

2020

MICROTEST

EM2 Series Dual Column Floor Model Electromechanical Universal Testing Systems



MICROTEST, S.A.

Systems and Solutions for Materials Testing

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MICROTEST AT A GLANCE

MICROTEST, S.A. has over 25 years experience in design and manufacturing of high quality electromechanical and hydraulic testing systems with force capacities ranging from 500 N to 5000 kN. MICROTEST is especially well-known for its scientific and technical expertise, superior product and service quality, and reliability in materials testing solutions. Microtest testing systems are compliant with international standards and designed carefully to meet the requirements of all common materials testing standards, such as ISO, ASTM, DIN, TAPPI, GB, JIS, ANSI, NAS.

Microtest universal testing systems are fast and easy to operate. Providing an ideal balance between functionality and cost, these systems are suitable for performing diverse mechanical tests on a wide variety of materials and components, whether for routine quality control and product testing or research projects and activities. Microtest universal testing systems are extensively used worldwide in universities and research centers as well as a broad range of industries from metals, polymers and composites to concrete, textiles and fibers particularly in the manufacturing, automotive, aerospace, energy, biomedical and construction sectors.

OVERVIEW

Microtest EM2 Series floor models are dual column electromechanical universal testing systems suitable for performing static (tensile, compression, flexure/bend, shear, friction, tear, peel, etc.) and low-frequency cyclic testing over a range of force applications up to **1200 kN** (270,000 lbf). A wide choice of load cells, extensometers, grips, specimen holders, fixtures and other testing accessories allow the EM2 Series floor-standing universal testing machines to be used for accurate and repeatable mechanical testing of metals and alloys, aerospace and automotive structures, components, plastics, polymers, composites, rubber, elastomers, bolts, fasteners, cables, textiles, biomaterials, wood products, building components and etc.

In EM2 Series floor-standing testing frames, the upper moving crosshead is actuated by double lead ball screws and guided by 2 or 4 robust guide columns. The lead ball screws are preloaded for backlash elimination. The precisely-aligned, hard chrome plated guide columns along with the preloaded ball screws provide superior stiffness and rigidity for these

testing frames. The load cell is usually mounted under the upper moving crosshead.

Microtest EM2 Series floor-standing universal testing systems feature high resolution digital control electronics and powerful servo motor drive, both essential for precise and smooth mechanical testing. These testing systems integrate a digital closed-loop servo control system with a reliable electromechanical drive to perform tests in load, position (displacement) and strain control modes at force capacities ranging from **10 kN** to **1200 kN**.

The EM2 Series floor-standing universal testing systems provide a single or dual zone test space in which the test specimens can be loaded/unloaded with minimal effort. This feature is further enhanced by a programmable switch mechanism that allows operators to quickly set the upper and lower crosshead limits at any point within the vertical test space.

Microtest EM2 Series universal testing systems can be modified as required to suit the individual testing requirements and needs of our customers.



Microtest EM2 Series 500 kN universal testing machine

FEATURES

- Dual column floor-standing universal testing frames featuring superior stiffness and precision alignment for more accurate test results and reproducibility
- High speed, high precision electromechanical drive systems with a maintenance-free powerful servo motor and double preloaded ball screws
- High resolution digital closed-loop servo controls to test in load, crosshead position (displacement) and strain control modes
- Full software control (cyclic capability optional)
- Convenient test setup
- Control handset or control panel for enhanced usability and productivity (optional)
- Ergonomic working height and design
- A small footprint and space-saving design requiring minimal laboratory floor space
- Dual zone test space (optional)
- Advanced load cell technology for faster testing and reduction of inertial errors
- Automatic recognition and calibration of load cells, extensometers and other transducers
- A complete selection of load cells, extensometers, grips, specimen holders, fixtures and other testing accessories
- Test cam for video recording (optional)
- T-slot base platen (optional)
- Compatible with various types of video extensometers, environmental chambers, high temperature furnaces and temperature-controlled fluid baths
- Design for both static and dynamic testing on a variety of materials and components
- Meets or exceeds requirements of all national and international standards for materials testing systems
- Full CE compliance

SAFETY

To ensure operator safety and compliance with the latest international safety directives, the design and engineering of Microtest electromechanical universal testing systems incorporate all the latest safety features, including:

- A bright red ISO-approved emergency stop button
- Operating-mode selector and drive off switches
- System status light indicating whether the load frame drive is energized and ready for working
- Automatic limit checking for crosshead over-travel, overload, over-voltage, etc.
- An auto frame standby mode that automatically stops the testing frame when the load/strain transducers, control electronics or computer system get disconnected or stop working properly
- Dual level mechanical limit switches to stop the moving crosshead at predetermined points
- Limit-setting and configurable alarms for load, crosshead position, strain or any other measured/calculated channel
- Test space transparent safety shield to protect the operator from flying specimen fragments or other hazards

ACCESSORIES

The utility of Microtest EM2 Series universal testing systems is further extended by a broad choice of system options, grips, fixtures and accessories:

- A complete range of load cells, extensometers (including axial, extended length and high temperature extensometers) and other transducers
- A wide variety of manual, pneumatic and hydraulic grips with various jaw inserts, specimen holders and fixtures
- Compression platens
- Flexure / bend fixtures
- Grip control kits for increased productivity with pneumatic and hydraulic grips

Examples of the testing accessories compatible with the EM2 Series floor-standing universal testing systems are shown below.

