



NG-EML Series C – Dual Column Bench Top and Floor Standing UTM

Standards: <u>ISO 604</u>, <u>ASTM E21</u>, <u>ISO 6892-1</u>, <u>GB/T 228</u>, <u>GB/T 16825.1</u>, <u>ISO 6892</u>, <u>ASTM D790</u>, <u>ASTM D638</u>, <u>ISO 37</u>, <u>ISO 1184</u>, <u>ISO 178</u>, <u>ISO 527</u>, <u>ASTM E4</u>, <u>ISO 7500-1</u>, <u>ISO 7500</u>, <u>ASTM E8</u>, <u>ASTM D412</u>



ULTIMATE USER-FRIENDLINESS



LEADING DEPENDABILITY AND RELIABILITY



STRICT COMPLIANCE WITH INDUSTRY STANDARDS



STOCKED CONSUMABLES AND SPARES



TRUSTED AFTER SALES TECHNICAL SUPPORT





Description

The NG-EML Series C – Dual Column Bench Top and Floor Standing Universal Testing Machine (5 kN – 50 kN) is a next-generation electromechanical system developed for precise and reliable testing across a wide range of materials. Engineered with a servo direct-drive system, FEM-optimized frame, and high-rigidity dual-column structure, the machine delivers superior accuracy, higher stiffness, and faster control response.

The system is designed to meet the growing demands of testing advanced composites, high-strength steels, high-temperature alloys, and other complex materials. With minimized vibration and high alignment stability, it is ideal for determining elastic modulus, yield strength, tensile strength, and more.

This versatile machine supports a broad array of test configurations, including tension, compression, flexural, and cyclic loading, and is suitable for both standardized routine testing and research-level material development.

- Force Capacity Options: 5 kN, 10 kN, 20 kN, 25 kN, 30 kN, 50 kN (1124 11240 lbf)
- **Frame Configuration:** Dual-column, bench-top and floor-standing electromechanical frame with direct-drive servo transmission
- Test Space: Single-space and dual-space options available; extended travel models



supported for long specimens or fixtures

 Typical Applications: Used in R&D, quality control, and academic environments for testing metals, rubbers, polymers, plastics, foams, composites, and more – including advanced and high-frequency loading scenarios.

Typical Test Specimens

Designed for high-precision testing of modern materials, the NG-EML Series C – Dual Column Bench Top and Floor Standing system supports a wide range of specimen types, including:

- Metals, high-strength steels, and high-temperature alloys
- Rubber, elastomers, and flexible plastics
- Engineering plastics, polymers, and composite materials
- Biodegradable plastics and flexible electronics
- Foams, films, and soft materials
- Materials used in aerospace and research environments
- Samples requiring high-accuracy modulus, yield, and tensile strength determination

Key Features of the NG-EML Series C Universal Testing Machine

The NG-EML Series C is engineered to meet the rigorous demands of modern materials testing. Key features include:

- **Ultimate User-Friendliness:** GenTest™ universal test software features a modern, intuitive interface with icon-based navigation and touchscreen compatibility. It includes a broad library of preloaded ASTM, ISO, GB/T, and EN methods, a step-by-step workflow, real-time feedback, and simplified operation with ergonomic layout and screen orientation support.
- Advanced Accuracy and Reliability: Delivers Accuracy Class 0.5 across 0.2–100% FS for 500 N–50 kN; 0.4–100% FS for 10 N–250 N. Uses preload ball screws, dual-column FEM-optimized frame, and servo belt transmission. ±0.2% speed and position accuracy with compliance to GB/T 228, ISO 6892–1, ASTM E8, ASTM E21.
- **Certified Performance:** Fully compliant with GB/T 16825.1, ISO 7500, and ASTM E4. Includes a high-resolution optical encoder and TEDS-enabled load cells for plug-and-play setup, self-calibration, and 1/600,000 FS resolution.
- **Extended Test Compatibility:** Compatible with ASTM D412, ASTM D638, ASTM D790, ISO 178, ISO 527, ISO 604, ISO 37, ISO 1184, and more. Supports testing of metals, polymers, composites, rubbers, biodegradable plastics, and flexible electronics.
- Stocked Consumables and Spares: Grips, load cells, fixtures, and accessories are stocked





and NIST-traceable where applicable. Modular pneumatic and pressure control options available.

