DATA SHEET

Automatic Computerized 1000/2000kN Testing Machines for Steel and Concrete

70-C0821

General description

Introduction

This machine has been specifically designed to suit the requirements of Central and Commercial laboratories of the construction industry and Civil engineering in general. This universal tester, in fact, can be used for tensile tests on steel re-bars up to 40 mm dia., flats up to 35x75 mm, and compression tests on standard concrete specimens. It can also be used, with the appropriate accessory, for transverse and bending test on steel, flexural tests on concrete beams and general compression tests. Specialò accessories are also available for testing steel strands and electro-welded steel screen.
All the control functions are managed from a standard keyboard and mouse. The frame differ substantially from the old traditional models because of the originality of the design as for example the remote control displacements and gripping systems. The software include a complete suite of programs: tensile, bending, flexure and compression tests.
Once the specimen has been placed in the machine (using accessories if required) and the specimen data introduced, the test is run completely automatically at the press of a button up to the printout of the test certificate and the storage of the test data.

Machine frame, cylinder assembly, load cell

- Steel base with rigid frame housing the lower grippers
- Piston/Cylinder assembly mounted on the top of the rigid frame. Load cell incorporated in the piston.
- Mobile frame consisting of four high tensile strength columns, upper crosshead directly connected to the piston, intermediate crosshead with compression platen and lower crosshead housing the upper grippers.
- Hydraulically operated gripping system and vertical adjustment by two independent auxiliary cylinders controlled by the push button panel. This unique feature make the machine extremely easy to operate enabling one man to perform the test in a very short time.
- Crosshead displacement controlled by the use of a bi-directional encoder.

Control console

- The lower section houses the hydraulic assembly which include: Hydraulic pump, Proportional valve, Hydraulic valves, Heat exchanger to control the oil temperature and the Oil tank.

Grippers

- Three sets of standard grippers supplied with the machine, for rounds and flats, plus two sets of grip liners to provide maximum bearing and holding surface for specimens of all sizes.

Safety features

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- Pressure switch, which automatically stops the machine when the oil pressure goes over the maximum permitted level.
- Max travel limit switch to stop the mobile frame at its upper position.
- Software feature which stops the machine when the maximum load is reached.

Hardware

The upper section of the control console houses the electronic card for the control of all functions, having the following specifications:

- A/D converter resolution 1/20000
- No. 4 outputs for electrovalves
- Analogical output for load and strain control:12 bit
- Load cell input

Software

The machine can be used either in the manual or in the automatic mode to perform:

- Tensile test on steel reinforcing bars conforming to EN 10002 and ASTM A370
- Tensile tests in general, flexural (transverse) and bending test on steel conforming to ASTM E290, UNI 564.
- Flexural tests on concrete beams conforming to EN 12390-5
- Compression tests on concrete specimens conforming to EN 12390-3

Standard outfit

The machine is supplied complete with:

- No. 3 sets of grips for round specimens up to 40 mm dia. and flat specimens up to 70 mm wide and 35 mm thick and two sets of grip liners.
- No. 1 set of foundation bolts, 1 service spanner, instruction manual, PC and colour graphic printer

Main features

- 1000 kN capacity in tension and 2000 kN in compression
- Completely automatic test cycle at a press of a button up to the printout of the test certificate
- Strain gauge load cell incorporated in the piston, providing accurate load measurement
- Rapid vertical displacement of mobile frame by remote control
- Hydraulic gripping system controlled by remote control
- Three sets of grippers for round re-bars up to 40 mm dia. and flats up to 70x35 mm
- Front loading of specimens for quick and easy operation
- Display of stress/strain diagram in real time
- Printout of stress/strain diagram and test results
- Optional second frame facility to control an additional frame up to 5000 kN capacity for concrete testing

Standards

- EN ISO 6892
- EN ISO 7500-1
- ASTM A370

Specifications

Max. test load

In tension: 1000 kN

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In compression: 2000 kN

Measurement load ranges : Automatic changeover of scale sensitivity, minimum reading value 100 N

