Laboratory Benchtop Hydraulic Hot Press For Solid State Battery Research

Item Number: KT-ZYA

Introduction

Accelerate solid state battery research with this laboratory benchtop hydraulic hot press engineered with programmable multi step pressure control dual heated platens and active force compensation to deliver uniform interfacial contact for advanced electrolyte pellets and functional composite laminates.

Learn More

Application	Description	Key Benefit
Solid-State Battery Electrolyte Pellets	Hot compaction and densification of sulfide, oxide, and polymer-matrix solid-state electrolyte powders into dense, defect-free separator disks.	Minimizes grain boundary resistance, eliminates microscopic voids, and yields consistently high ionic conductivity across the electrolyte layer.
Membrane Electrode Assembly (MEA) Fabrication	High-precision thermal bonding of catalyst-coated membranes (CCM) to gas diffusion layers (GDL) for proton exchange membrane fuel cells and water electrolyzers.	Provides uniform mechanical contact without crushing delicate carbon fiber porous transport layers or puncturing ultra-thin ion exchange membranes.
Battery Electrode-Electrolyte Interface Lamination	Direct thermal lamination of composite solid electrolyte films to active cathode/anode layers under controlled temperature and mechanical pre-load.	Substantially reduces interfacial charge-transfer resistance and prevents delamination during electrochemical charge-discharge cycling.
Advanced Polymer Matrix Composites Consolidation	Controlled thermo-compression curing and consolidation of continuous fiber-reinforced thermoplastics, prepregs, and layered thermoset resin matrices.	Ensures complete resin flow, optimal fiber wet-out, and void-free consolidation with strict dimensional thickness control.
Functional Ceramics & LTCC Green Tape Lamination	Multi-layer compaction of low-temperature co-fired ceramic (LTCC) green tapes and functional piezoelectric layers prior to high-temperature sintering.	Prevents layer delamination, warpage, and shrinkage non-uniformities by ensuring isotropic density throughout the green body.
Biomedical Biomaterial & Drug Delivery Synthesis	Compaction of biocompatible polymers, drug-eluting matrices, and resorbable tissue engineering scaffolds under controlled thermal conditions.	Preserves active pharmaceutical ingredient stability while achieving precise scaffold porosity, mechanical strength, and dissolution profiles.
Technical Engineering Plastics Processing	Thermal compression molding, melt-flow testing, and crystallization studies of specialized engineering thermoplastics and fluoropolymers.	Facilitates accurate characterization of polymer rheology, thermal transitions, and mechanical deformation under repeatable load-temperature curves.

Specification Parameter	KT-ZYA-18	KT-ZYA-10	KT-ZYA-23	KT-ZYA-21	KT-ZYA-07
Drive Mechanism	Electric Servo Cylinder	Servo Motor Driven	Integrated Hydraulic System	Hydraulic System	Heavy-Duty Hydraulic System
Working Pressure Range	0 to 1800 kgf (1.8 T)	0 to 4 Metric Tons (0 to 40 kN)	0 to 15 Metric Tons (0 to 150 kN)	0 to 25 Metric Tons (0 to 250 kN)	0 to 50 Metric Tons (0 to 500 kN)
Maximum Platen Surface Pressure	Application-Dependent	Application-Dependent	Application-Dependent	Application-Dependent	Up to 55 MPa
Pressure Control Accuracy	< ±1% Full Scale (Std: < 2%)	±2 kg	±1% Full Scale	±1% Full Scale	±0.5% Full Scale

