

2018

MICROTEST

## EM1/10...250E/H-HTRP Series Electromechanical Creep Testing Machines



**MICROTEST, S.A.**  
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## DESCRIPTION

The EM1/10...250E/H-HTRP is a modified EM1/10kN to 250kN stand-alone floor machine designed for high temperature creep testing applications. The load frame capacity can vary between 10 kN and 250 kN.

Its compact design consumes a minimal amount of laboratory space while performing tension tests on a variety of materials. It is also possible to adapt this type of machine for other type of tests: compression or shear tests, for example. Possible applications are, among others:

- Force and strain controlled applications
- High Temperature Creep and Relaxation tests
- Accelerate Stress Rupture Tests
- Creep crack growth tests
- Tensile and Compressive tests
- Low cycle Fatigue tests (LCF) in tension, compression and through zero tests

Rigid-column construction with single-screw driven provides precise alignment during testing procedures. Columns are treated and hard-chrome plated for extended life and durability. Two options: standard twin column frame and four column frame option (4c option).

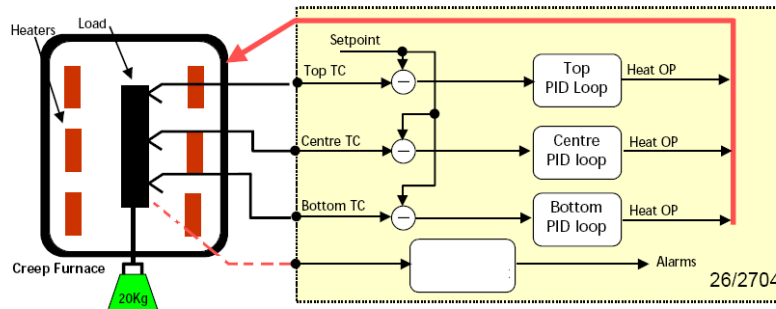


The features of this system include an advanced version of the SCM3000 system for machine control, measurement of quantities and data recording during long term tests. Apart from the whole set of analog channels, with the load cell signal conditioner and pulse channel for high precision position measurement and control, this SCM3000 version contains also two new pulse channels for high accuracy measurement of strains in high temperature creep tests by using linear encoder displacement transducers.

The standard applications for high temperature tests, includes a 3-zone furnace (300 mm length) for a temperature range from 200 °C (or even lower) up to 1000 °C, 1100 °C or 1200 °C with a state-of-the-art digital programmable temperature Eurotherm 2604 or 2704 controller: Every zone in the oven has its own heater that can be controlled through a type-K or N thermocouple and a sample thermocouple (type k or S) in a dual loop process (typically cascade control). This configuration leads to a high temperature stability (less than  $\pm 1$  °C) and a precise temperature

long term control, without overshooting. Another set of three type-K thermocouples is used to protect the furnace from accidental overheating.

The furnace is a tubular design type (both sides diameter bore: 90mm), concentrically placed along the test axis. It can be moved up and down the load line easily by the help of a counterweight cable system.



The furnace isolation is provided by means of soluble refractory ceramic fiber, complying with the European standard for fiber solubility (Commission Directive 97/69/EC).

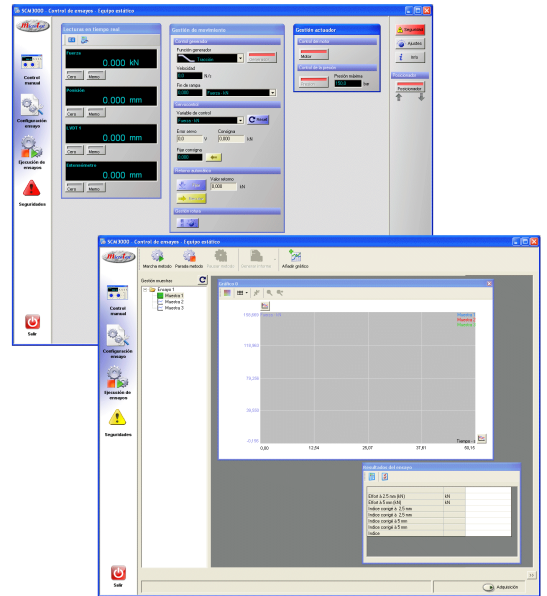
The machine frame has also been adapted to accommodate the furnace. It uses an extra-large testing area and the vertical clearance allows an easy management of the furnace. Other type of chambers can be designed under demand.