Tensile test

Max. distance between grips: 700 mm
Gripping system: Hydraulic with remote control
Max. round dia.: 40 mm
Max. plate specimens size: 70x35 mm

Test speed: 0-100 mm/min
Crosshead adjustment speed: 500 mm/min
Max. piston stroke: 610 mm
Distance between columns: 330 mm

HPU POWER AND CONTROL CONSOLE
Hardware

131.000 points effective resolution
Control frequency 250 Hz
Sampling rate 500 Hz
Closed-loop P.I.D.control
6 channels (one dedicated to crosshead displacement) to measure elongation/displacement/strain with potentiometric, conditioned LVDT and magnetostrictive transducers
4 channels for strain measurements with strain gauges
2 channels for load sensors: load cell and load cell/pressure transducer of possible second frame
simple multi-sensors connection and calibration file selection
digital linearization of the calibration curve. (multi-coefficient)

Hydraulics

Dual stage pump: centrifugal low pressure for fast approach (max. flow rate 9 l/min) automatically switching to radial multi- piston high pressure (max. flow rate 3.2 l/min) for loading
Oil flow control by servo-controlled proportional valve
AC motor 3000 W
Maximum working pressure 700 bar
Oil temperature controlled by air cooling system
Console cabinet lined with soundproofing material for operator's comfort.
Tank capacity: 30 liters

MANAGEMENT SOFTWARE AND SOFTWARE PACKAGES
The machine is supplied complete with RTM (Real Time Management) user interface environment allowing:

Remote control of the complete system for automatic test execution: quick platen approach, zeroing, test execution according to the selected test type, calculation of results, graphical and numerical management of results
Storage of single and multiple tests
Printing of customized test reports for both single and multiple tests
Real time and deferred management of tests data and results, either in numeric or in graphic format
Language selection (Latin characters only)
Units selection
Remote technical assistance/diagnostic via internet

The following Software packages are also included in the system:

UTS Software Specifically designed for tensile testing under load/stress control and crosshead separation control (by using the displacement transducer

supplied with the machine), allowing:
Simultaneous display of stress/time, stress/elongation %, elongation/time and stress/elongation;
Possibility to overlap two elongation/stress graphs: one obtained with the included displacement transducer measuring crosshead separation travel and the other obtained w ith an optional extensometer (coaxial or universal);
Elaboration of tension test results: ReH, ReL or Rp (calculated at three different elongation percentages selectable by the user), A, Ag, At, Agt, Ae, Rt, Z, elastic modulus E, etc, conforming to EN ISO 6892-1 and EN 15630-1 for steel rebars.

DATAMANAGER Software For compression, flexure and indirect tensile test on concrete, cement specimens and other construction materials allowing:
Real time monitoring of test data and stress/time graph
Automatic load detection failure and storage
Cement testing to EN 196-1 guided test procedure
Saving of batch file with automatic calculation of average and standard deviation

The following software package is available as option when upgrading the machine with the hydraulic system for a second frame connection (see **70-T10/2F**).

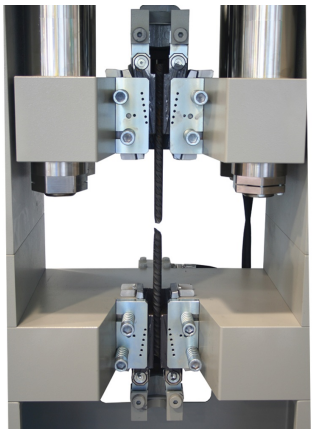
E-MODULE software For Poisson ratio and Elastic Modulus determination on concrete specimens allowing:
Free unlimited programmable load/stress cycles to fulfill any kind of test procedure
Real time monitoring of test data, stress/time, stress/axial strain, stress/lateral strain graphs
Automatic verification of sample centering and sensors functionality, as per Standard requirements
Automatic calculation of Initial and Final secant Elastic Modulus values

DIMENSIONS

Testing frame (piston fully out): 955x635x3960 mm
Control console: 800x900x1550 mm

WEIGHTS AND SHIPPING CUBAGE

Testing frame: 2900 kg approx.
Control console: 200 kg approx.
Total gross weight: 4000 kg approx.
Shipping cubage: 7 m^3 approx.