- **Robust Support:** Includes NextGen's Lifetime Product Support Advantage with calibration, firmware updates, technical support, and optional long-term maintenance. Pull-out controller and easy-access covers improve serviceability.
- **Safety Built-In:** Integrates overload protection (103%), mechanical limiters, and real-time collision detection. Optional full shield with interlock logic. All safety features are embedded to ensure safe, interruption-free operation.







Control System

The NG-EMLSeries C system incorporates a high-performance digital control unit designed for precise test execution, seamless communication, and enhanced system integration.

- Alternative Connectivity Ethernet (TCP/IP): In addition to USB, the controller supports
 Ethernet-based communication using a dedicated high-speed logic chip with full TCP/IP
 protocol stack support. This allows for high-throughput, low-latency data transmission in
 distributed testing environments or where remote control and network integration are required.
- Sampling and Acquisition Performance: The control system
 offers 1200 Hz closed-loop sampling, enabling precise
 synchronization of force, displacement, and extensometer
 inputs. Six-channel analog acquisition with 24-bit resolution
 allows highly accurate signal capture for real-time feedback
 and test control.



- Integrated Hardware Protection: Embedded firmware ensures autonomous monitoring of voltage, current, overload, motor temperature, and crosshead limits. Emergency stop logic is implemented both in software and hardware layers.
- Handheld Remote Console (Standard): Includes a 3.5-inch full-color touch screen, ergonomic silicone keypad, and fine-adjustment rotary dial. Features include test start/stop, grip control, crosshead positioning, return-to-origin function, and overload prevention. It can operate in dual mode—connected directly to the controller or through the PC interface—offering full control redundancy for lab flexibility.

Optimized Structural Rigidity

The NG-EML Series B – Dual Column Bench Top Universal Testing Machine features a frame engineered for superior mechanical stiffness and durability. Utilizing a high-rigidity dual-rail structure and an FEA-optimized crosshead design, the system minimizes deflection and backlash, ensuring exceptional accuracy during critical measurements such as modulus determination, yield strength, and failure loads.

- The testing frame integrates preloaded precision ball screws, dual linear motion guide rails, and reinforced column supports to significantly reduce mechanical play.
- All interfaces load cell, ball screw, motor couplings, and crosshead contact points are engineered for zero-clearance under load, enhancing measurement consistency in both static and dynamic tests.
- The rigid design ensures long-term alignment stability, even during high-cycle or repetitive test applications.



Advanced Direct-Drive Servo Actuation

The NG-EML Series C UTM is equipped with a next-generation direct-drive servo transmission system that delivers exceptional speed, acceleration, and responsiveness.

- The system eliminates traditional gear reducers by employing a high-rigidity synchronous belt and servo motor assembly, which significantly improves mechanical efficiency and reduces transmission backlash.
- Maximum crosshead movement speed reaches 2400 mm/min, significantly reducing testing cycle durations and increasing throughput.
- High-speed drive enables better responsiveness for low-speed creep, stress relaxation, and modulus ramp tests, while still allowing ultra-slow control for precision measurement scenarios.
- Enhanced acceleration profiles improve system adaptability in multi-stage or high-speed ramp testing procedures

Intelligent Safety and Control Architecture

The NG-EML Series C incorporates an advanced safety and intelligence layer that protects both operator and equipment while optimizing system responsiveness and usability.

- Real-Time Collision Prevention: The system constantly monitors real-time force feedback and movement data. If an abnormal force spike is detected (e.g., specimen fracture or obstruction), crosshead motion is automatically halted to prevent load cell overload or mechanical damage.
- **Overload Protection Logic:** The system enforces an immediate stop at 103% of rated capacity. This hardware-level safeguard ensures long-term integrity of sensitive components.
- **Dual-Layer Position Limit Protection:** Built-in software and mechanical end-stop switches ensure safe operation boundaries. Both user-defined digital limits and physical stroke protectors are implemented.
- **Emergency Stop Circuitry:** Integrated emergency stop buttons allow the operator to immediately interrupt any movement.
- **Sensor Range Enforcement:** All input channels (force, displacement, extensometer) include range-checking logic to prevent overrange conditions and maintain data validity.
- **Handheld Controller Safety:** The remote control unit includes grip lockout, overload prevention, and a return-to-origin function that prevents accidental mispositioning.



