MULTIENSAYO

70-S16C2 AND 70-S17C2
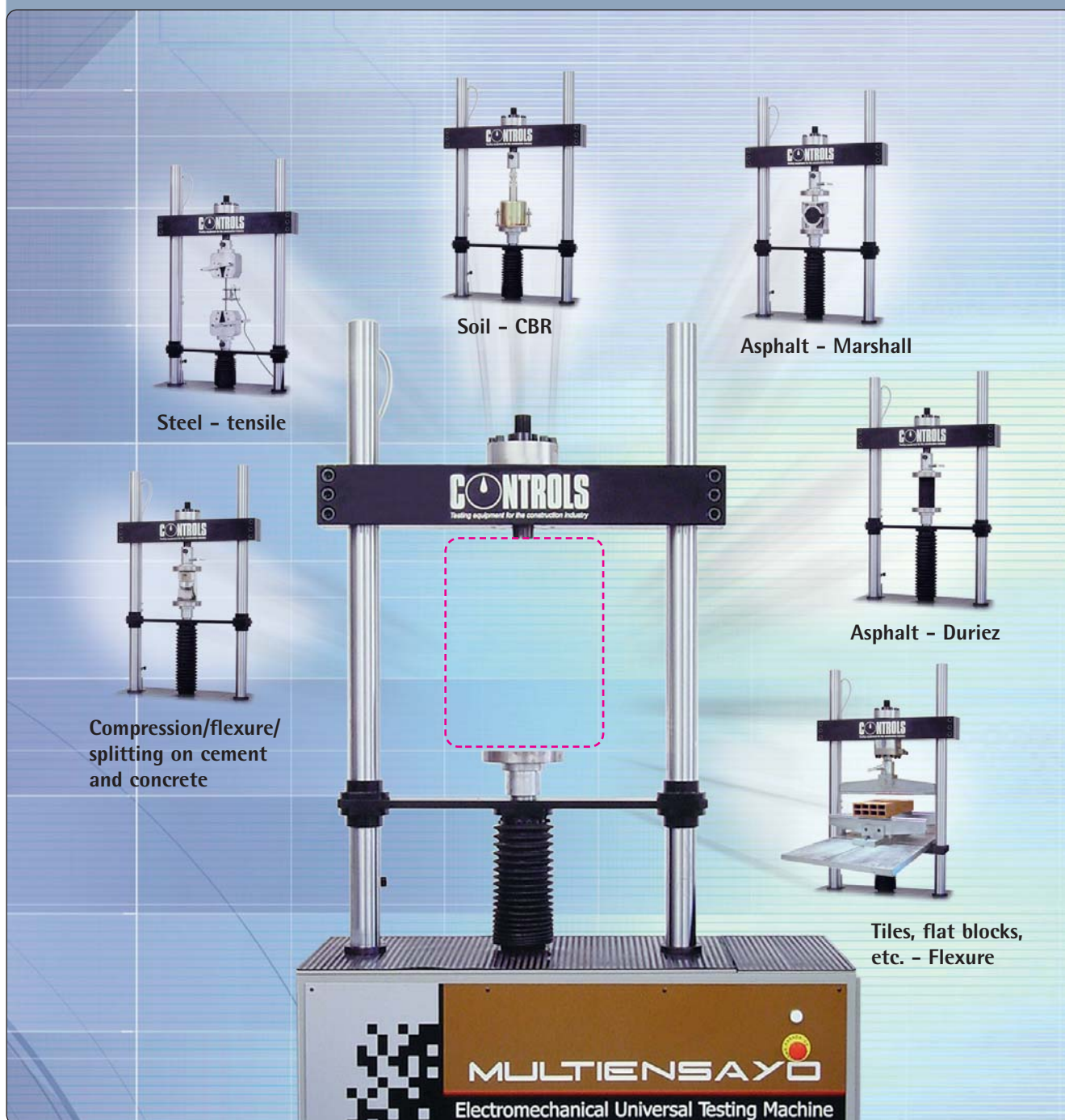
Introduction

The demand for quality control and testing of construction materials carried out by industrial, research and university laboratories is growing and emphasises the need for versatile universal testing systems.

The Multiensayo fully satisfies this need and is an economic machine that offers an alternative solution to older style testing machines coupled with important advantages such as better precision, sophisticated processing of data and excellent reliability.

In fact, the versatility of the Multiensayo allows its use for a wide range of industrial applications as it is described in the following pages.