Detail of specimen failure

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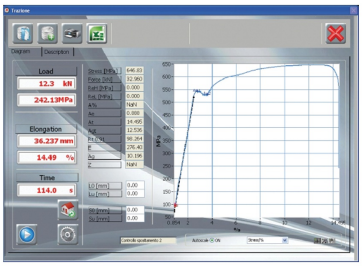
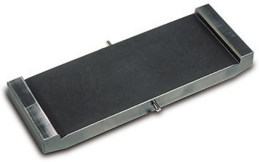


Tensile test on steel rebar



Standard grippers supplied with the machine

Grip liners to protect the crosshead surfaces

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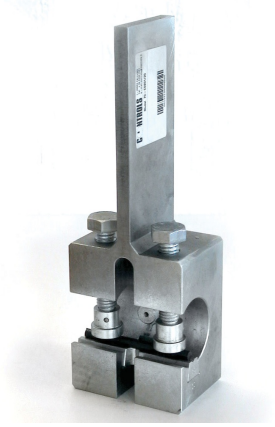
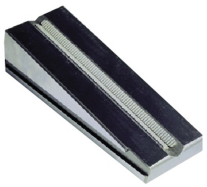


70-C0901/20 gripper for electro-welded steel screen



70-C0901/31 grip for strands and anti-sliding plate

Products

70-C0821

Computer controlled universal testing machine 1000 kN cap. in tension and 2000 kN cap. in compression, complete with three sets of grippers. 380V, 50Hz, 3ph. - Conforming to EN ISO 7500-1 and ASTM A370

70-C0821/Y

Computer controlled universal testing machine 1000 kN cap. in tension and 2000 kN cap. in compression, complete with three sets of grippers. 380V, 60Hz, 3ph. - Conforming to EN ISO 7500-1 and ASTM A370

70-C0821/Z

Computer controlled universal testing machine 1000 kN cap. in tension and 2000 kN cap. in compression, complete with three sets of grippers. 220V, 60Hz, 3ph. - Conforming to EN ISO 7500-1 and ASTM A370

Accessories and consumables

55-C0222/H

Electronic universal extensometer/compressometer for cylinders, prisms and cubes. Suppied with short distance piece for use with prisms 40x40x160 mm and 2 elastic bands

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70-C0820/UP

Frame modification increasing vertical daylight ofUTM model C082x by approx 140mm. Particularly in indicated for strands testing. The distances (max and min) are increased of 140mm. To be factory installed.
70-C0820/2

Tranverse test attachment for 70-C820/C
70-C0820/31

Bending test attachment for 70-C820/C
70-C0820/5

Compressione device for 70-C0820/C. Includes: upper and lower platens dia. 216x50mm, spherical seat, distance pieces dia. 200x100mm and dia. 200x50mm.
70-C0901/21

Graphited grease for grips 1 kg can
70-C0954/C1

Electronic universal extensometer to measure the elongation of wires, steel rebars and round steel specimens. To be removed before sample failure. - Measuring base: 50 to 200 mm - Linearity: better than +- 1% - Max. travel: 10 mm
70-T10/2F

Upgrading of HPU 200 power unit for the connectionof a second frame up to 5000 kN capacity. To be factory installed. Not compatible with upgrading option 70-T10/EM forUTM HPT-Series controlled by HPU 200 power unit.
70-C0901/20

Gripper for electrowelded steel screen
50-SW/EM

E-MODULE software package for Elastic modulus and Poisson ratio determination.

70-C0961/E

Coaxial electronic extensometer to measure the elongation of wires up to failure. Gauge length: 600mm; Max travel: 50mm
70-C0961/G

Coaxial electronic extensometer for round specimens from 16 to 40 mm dia. Gauge length: 200 mm. Travel: 75 mm.
70-C0961/H

Coaxial electronic extensometer for round specimens from 6 to 26 mm dia. Gauge length: 200 mm. Travel: 50 mm.
70-C0901/31
Grip for test on seven-wire cord dia. 9.3 to 15.2 mm