changes under controlled compression force and travel settings.	Supports consistent evaluation conditions when comparing sample groups.
Battery safety test facilities	Conducts high-consequence mechanical tests inside a chamber with explosion-protected viewing, smoke exhaust, pressure relief, and fire-control provisions.	Improves operational control and observation during tests that may generate smoke or strong airflow.
Academic electrochemical and materials research	Provides a controlled platform for studying battery response to mechanical deformation or puncture alongside voltage and temperature acquisition.	Combines mechanical test execution with measurement data for laboratory investigations.

Parameter	DA08 Specification
Application	Simulates compression conditions that various power lithium battery cells may encounter during use and presents possible battery conditions during compression.
Operating principle	A battery is placed between two compression plates. A motor applies pressure through a screw mechanism; the platen returns after a set pressure is reached, after voltage falls to a selected value, or after the battery is compressed to a specified deformation and held before further programmed compression and return.
Pressure range	1~20KN (adjustable)
System structure	Vertical downward compression structure
Input voltage	220V, 50 Hz single-phase power
Force error	<= +/-1% full scale
Force unit conversion	n, kn,
Compression speed	1~900mm/min (speed can be adjusted arbitrarily)
Compression speed accuracy	<= +/-1% full scale
Compression travel	300mm

Parameter	DA08 Specification
Compression travel accuracy	$\leq \pm 1\%$ full scale
Testable battery size	W400 X D400 X H300mm
Voltage-drop control	When voltage drops to a selected voltage-drop value, the platen automatically returns or maintains pressure for a specified time before returning.
Pressure control	When pressure reaches the set force value, the platen returns immediately or maintains the set pressure for a specified time before returning.
Displacement control	The platen descends to a set position, pauses for a specified time, then continues to a second displacement and pauses. This cycle continues; after the final descending displacement, the platen holds for a specified time and then returns.
Safety stop switch	Equipped with an emergency stop button
Voltage resolution	1mv
Test conditions	Force, displacement (deformation), or voltage; one of the three
Compression hold time	0~99 hours 99 minutes 99 seconds; time status can be freely set and adjusted, with automatic termination according to deformation arrangement.
Communication and data handling	Computer control supports stable, real-time remote acquisition; includes explosion-proof function; all data are saved and printed as Excel documents through the computer.
Drive method	Servo motor drive
Nail penetration speed	1~40mm/s
Tungsten carbide needles	Phi3; Phi4; Phi6X100MM, 6 pieces each, 18 pieces total
Acquisition system	Temperature/voltage acquisition system
Chamber arrangement	Vertical structure with chamber and control section separated by up to 5 m for operator safety; includes an independent controller and supports local and remote control.
Inner chamber material	Flame-resistant material, SUS#304 stainless steel
Outer chamber material	Powder-coated cold-rolled steel
Camera monitoring system	High-definition camera monitoring system installed in the test area; remotely controllable to help ensure accurate data.
Viewing window	400 X400mm explosion-proof glass with explosion-proof film and built-in steel-mesh structure to prevent explosive objects from striking the window.
Lighting	High-brightness energy-saving explosion-proof lamp installed inside the test chamber to illuminate the full test space.
Exhaust system	Independently controlled; automatically detects smoke produced by the sample and exhausts smoke through ducting. Diameter: 150mm; installed at the top of the equipment.
Ergonomic design	Bottom of test chamber is approximately 800MM above the ground for observation and operation during testing.
Equipment base	Fitted with 4 universal wheels and 4 fixed feet for movement and stable positioning.
Automatic explosion-proof pressure-relief system	Provides exhaust for large quantities of waste gas generated during testing and discharges it outdoors. Rear protective enclosure has a magnetic pressure-relief door, 300*300mm, which opens automatically under strong airflow to reduce explosion impact.
Fire protection device	Carbon dioxide fire-extinguishing device; remotely controllable.
Automatic fire-extinguishing device	Fire-extinguishing device can be controlled remotely by remote control.
Overall dimensions	Approximately 1020W X 600D X 1900H mm; subject to actual equipment.
Computer control cabinet dimensions	Approximately 700W X 600D X 1300H mm; subject to actual equipment.
Machine weight	Approximately 1000KG
Power supply	220V, 50Hz, single-phase power, British-standard plug
Power	2.2KW
Test port	One Phi50mm test port on the left side of the chamber, with silicone compression sealing and a stainless-steel cover.