

2017

MICROTEST

EM1 Series Dual Column Tabletop & Floor Models with Central Actuator

Electromechanical Universal Testing Systems



MICROTEST, S.A.

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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.

columns along with the preloaded ball screw provide superior axial/lateral stiffness and rigidity for these testing frames. The load cell is usually mounted under the upper crosshead. The upper crosshead is tightly gripped on the guidance columns and can be moved up/down to increase/decrease the total vertical test space.

Microtest EM1 Series universal testing systems feature high resolution digital control electronics and powerful servo motor drives, 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 300 kN**.

The EM1 Series universal testing systems provide a single 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 EM1 Series universal testing systems can be modified as required to suit the individual testing requirements and needs of our customers.

OVERVIEW

Microtest EM1 Series table-top & floor models are dual column universal testing systems featuring a single-screw central electromechanical actuator. These testing systems are especially suitable for slow speed **static** (tensile, compression, flexure/bend, shear, friction, tear, peel, etc.) and **long-term/quasi-dynamic** (creep, stress relaxation, stress rupture, low cycle fatigue, etc.) testing over a range of force applications up to **300 kN** (270,000 lbf). A wide choice of load cells, extensometers, grips, specimen holders, fixtures and other accessories allow the EM1 Series universal testing machines to be used for accurate and repeatable mechanical testing of metals and alloys, ceramics, plastics, polymers, composites, small/large components, adhesives, wood products, building components, stone, concrete and many more.

In EM1 Series universal testing frames, the lower crosshead is actuated by a central ball screw and guided by 2 robust guidance columns. Thus, a very good force flow with direct force transmission to the specimen is obtained during mechanical testing. The central ball screw is preloaded for backlash elimination. The precisely-aligned, hard chrome plated guidance



Microtest EM1 Series 50 kN tabletop universal testing machine



FEATURES

- Dual column tabletop/floor-standing universal testing frames featuring superior axial/lateral 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 a preloaded central ball screw
- High resolution digital closed-loop servo controls to test in load, crosshead position (displacement) and strain control modes
- Full software control (cyclic capability optional)
- Control handset or control panel for enhanced usability and productivity (optional)
- Convenient test setup
- Adjustable total vertical test space
- Ergonomic working height and design
- A small footprint and space-saving design requiring minimal laboratory floor space
- 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 EM1 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 and pneumatic grips with various jaw inserts, specimen holders and fixtures
- Compression platens
- Flexure / bend fixtures
- Grip control kits for increased productivity with pneumatic grips

Examples of the testing accessories compatible with the EM1 Series universal testing systems are shown below.

Furthermore, the EM1 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
- Creep / stress relaxation / stress rupture
- Low cycle fatigue

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.



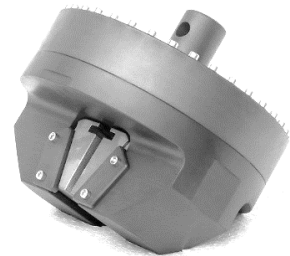
50 kN
Vise Action Grip



50 kN
Wedge Action Grip



100 kN
Wedge Action Grip



100 kN
Pneumatic Wedge Grip



116 mm
Compression Platens



50 kN
Flexure Fixture



350 °C
Environmental Chamber



1200 °C
Split Furnace



SCM3000 DIGITAL CONTROL SYSTEM AND TESTING SOFTWARE

Microtest EM0, EM1 and EM2 Series electromechanical universal testing systems are controlled by **SCM3000 digital controllers**, designed and developed by Microtest specifically to meet the requirements of the most demanding materials testing applications. SCM3000 digital controllers deliver high precision closed-loop servo control and a fast 1000 Hz data acquisition and control loop rate. This capacity allows operators to generate high resolution test data for more meaningful analysis and achieve high accuracy across test runs. If required, the data acquisition rate can be increased by several hundred times (optional).