Specification Parameter	KT-ZYA-18	KT-ZYA-10	KT-ZYA-23	KT-ZYA-21	KT-ZYA-07
Pressure Holding & Compensation	Programmable curve, auto-hold & compensation	Automatic real-time compensation	Closed-loop automatic hold & replenishment	Programmable curve, auto-compensation	Active dynamic compensation (deviation within ±0.1 T)
Programmable Pressure Steps	Multi-stage programmable curve	Programmable pressure & auto-hold	Up to 8 programmable pressure stages	Programmable pressure curve	Multi-stage pressure & ramp curve
Platen Dimensions	60 mm × 60 mm	150 mm × 150 mm	500 mm × 500 mm	300 mm × 300 mm	300 mm × 300 mm
Uniform Heating Zone	Full Platen Working Area	Full Platen Working Area	Centered Active Core	250 mm × 250 mm	250 mm × 250 mm Central Core
Daylight Opening (Max Platen Clearance)	30 mm	50 mm	60 mm	50 mm	150 mm
Piston / Hydraulic Stroke	Integrated Servo Travel	Servo Stroke Drive	60 mm	60 mm	150 mm
Operating Temperature Range	Ambient to 200°C	0°C to 300°C	Ambient to 200°C	0°C to 300°C	Ambient to 300°C
Heating Control Method	Dual-platen independent PID (ramp control)	Dual-platen independent PID (ramp control)	Dual-platen independent programmable PID	Dual-platen independent PID (ramp control)	Dual-platen independent multi-step programmable PID
Total Heating Power	600 W (Dual Platens)	1500 W	12 kW (2 × 6000 W)	5400 W	4500 W
Platen Cooling Mode	Circulating Water Cooling	Circulating Water Cooling	Dedicated Circulating Chiller	Optional External Water Chiller	Rapid Cooling Platens / Chiller
System Controller	Digital Touchscreen PLC	7-Inch PLC Touchscreen	7-Inch PID Touchscreen (English UI)	7-Inch Color Touchscreen	7-Inch Touchscreen HMI (Real-Time Graphics)
Data Acquisition & Interface	Onboard Parameter Memory	Onboard Parameter Memory	Real-Time Logging & USB Export	Real-Time Curve Storage & Monitoring	Real-Time Graphical Display & USB/LAN Export
Electrical Power Requirements	AC 220 V, 50 Hz	AC 230 V, 50 Hz	3-Phase AC 400 V, 50 Hz	AC 220 V, 50/60 Hz (Configurable)	AC 220 V, 50 Hz
External Dimensions (W × D × H)	300 mm × 300 mm × 500 mm	Compact Benchtop Profile	1250 mm × 750 mm × 1300 mm	500 mm × 500 mm × 650 mm	400 mm × 490 mm × 780 mm

Parameter	KT-ZYA-21 Optional Chiller	KT-ZYA-23 Dedicated Chiller
Cooling Capacity	12,404 kcal/h	High-efficiency industrial circulation
Water Flow Rate	3 m^3/h	Matched closed-loop circulation
Quick-Cool Platen Compatibility	300 mm × 300 mm	500 mm × 500 mm
External Dimensions (W × D × H)	1045 mm × 610 mm × 1460 mm	470 mm × 670 mm × 890 mm
Electrical Requirements	3-Phase AC 380 V, 50 Hz	System-integrated power supply

Engineering Category	Available Custom Configurations
Mechanical & Hardware Modifications	Custom platen dimensions, specialized platen materials (stainless steel, specialized tool steels, or conductive alloys), extended daylight opening distance, lengthened hydraulic stroke, and integrated vacuum chamber enclosures for oxygen-sensitive materials.
Thermal Upgrades	Ultra-high-temperature platen assemblies supporting continuous operation up to 400°C or 500°C, custom heating coil patterns, and rapid-cooling platen inserts for high-throughput thermal cycling.
Software & Connectivity Integration	Direct integration with Laboratory Information Management Systems (LIMS), custom communication bus protocols (Modbus, Ethernet/LAN), expanded multi-step programming capacity, and tiered multi-user role management.

Safety Mechanism	Implementation Details
CE Compliance	Fully certified under European machinery, low voltage, and electromagnetic compatibility directives.
Electrical Circuit Protection	Dedicated circuit breakers, over-temperature thermal cutout switches, and high-voltage insulation barriers compliant with IEC safety standards.
Mechanical Safety Measures	Physical perimeter safety shielding, interlocked automatic shutoff doors that cease hydraulic and heating movement upon opening, emergency stop pushbuttons, and hydraulic pressure relief safety valves.