– Suitable for tension, compression and flexural tests on various materials

Steel – tensile

Soil – CBR

Asphalt – Marshall

Compression/flexure/ splitting on cement and concrete

Asphalt – Duriez

Tiles, flat blocks, etc. – Flexure

MULTIENSAYO
Electromechanical Universal Testing Machine

General description

The machines consist essentially of a robust two column frame with an upper crosshead which can be adjusted in height and a lower mobile crosshead moved by an electromechanical system with a single recirculating ball screw powered by a DC permanent magnet servomotor which assures smooth application of load at constant speed.

The stress is measured by a load cell incorporated in the upper crosshead and the displacement by an encoder fitted to the DC motor.

The advanced microprocessor technology achieves a large flexibility in conducting the test. The menu driven program gives the operator the possibility of performing the test under a wide range of conditions under load, elongation and displacement control.

The machines are supplied complete with high precision load cell and PC.

Gripping systems, extensometers and accessories are not included and have to be ordered separately. See accessories.
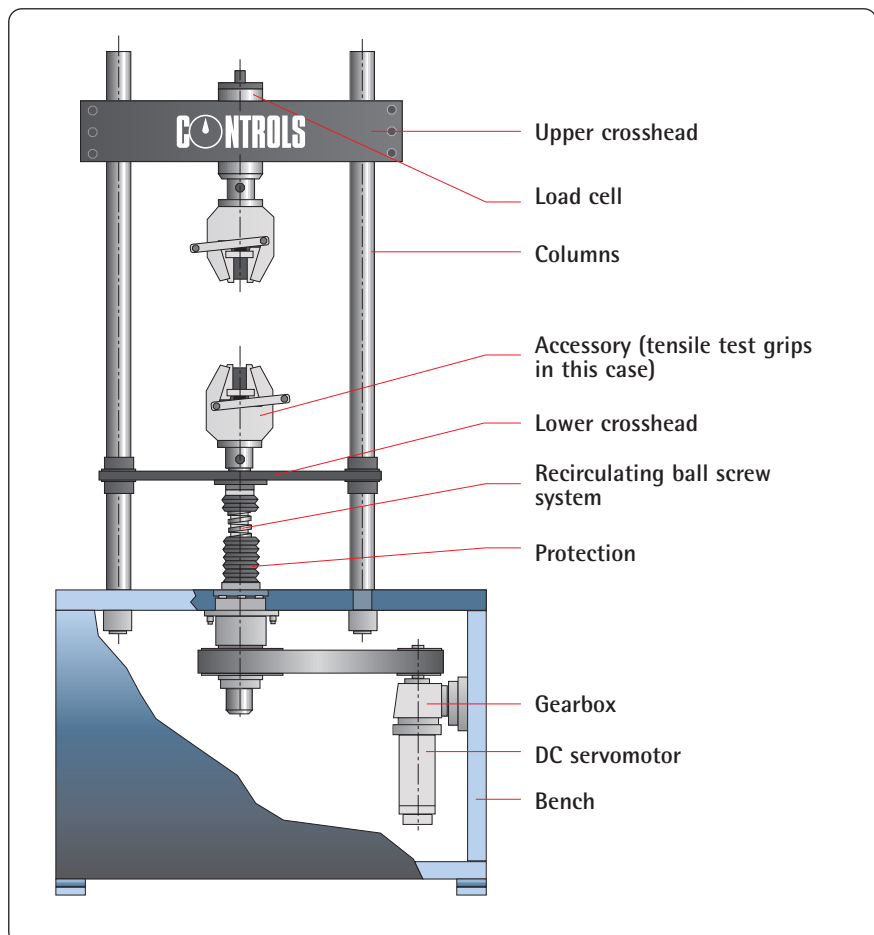
Frame specifications

- Max. load: 200 or 300 kN
- Max. vertical daylight: 800 mm (without accessories)
- Distance between columns: 610 mm
- Crosshead travel: ± 200 mm
- Testing speed range: 0-100 mm/min
- Max. load rate: 100 kN/s
- Machines class: 1
- Encoder resolution: 0.01 mm
- Encoder accuracy: better than 0.2%

📦 **Overall dimensions:**
2150x710x510 mm

⚖️ **Weight approx.:**
750 and 800 kg

70-S16C2 with 86-D2999, PC and printer

- Upper crosshead
- Load cell
- Columns
- Accessory (tensile test grips in this case)
- Lower crosshead
- Recirculating ball screw system
- Protection
- Gearbox
- DC servomotor
- Bench

70-S16C2
Fitted with tensile grips and extensiometer and PC cabinet 86-D2999 (optional. See page 304)

The PC controls all functions of the machine. The general purpose program installed allows the performance of the most popular tension, compression and flexural tests under load and/or displacement/elongation control.

In particular, the software can automatically perform the tensile test on rebars and round steel specimens conforming to **EN 10002-2**. This system has exceptional performance and we list in the following pages the main features.