Optional Protection Shield

The optional protection shield features a fully enclosed structural design with an aluminum alloy reinforcement frame and high-impact polycarbonate panels. This safety enclosure is engineered in accordance with international mechanical safety standards to ensure maximum protection during critical testing operations.

Equipped with an integrated door locking mechanism and software-linked interlock system, the shield restricts system movement when the door is open. This design minimizes the risk of injury and enhances occupational safety in high-throughput or high-force test scenarios.

Streamlined Operation and Maintenance

The Series C UTM is designed for intuitive use and efficient daily operation, reducing setup time, operator training, and maintenance complexity.

- **User-Centered Software Workflow:** GenTest software presents a clean, icon-driven interface. Built-in templates for ASTM, ISO, GB/T, and EN standards allow rapid setup, while drag-and-drop test design and real-time graphical outputs simplify routine and advanced testing alike.
- **Step-by-Step Configuration:** Operators can build test sequences with guided steps, reducing the risk of errors and ensuring repeatability across users and labs.
- Instant Report Generation: One-click data export, automatic calculation of results (modulus, yield, tensile strength, etc.), and batch processing functions streamline documentation and compliance.
- Accessible Maintenance Architecture: The controller module is slide-mounted and accessible
 for service without disassembling the frame. Protective covers can be quickly opened for belt,
 motor, or sensor inspection.
- **Dual Control Modes:** The handheld remote console and optional touch-screen PC interface allow local or PC-based operation with full synchronization, offering flexibility for both training and production use.

Mechanical and Electronic Architecture

The NG-EML Series C – Dual Column Bench Top and Floor Standing Universal Testing Machine is engineered with a precision mechanical structure and high-performance control electronics to ensure stability, repeatability, and accuracy across all test scenarios.

 High-Stiffness Linear Guide System: Dual linear guide rails with integrated self-lubrication significantly enhance lateral stiffness and ensure straight, low-friction crosshead travel. This design minimizes off-axis motion and maintains precise axial alignment, which is essential





for reducing measurement error in displacement- and strain-sensitive tests.

- Low-Noise Synchronous Belt Drive: The direct-drive system employs a high-performance synchronous belt optimized for high speed and low vibration. It operates maintenance-free and ensures smooth power transmission between the servo motor and the actuator assembly.
- **Integrated Optical Encoder:** A high-resolution photoelectric encoder is embedded within the servo system to capture real-time position feedback of the crosshead, supporting micro-displacement measurements with 0.0133 µm resolution.

Load Cell Assembly

The system includes the following load cell features:

- **High-Precision Load Cells:** Each system includes a factory-calibrated load cell with high stiffness, minimal signal drift, and linearity across the entire rated force range.
- Overload and Lateral Force Protection: Built-in safety logic and structural reinforcement protect the sensor against shock loading, side forces, and improper specimen failure.
- **Bidirectional Testing:** The load cells support both tensile and compression tests without requiring reconfiguration.
- **TEDS Auto-Recognition:** All load cells are equipped with IEEE 1451.4-compliant TEDS chips, enabling plug-and-play recognition and eliminating manual setup.
- **Self-Calibration Ready:** The system supports internal load cell verification procedures to maintain measurement accuracy over time
- **Wide Operating Temperature Range:** Rated from -55°C to +90°C, suitable for standard and environmental chamber-based testing.



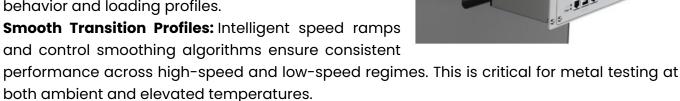




Closed-Loop Controller

The system incorporates a responsive closed-loop controller designed for test control under dynamic load conditions:

Adaptive Feedback Control: The controller features a next-generation closed-loop PID algorithm, optimized for the upgraded direct-drive mechanics. This enables rapid system response under varying material behavior and loading profiles.