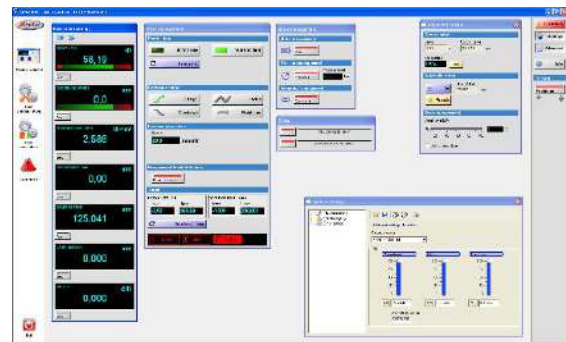
SCM3000 control and data acquisition electronics contain a high resolution 8-channel analog-to-digital (A/D) converter, a high performance 32-bit digital signal processor (DSP), and USB or Ethernet interface for PC communication. In addition to the 8 analog input channels (+/- 10V DC), there is a digital (pulse) input channel which is employed for precise position measurement and control. SCM3000 digital controllers include an integrated signal conditioner for the load channel. Some applications may also require direct strain measurement from the specimen or load/strain control. Sensor conditioner cards can be added to the SCM3000 electronics and these are directly compatible with extensometers and LVDTs, as well as load cells or other devices with +/- 10V DC output signal.

SCM3000 digital controllers can take up to two additional signal conditioner cards for the strain channel(s) as standard but this can considerably be increased using a Channel Expansion Module (optional). This provides signal conditioning and calibration for up to seven transducers which may be used for control and/or data acquisition. An analog output and digital I/O card is also available (optional), allowing connection of analog chart recorders and plotters.

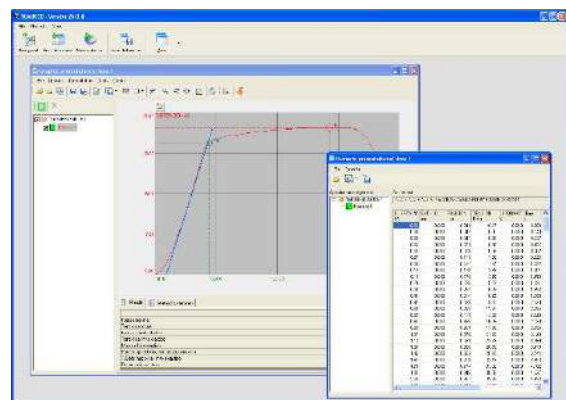
When coupled with the SCM3000 digital control system, **SCM3000 modular software** enhances the capabilities and versatility of Microtest electromechanical universal testing systems for accurate and repeatable mechanical testing of materials, components and finished goods. SCM3000 is a powerful and versatile, 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		EM1 / 10 , 30 , 50 / FR	EM1 / 100 , 200 , 300 / FR		
Force capacity [kN]		10 ; 30 ; 50	100 ; 200 ; 300		
Force capacity options [kN]		5 ; 10 20 ; 30 50	100 150 ; 200 250 ; 300		
Frame type		Tabletop Floor-standing	Floor-standing		
Maximum test speed [mm/min]		100	100		
Minimum test speed [mm/min]		0.005	0.005		
Position control resolution [μ m]		0.05	0.05		
Axial stiffness [kN/mm]		100	300		
Column spacing [mm] (*)		350 - 500	450 - 700		
Total vertical test space [mm] (**)		700 - 1000	900 - 1600		
Total crosshead travel [mm]		150 - 350	150 - 400		
Dimensions [mm]	Height (H)	1420	2070	2310 - 2560	2360 - 2560
	Width (W)	700	900 - 1150	990 - 1250	990 - 1250
	Depth (D)	415	500 - 600	500 - 600	500 - 600
Motor		AC or DC servo motor	AC or DC servo motor		
Power requirements		Single phase, 120/220 VAC \pm 10%, 50/60 Hz	Single phase, 120/220 VAC \pm 10%, 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 lower crosshead to the bottom surface of the upper 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 force capacities other than the force capacities stated above are also available upon request.

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

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