Furthermore, the EM2 Series universal testing systems are in full compatibility with the auxiliary testing equipment, such as video extensometers, environmental chambers, high temperature furnaces and temperature-controlled fluid baths. Using the proper testing configuration, these testing systems can be used to conduct a broad range of mechanical tests, including but not limited to:

- Tensile / compression
- Flexure / bend
- Shear / friction / tear / peel

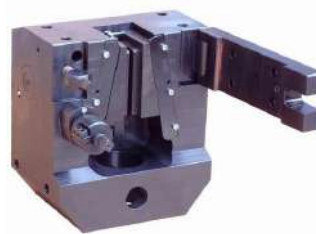
If required, all of the mentioned testing accessories and auxiliary equipment can be tailored to suit the individual testing requirements and needs of our customers.



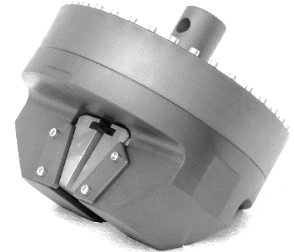
50 kN
Vise Action Grip



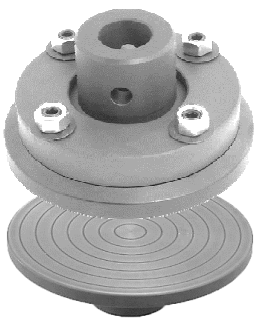
100 kN
Wedge Action Grip



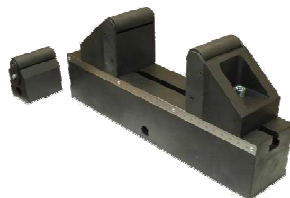
300 kN
Wedge Action Grip



100 kN
Pneumatic Wedge Grip



156 mm
Compression Platens



600 kN
Flexure Fixture



50 kN
Rope and Ribbon Grip



350 °C
Environmental Chamber

DIGITAL CONTROL SYSTEM AND TESTING SOFTWARE

Microtest EM2 Series electromechanical universal testing systems are controlled by **SCMD3000 digital controllers**, designed and developed by Microtest specifically to meet the requirements of the most demanding materials testing applications. Microtest SCMD3000 electronics provides **full digital servo control, machine safety, transducer conditioning and data acquisition** for EM2 Series testing systems to conduct static mechanical tests (tensile, compression, flexural/bend, peel etc. under quasi-static loading rates) on a wide variety of materials and components. The SCMD3000 digital controller takes advantage of an advanced **full PID control algorithm** for precise control in load, displacement (stroke) and strain control modes.

The SCMD3000 controller provides sufficient number of **analog and digital inputs/outputs** (with expandable structure for future expansion) to provide connection for sensors like displacement transducers and strain gauge extensometers in addition to the default channels such as load, crosshead displacement (stroke) and strain. The SCMD3000 controller provides enough measurement channels for most cases in materials testing. However, the number of input channels can be increased if required.

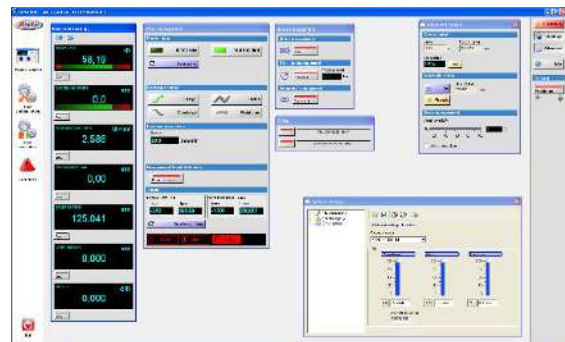
High-resolution sensor conditioner cards can be added to the SCMD3000 electronics and these are directly compatible with load cells, strain gauge extensometers as well as other devices even with +/- 10V DC output signal.

The SCMD3000 control system includes a 32-bit Digital Signal Processor (DSP). The SCMD3000 control electronics features high speed servo control (control loop update rate up to 2500 Hz as standard or more as optional) and high-resolution analogue-to-digital conversion (resolution up to 24 bits) for the required analog input channels.