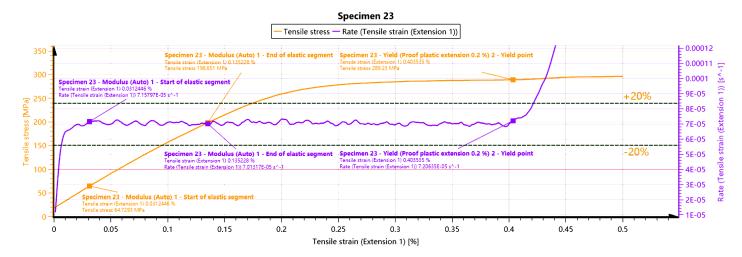


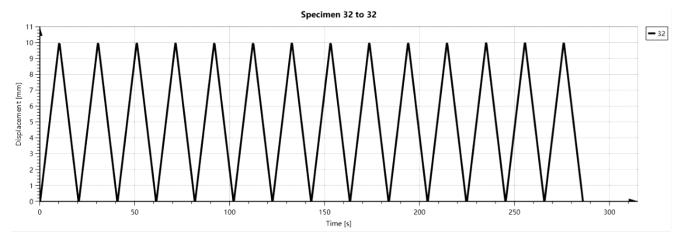
- Multi-Channel Acquisition: Six synchronized analog channels and multiple digital inputs
 allow simultaneous integration of extensometers, temperature sensors, strain gauges, and
 load signals with millisecond-level accuracy.
- **Real-Time Monitoring and Safety:** Continuous monitoring of voltage, temperature, and sensor integrity ensures safe test execution even during long-duration or high-cycle protocols.

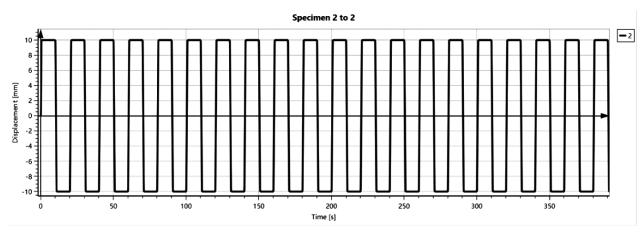




Live Data Visualization and Graphing











- **Real-Time Graphing:** During each test, the system displays synchronized force-displacement, stress-strain, and time-based curves in real time. Graphs are updated dynamically with every acquisition cycle (1200 Hz).
- **Customizable Chart Layouts:** Operators can define custom chart views, zoom windows, axis scaling, and data overlays for advanced comparative analysis.
- **Result Markers and Zoom-In Tools:** Breakpoints, yield offsets, modulus zones, and extensometer triggers are automatically marked and labeled during or after testing.
- Multiple Curve Overlays: Batch testing and comparison of multiple sample curves on a single graph allow performance consistency analysis and outlier detection.
- **Export Formats:** Charts and raw data can be exported in multiple formats including CSV, Excel, PDF, and graphical image (PNG, SVG).

Integrated Control Interfaces

The NG-EML Series C Universal Testing Machine is engineered to support multiple control and interaction modes, providing operators with ergonomic, efficient, and flexible access to all machine functions. Whether in production, R&D, or training environments, these interfaces streamline test execution, setup, and safety control.





Handheld Remote Controller – Included as Standard

This compact, magnetically mountable remote handset includes a fully integrated 3.5-inch full-color touchscreen display for direct user interaction with test status and parameter control.

- Ergonomic Interface: Features silicone-coated buttons and a fine-resolution rotary wheel, which allows precise manual positioning of the crosshead. Operators can jog the crosshead, issue return-to-origin commands, or fine-tune alignment prior to clamping specimens.
- Real-Time Feedback: Live force, displacement, and system state are displayed on-screen. The user receives continuous updates, reducing the need to shift attention between the handset and PC.



- Start / Stop test
- o Return to home position
- Manual jog of crosshead (up/down)
- Grip open/close control (if pneumatic system installed)
- Specimen protection logic prevents excessive preload during setup
- Flexible Communication Modes: Can function either:
 - o In direct mode, communicating with the controller via embedded logic
 - In PC-synchronized mode, acting as a secondary user input device for software-guided workflows







Optional Industrial Touchscreen PC

An optional all-in-one touchscreen computer can be mounted directly on the load frame, enabling standalone test execution without requiring an external desktop or laptop.

- GenTest™ Software Ready: The integrated industrial PC is preloaded with the full version of GenTest™ software. It provides access to all standard test method libraries, custom sequence creation, live graphing, real-time analytics, and report generation tools.
- Intuitive Touch Interface: Multi-touch screen supports tap, drag, pinch-to-zoom, and gesture control. Graphs, test results, and settings are interactively accessible onscreen, minimizing the learning curve for new users.