MULTIENSAYO

PC SOFTWARE

■ Main window
The main window with the diagram display and all the function keys necessaries to perform the tests.
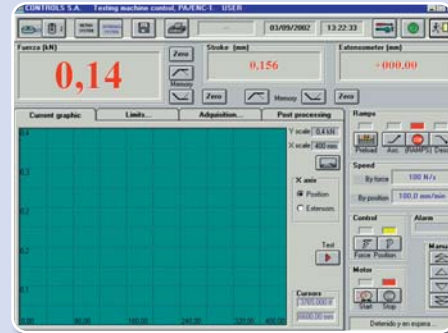
■ Tool bar
With function control keys.

■ Load cell selection
The first one is for the high capacity load cell, the second one is for the low capacity load cell (if any).

■ Storing data
All data can be stored in order to plot the relevant graphs, by recalling them from the data recovery section. Alternatively they can be recovered and processed through a spreadsheet program like Excel, Lotus or other.

■ Certificate printout
With the printer icon key it is possible to printout the test report.

■ Test result display
Force, displacement and strain are displayed along with the related "zero" keys and "peak functions" keys, "maximum" and "minimum".

■ Control

Selection of the type of control during the test. The operator can select "F" key, force control, or "P" key, displacement control.

■ Ascending ramp

By this key, ASC, the machine starts the test increasing load or displacement with selected rate. The actuator runs until the operator pushes the STOP key or the sample is broken, as the "max. memory" key has been activated.

■ Descending ramp

By this key, DESC, the machine starts the test decreasing load or displacement with selected rate. The actuator runs until the operator pushes the STOP key or the sample is broken, as the "max. memory" key has been activated.

■ Test speed

The upper box concerns the load rate control and the lower the displacement rate control.
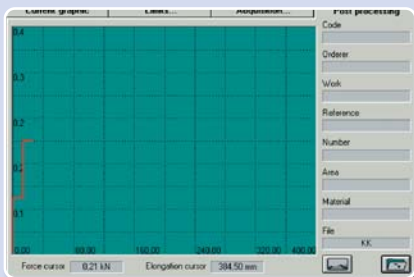
■ Manual operation

Keys for the fast and slow displacement of the machine cross head, upward and downward.

■ Real time plot

The central part of the window concerns the graphic display section where the test diagram is plotted in real time during the test.
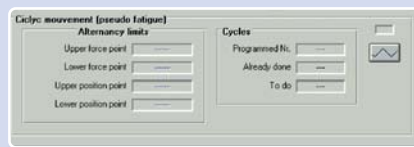
■ Limits

The second page heading selection of the window concerns the alarm limits, the rapid reversal, the sensitivity of sample failure detection and the cyclic movement.
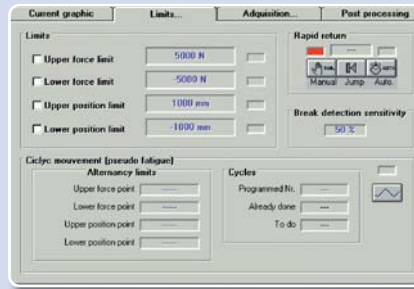
■ Cyclic testing operation

The operator can select the upper and lower limits of force or displacement and enter the number of cycles to be performed by the machine.

■ Acquisition

The third menu heading page is named "Acquisition" and consists of the following parts: General test identification, Type of test, Sample data, Data acquisition control.

■ Type of test

The test type selection is obligatory. In the test type menu, the tensile test is selected by default and the test data are saved automatically. If another type of test is required, it can be selected from the selection list

■ Data acquisition control

By the data acquisition control function it is possible to store the force, displacement or strain data from a certain point up to another point of the test at choice of the operator. Then the stored data can be recalled by the "Data recovery function" to obtain a graphic representation by the installed program or by other user's program or by a spreadsheet like Excel, Lotus, Quattro or other.

Typical diagram of tensile test on steel rebars conforming to EN 10002-2
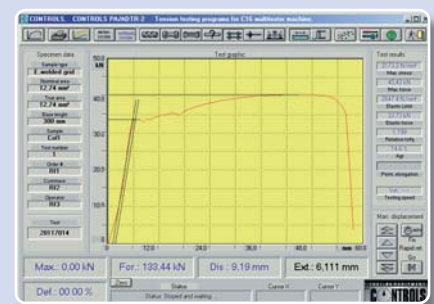
As specified, the above information concerns just a little part of the testing software installed. Other functions are available as for example:
- Preload key
- Setting of load or displacement rate
- Motor switch ON/OFF
- Stop keys to stop displacement or load
- Alarm limits to inform that the prefixed limit of force or displacement has been achieved
- Diagram scale modification
- Rapid reversal
- Failure sensitivity
- Test recovery
- Colors option, etc.
- Zero
- Control
- General test identification

ORDERING INFORMATION

■ **70-S16C2**

Universal electromechanical tester, 200 kN cap., PC controlled, complete with printer.
230 V, 50-60 Hz, 1 ph.