The standard configuration is applied for threaded samples. This configuration makes use of interchangeable threaded couplings made in high temperature resistant NI-base alloy or super-alloy and defined for every type of threaded sample. The pull rods are also designed in high temperature alloy and are threaded both ends to be coupled to alignment elements such as Cardan shafts used as tension alignment element, clevis couplings and spherical plain thrust bearings. The length of the pull rods is defined to fulfill the user requirements.

### SCM3000 TESTING SOFTWARE

SCM3000 testing software is used to launch the creep tests including the temperature set-points to be reached by the furnace. The SCM3000 software has been adapted to include also a temperature stability control and PID parameters user's selection according to the sample to be tested. Calculated channels are defined for creep testing: stress, average strain, average temperature, etc. Standard methods are defined also for typical tests. New methods can be adapted to user requirements.



### MICROTEST HIGH TEMPERATURE AVERAGE EXTENSOMETER HT-EXT.12.2

- Designed for high temperature creep testing
- Interchangeable specimen adapters for different diameters
- Designed for grooved samples
- Four bars construction
- Dual gauging platforms that provide adjustable gauge lengths
- Two transducer adapters designed for various types of displacement transducers (the standard type is linear pulse displacement gauge Heidenhain 1278)
- Resolution: 0.0001mm. Range 12mm
- Maximum Temperature: 1000 °C / 1200 °C (SHT-EXT version)





## SPECIFICATIONS

### LOAD FRAME

- Modified EM1/10kN - 250kN stand-alone floor machine.
- Load Capacity: 10 kN, 50 kN, 100 kN and 250 kN (or other capacities upon request).
- High stiffness, precision and durability by 2 or 4 columns-design and central single screw.
- Frame Stiffness: 200kN/mm to 700kN/mm standard\* (or higher stiffness upon request).
- Precise axial alignment by precision crosshead guiding and special seating load train.
- Requires no special base or foundation
- Includes vibration isolation legs with dampers under the load frame
- High resolution crosshead position measurement and high resolution load channel permit excellent control characteristics.
- Horizontal Clearance: 395 mm between columns.
- Standard Vertical Clearance: 1355 mm (STANDARD, excluding load cell, grips or fixtures\*)  
\* Extended crosshead travel and vertical clearance are available
- Crosshead Travel: 75-100 mm STANDARD\*
- End Limit Switches: factory fixed
- Alarm Switches: Computer adjustable.
- Crosshead Guidance Independent chrome-plated guide rods
- Upper Crosshead: fixed
- Ambient or elevated temperature tests.

### CROSSHEAD CONTROLS

- System: SCM3000
- Software: SCM3000 V20 or latest version.
- Computer and closed loop controlled system
- Speed Range: <0,001mm/min to 100mm/min STANDARD
- Crosshead Speed Selection 0.1% increments of speed range
- Digital Speed Display: user selected units.
- Constant load control.
- Constant position control.
- High durability
- Integration of high temperature controller.
- Manual crosshead controls: A set of "up-down-stop" buttons provide a simple interface for operating the machine.

### LOAD MEASURING

- Force range: depending on the load cell: 250kN, 100kN, 50kN, 10kN or any other value.
- Load Accuracy: Class 0.5 according to EN ISO 7500
- Automatic Overload Protection STANDARD
- Peak Load detection STANDARD
- Digital Display STANDARD: user selected units.
- Other Load Cells Available (to be offered separately)
- Several load cells can be used
- Automatic Break Detection STANDARD (Featuring adjustable sensitivity and an on/off control)

### **DISPLACEMENT MEASURING SYSTEM AND POSITION RETURN**

- High Precision Optical incremental encoder
- Range Full crosshead travel
- Computer Digital Display
- Position Resolution : <0.0001 mm
- Computer actuated return to selectable position

### **ACCESSORIES**

A wide variety of options is available for use with these systems, including chambers, extensometers, grips, etc.

### **REQUIREMENTS**

- Supply power: 240 VAC, 1 Phase or 400 VAC, 3 Phase (furnace power supply), 3 kW.
- The system can be adapted to other local voltage values.
- For computer requirements, check the requirements for SCM3000 software.



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