- Industrial-Grade Build: The PC unit features:
 - Shock-absorbing housing
 - o Sealed surface for dust and moisture resistance
 - Vibration isolation mounts (optional)
- **Port Expansion:** Offers multiple USB ports for data export, printer connection, barcode scanning, or peripheral automation.

Optional Workbench

The optional ergonomic workbench is designed to enhance operator convenience during test preparation and execution. It provides a stable surface for instrument handling and organized storage of accessories such as grips and fixtures. With compact dimensions of 793 × 658 × 675 mm (L × D × H), it integrates seamlessly into laboratory environments and supports efficient workflow.



Optional Pneumatic Grip Control Module

For applications requiring pneumatic grips, the system supports an optional digital pneumatic grip pressure control unit.





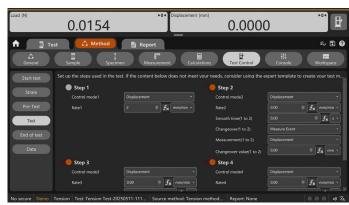
• **Pressure Control and Regulation:** Users can set and adjust air pressure via a digital interface to match the material's clamping requirements. Accurate pressure prevents both under-

clamping (slippage) and over-clamping (material deformation).

- Dual Gripping Channels: Independently control opening and closing of upper and lower pneumatic grips for high-precision clamping sequences.
- Integrated Safety Mechanism:
 - Grip actuation is disabled unless the test space is clear and the system is in a safe state
 - Pre-pressure locking and relief mechanisms help maintain grip force during test start
- Compact Design: The module can be rack-mounted near the testing system or installed directly on the machine frame for easy access. Quick-connect fittings allow fast changeover of grip types.
- **Visual Display:** Real-time pressure feedback and grip status indicators support operator awareness and reduce the risk of setup error.

GenTest™ Software





The newly updated testing software features a streamlined and intuitive layout, offering a logical arrangement of functions, consistent interface design, and clearly structured navigation. It supports both horizontal and vertical screen orientations, with automatic resolution scaling based on the display settings of the host computer.

A broad set of preloaded testing protocols is included, covering widely used standards such as



GB/T, ASTM, ISO, and EN. These methods are organized into modular test groups based on application type, allowing users to efficiently select appropriate configurations for different industries and materials. In addition to standard methods, the software enables full customization of test procedures and standards to accommodate unique testing scenarios.

An integrated modular accessory management system links accessory configurations directly with the test workflow, allowing seamless interaction between the software and connected components. The platform supports a wide range of external devices, including video extensometers, temperature controllers, analog gauges, fully automatic extensometers, thermal chambers, pneumatic grip controllers, and strain measurement sensors, ensuring maximum adaptability across complex test setups.

- **Modern Interface & Layout:** Flat, user-friendly UI with touch optimization, numeric keypad, and real-time language switching.
- **Flexible Test Methods:** Preloaded GB/T, ASTM, ISO, EN standards with quick test options, templates, and customizable expressions.
- **Real-Time Monitoring:** Live display of up to 12 data channels, interactive graphs, and full test progress visualization.
- **Data Handling & Reports:** One-click raw data export, customizable reports, built-in analysis tools, and recalculation features.
- Automation & Protection: Automatic fixture pressure, clamping control, pre-test validation, and sample protection mechanisms.
- **Advanced Control:** Step-based sequencing, voice prompts, and programmable peripheral integration.
- **Security & Maintenance:** Tiered user permissions, test logs, and smart maintenance reminders.
- **Safety Compliance:** Covers overload, electrical, and thermal protections with real-time monitoring.