■ **70-S17C2**

Universal electromechanical tester, 300 kN cap., PC controlled, complete with printer.
230 V, 50-60 Hz, 1 ph.

EXTENSOMETERS

■ 70-C0954/C

Electronic universal extensometer to measure the elongation of wires, steel rebars and round steel specimens.
- Measuring base: 50 to 200 mm
- Linearity: better than ± 1%
- Max. travel: 10 mm

The extensometer must be removed before the specimen failure.

70-C0954/C Universal extensometer

70-C0954/C Application on steel rebars

Accessories

▼ **70-C0954/C5**
Extension for 70-C0954/C
for measuring base 600 mm

TENSILE TESTS

■ 70-S0017/10

Upper and lower tensile heads complete with grips for round specimens 2 to 20 mm dia. and flats 0 to 15 mm thick

70-S0017/10 with 70-C0954/C

COMPRESSION TESTS

■ 70-S0017/1

Lower platen 200 mm dia. with centring device

■ 70-S0017/20

Upper platen 200 mm dia. complete with spherical seat

70-S0017/1, 70-S0017/20

Important note.

The electronic coaxial extensometer series 70-C0961 can be left on the specimen up to failure.
For more information see page 314.

ACCESSORIES

PC cabinet

■ 86-D2999

PC cabinet for testing systems.
230 V, 50 Hz, 1 ph.

This PC cabinet is a purpose built accessory for use in many laboratory applications, where a PC is required in a testing environment. It is designed to provide PC system protection from airborne contamination such as cement dust. Filtration is achieved by two vented filters into the cabinet. The monitor can be fitted on top of the cabinet and three extractable shelves holds keyboards, printer and mouse.

📦 **Overall dimensions:**
   500x550x915 mm (lxdxh)

⚖ **Weight approx.:** 55 kg

86-D2999, PC and printer

MAIN APPLICATIONS AND SPECIFIC ACCESSORIES

Materials	Test/Method		Standards	Accessories and notes	
Steel Rebars, rounds and flats	Tensile test under load/ elongation control		EN 10002-2	70-S0017/10	Upper and lower tensile heads complete with grips for round specimens 2 to 20 mm dia. and flats 0 to 15 mm thick
				70-C0954/C	Electronic universal extensometer
Cement and mortars	Compression test under load control		EN 196-1	70-S0017/1 70-S0017/20 50-C9030	Lower compression platen Upper compression platen Compression device for portions of 40x40x160 mm beams broken in flexure
			ASTM C109	70-S0017/1 70-S0017/20 50-C9032	Lower compression platen Upper compression platen Compression device to test 50 mm (2") mortar cubes
Concrete	Flexure testing on concrete beams under controlled load		EN 12390-5 ASTM C78, C293 AASHTO T97	70-S0017/1 70-S0017/20 50-C9010	Lower compression platen Upper compression platen Flexure testing set for centre and third point test on concrete beams 100x100x400/500 mm and 150x150x600/700 mm
	Splitting test on cylindrical specimens under controlled load		EN 12390-6 ASTM C496	70-S0017/1 70-S0017/20 50-C9000	Lower compression platen Upper compression platen Splitting tensile test device for cylindrical spec. dia. 100x200 mm (4"x8"), 150x300 mm (6"x12") and 160x320 mm
	Splitting test on cubes and block pavers under controlled load		EN 12390-6 pr EN 1338	70-S0017/1 70-S0017/20 50-C9070	Lower compression platen Upper compression platen Splitting tensile test device for concrete block pavers and concrete cubes
Soil	CBR under controlled displacement		pr EN 13286-47 NF P94-078 UNI 10009 ASTM D1883 AASHTO T193	70-S0017/1 70-S0017/2 34-T0104/10 34-T0103/1	Lower compression platen Adapter for load cell Compression device Adjustable CBR penetration piston
Bituminous mixtures	Marshall under controlled displacement		pr EN 12697-34 BS 598:107 NF P98-251-2 DIN 1996 CNR No. 30 ASTM D1559	70-S0017/1 70-S0017/2 34-T0104/10 76-B0033 76-B0031/21	Lower compression platen Adapter for load cell Compression device Stability mould Stability mould conforming to BS/DIN/UNE Standards (as alternative to the 76-B0033 model)
	Duriez under controlled displacement		NF P98-251-1/4	70-S0017/1 70-S0017/20	Lower compression platen Upper compression platen