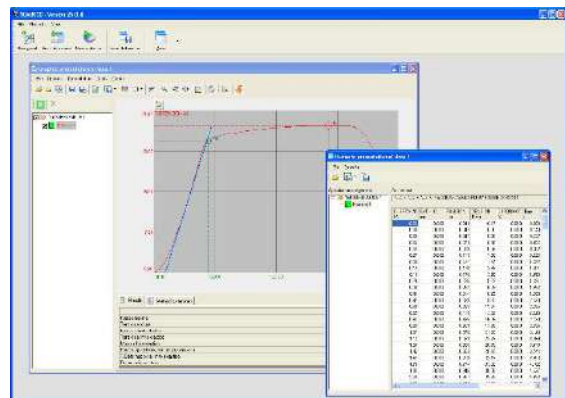
When coupled with the SCMD3000 digital control system, **SCM3000 modular software** enhances the capabilities and versatility of Microtest electromechanical universal testing systems for accurate and repeatable mechanical testing of materials, components and finished goods. SCM3000 is a powerful and versatile, yet easy-to-use interactive testing software with advanced configuration, control and safety features. This testing software includes a machine status bar presenting the current status/functions of the testing system and several configurable live displays/graphs for the raw data and measured values, as well as the test results and required calculations.

SCM3000 software comprises a set of modules (applications), including **Configuration, Methods Editor, Test Control, Data Analysis** and **User Management**. Each designed for a specific purpose, these modules provide utmost flexibility to modify the preset standards-compliant test methods or create new ones, design complex test sequences, run tests, analyze data and report results using standard or custom-built templates containing test information, graphs, tables, lists, etc. Depending on your workflow needs you can setup automatic export options for the test data and results: ASCII, Excel, PDF, plain text, Word and image files. Moreover, the Data Analysis module provides an intuitive interface to recall and analyze the test data, display and modify the results and generate test reports over time.

SCM3000 software offers the optimum solution for any testing requirement. Using this software, operators can control all of the functions of the testing system, providing ultimate convenience of operation. Besides, external devices such as video extensometers and test cams can be connected to SCM3000 software and defined as external channels in the Configuration Module.



SCM3000 Test Control module



SCM3000 Data Analysis module

SPECIFICATIONS

MODEL		EM2 / 10 , 30 , 100 / FR			EM2 / 300 , 600 , 1200 / FR		
Force capacity [kN]		10 ; 30 ; 100			300 ; 600 ; 1200		
Force capacity options [kN]		5 ; 10 20 ; 30 50 ; 100			150 ; 250 ; 300 400 ; 500 ; 600 900 ; 1200		
Maximum test speed [mm/min]		500 - 2000			250 - 1100		
Minimum test speed [mm/min]		0.00005 - 0.005			0.00005 - 0.005		
Position control resolution [μ m]		0.005			0.005		
Axial stiffness [kN/mm]		120 ; 150 ; 300			650 ; 900 ; 1100		
Column spacing [mm] (C) (*)		400 - 600			500 - 1000		
Total vertical test space [mm] (**)		1100 - 1900			1200 - 2800		
Total crosshead travel [mm] (S)		1000 - 1800			1000 - 2600		
Dimensions [mm]	Height (H)	2000 - 2700	2000 - 2700	2000 - 2700	2200 - 3800	2400 - 4000	2600 - 4200
	Width (W)	740 - 940	740 - 940	800 - 1000	900 - 1400	1100 - 1600	1300 - 1800
	Depth (D)	670	670	670	710	740 - 910	980 - 1110
Motor		DC or AC servo motor			DC or AC servo motor		
Power requirements		Single phase, 120/220 VAC \pm 10%, 50/60 Hz			Single phase, 120/220 VAC \pm 10%, 50/60 Hz (only 150 kN, 200 kN, and some 300 kN models) Three phase, 380/415 VAC, 50/60 Hz		
Accuracy class (meets or exceeds)		ISO 7500 Class 0.5 or ASTM E4			ISO 7500 Class 0.5 or ASTM E4		

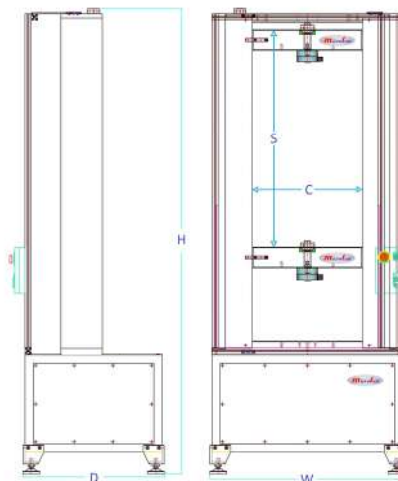
(*) The distance between columns.

(**) The distance from the top surface of the base platen to the bottom surface of the upper moving crosshead, excluding load cell, grips and fixtures.

NOTE: The specifications listed can be modified within the ranges shown in the above table to suit the individual testing requirements and meet the exact specifications required by our clients. We would be glad to give information on Microtest’s design and engineering capacities upon request.

NOTE: Universal testing systems with specifications other than stated above are also available upon request (**customized models**).

NOTE: Due to Microtest continuous product improvement policy the specifications listed are **subject to change without notice**.



Principle drawing of the EM2 Series floor-standing universal testing frames

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