Technical Specifications

Model	NG-EML Series C – Dual Column Bench Top and Floor Standing Universal Testing Machine			
Force Capacity	5 kN (1124 lbf) / 10 kN (2248 lbf) / 20 kN (4496 lbf) / 25 kN (5618 lbf) / 30 kN (6744 lbf) / 50 kN (11,240 lbf)			
Frame Type	Desktop			
Test Space	Single-space configuration			
Maximum Crosshead Speed	900 mm/min			
Minimum Crosshead Speed	0.00005 mm/min			
Return Speed (Max)	1500 mm/min			
Position Resolution	0.01 µm			
Vertical Crosshead Travel (H)	1000 mm (39.4 in)			
Test Width (W)	420 mm (16.5 in)			
Dimensions (W × D × H)	30.3 × 25.2 × 66.9 in (770 × 640 × 1700 mm)			
Height with Touch Screen (A1)	1350 mm (53.1 in)			
Frame Stiffness	180 kN/mm			
Weight	816 lbs (370 kg) – single space 926 lbs (420 kg) – dual space			
Power Supply	1.5 kW			
Voltage	Single-phase AC 220 V ±10%, 50 Hz / 60 Hz			





Common Parameters					
Accuracy	Class 0.5				
Force Range	500 N - 50 kN (0.2% - 100% FS) 10 N - 250 N (0.4% - 100% FS)				
Calibration Standard	GB/T 16825.1, ISO 7500 (Class 0.5), ASTM E4				
Speed Accuracy	±0.2% of set speed				
Position Accuracy	±0.2% of set position				
Force Resolution	1 / 600000 FS				
Extension Resolution	1 / 600000 FS				
Strain Accuracy	Better than GB/T 228, ISO 6892-1, ASTM E8, ASTM E21				
Safety Protection	Overload protection (103% of rated force), position limit, over-voltage protection				
Single-Channel Data Sampling Rate	1200 Hz				
Control Frequency	1200 Hz				



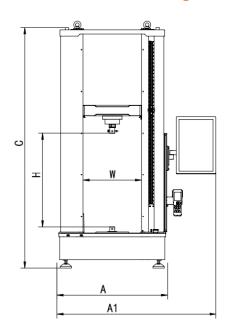


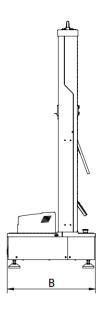
Environmental and Operational Conditions					
Working Temperature	+5 °C to +40 °C				
Storage Temperature	-25 °C to +55 °C				
Relative Humidity	At 20 °C, +10% to 90%, non-condensing				
Maximum Operating Altitude	2000 meters				
Motor Type	AC servo motor				
Ball Screw	Pre-loaded				
Position Measurement	Optical encoder				



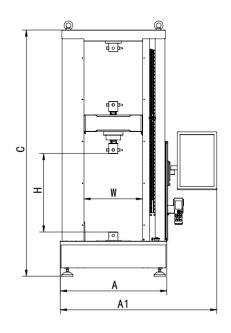


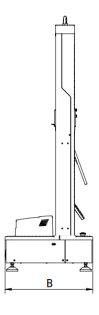
Dimensional Specifications and Drawing References





Single-Space Frame Configuration





Dual-Space Frame Configuration



Frame Type	Dimensions (W × D × H)	Crosshead Travel (H)	Test Width (W)	Touch Screen Height (A1)
Standard (single-space)	30.3 × 25.2 × 66.9 in (770 × 640 × 1700 mm)	39.4 in (1000 mm)	16.5 in (420 mm)	53.1 in (1350 mm)
Standard (dual-space)	30.3 × 25.2 × 69.3 in (770 × 640 × 1760 mm)	35.4 in (900 mm)	16.5 in (420 mm)	53.1 in (1350 mm)
Extended 300 mm (single- space)	30.3 × 25.2 × 78.7 in (770 × 640 × 2000 mm)	51.2 in (1300 mm)	16.5 in (420 mm)	53.1 in (1350 mm)
Extended 300 mm (dual- space)	30.3 × 25.2 × 81.1 in (770 × 640 × 2060 mm)	47.2 in (1200 mm)	16.5 in (420 mm)	53.1 in (1350 mm)
Extended 600 mm (single- space)	30.3 × 25.2 × 90.6 in (770 × 640 × 2300 mm)	63.0 in (1600 mm)	16.5 in (420 mm)	53.1 in (1350 mm)
Extended 600 mm (dual- space)	30.3 × 25.2 × 92.9 in (770 × 640 × 2360 mm)	59.1 in (1500 mm)	16.5 in (420 mm)	53.1 in (1350 mm)

^{*} Request a <u>formal quotation</u> or send an e-mail to <u>sales@nextgentest.com</u> for the most up-to-date pricing and applicable discounts and incentives.