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MCC, Multifunctional Control Console



MCC advanced servo hydraulic control console for static and low frequency dynamic test on building materials complete with PC and PC cabinet

General description

Automatic hydraulic systems for static and low frequency dynamic tests on building materials under control of Load/Stress, Displacement, Strain.

Ideal both for **traditional tests**, such as compression and flexure on concrete, cement, mortar, blocks etc. and cyclic tests for the determination of **secant elastic modulus (E)**, and also for measuring, for example, the **ductility and fracture energy** of concrete reinforced with fibres (**FRC**) and lined with polymers (**FRP**), or the toughness of sprayed concrete slabs (**shotcrete**) under concentrated load tests. The console is connectable to up to four test frames.

Main features

- **Unique technology based on servo-controlled proportional valve optimized for construction materials for load, stress and displacement controlled tests, with superior performances: fast reaction time, excellent sensitivity to minor variations, extremely wide oil flow range**
- **All above features extended onto up to 4 different frames ranging from 15 kN to 5000 kN**
- **Accuracy and reliability thanks to advanced electronics, efficient closed-loop control, high effective resolution, optimized P.I.D. algorithms**
- **Performs user defined displacement/deformation tests for research purposes: Unlimited combinations of load/stress, displacement/strain cycles, load/stress ramp sequences and test procedures**
- **Low frequency dynamic tests with a maximum of 0.1 Hz (depending on the wave amplitude)**
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Standards

- EN 12390-4
- ASTM C39
- ASTM C469
- EN 14488-5
- EN 14651
- ASTM C1550
- EN 1338
- EN 1339
- EN 1340
- ASTM C1609
- EN 12390-13

Specifications

Hydraulics

Max working pressure: 720 bar.

Hydraulic motorized power pump with automatic double stage mode: low pressure/high flow rate (2l/min) for the fast approach (min.40mm/ min) and high pressure/low flow rate (0.7 l/min) for test execution.

Wide flow rate range allowing the control of several frames with different capacities from 15kN up to 5000kN.

Forced ventilation oil cooling system.

High efficiency oil filtering system with anomalies warnings (e.g.low oil level and dirty oil filter).

Oil flow regulated by servo controlled proportional valve with high frequency driving signal.

2 (extendable to 4, see upgrading options) electronic ON/OFF valves for remote automatic selection via PC of the active frame.

Hardware and firmware

8 active channels (each one can be used by the machine as feedback variable to control test execution):

4 for load sensors (load cells or pressure transducers)

4 for displacement transducers (potentiometric, LVDT amplified, magnetostrictive) and deformation transducers (strain gauge)

Effective resolution 132.000 divisions, Closed loop control with high frequency PID.

Control frequency: up to 120 Hz

Electrical characteristics of the channel conditioners: Feed from 0.5 to 10V DC (digital selection)

Single-/dual-ended input with automatic detection

Input signal from -2.5 to +2.5V DC

Zero and gain digitally adjustable

Data acquisition synchronized on all channels

Calibration of the 8 channels in engineering units, via linearization function (up to 10 steps) which allows optimisation of readings accuracy over the whole test range.

User interface

The system is controlled via the PC. An alphanumeric keyboard and an icon driven display are also provided for factory settings and use of unit in local mode.

Graphical display 320x240 pixel

Software

The PC allows:

Remote control of the complete system (Console and Frame) for automatic test execution

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Real time and deferred management of tests data and results, either in numeric and in graphic format

Active frame selection via software

Printing and saving of customized test reports both for single and batch tests in Excel format

The following software packages are included:

Software for compression, flexural, splitting tests to EN and ASTM Standards.

Software for determination of Elastic Modulus on concrete and cement allowing:

User-defined test cycles and step programmable sequences

Real-time display of stress/ time and stress/axial strain diagrams

Automatic verification of sample centering, as per standards requirements

Software for displacement/strain controlled tests allowing:

Free unlimited programmable load/stress/displacement/strain cycles to fulfil any kind of test procedure

Possibility to display different curves in the same graph (for instance it's possible to display 3 different strain curves acquired by 3 different transducers in one graph with the same time axis)

Real time display and monitoring of all test data

Real time variation of settings, including the control method (load, displacement or strain), active channel used as feedback variable, load/displacement/strain rate, target value

Constant load/displacement/strain function with closed loop feedback assuring precise holding of the target value

Physical specifications

Power rating: 750 W

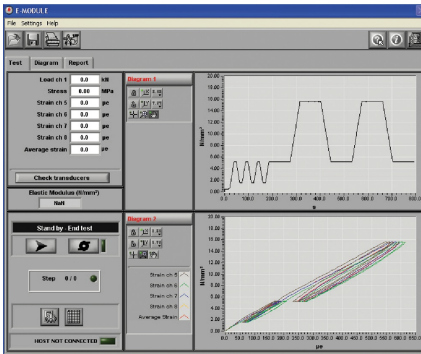
Dimensions (lxwxh): 470x410x1000 mm

Weight approx.: 120 kg

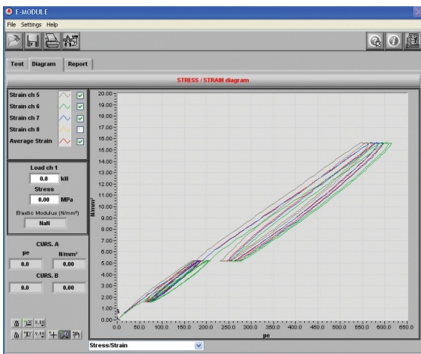


Complete testing system with 4 frames connected to the same unit

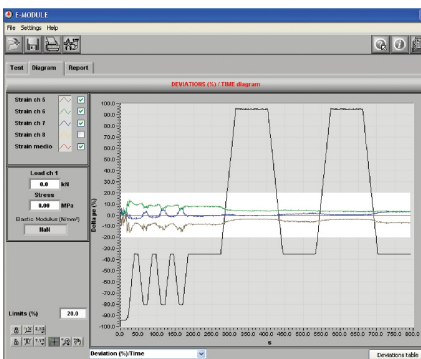
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Main screen of the E-Modulus software



Stress vs Strain diagram

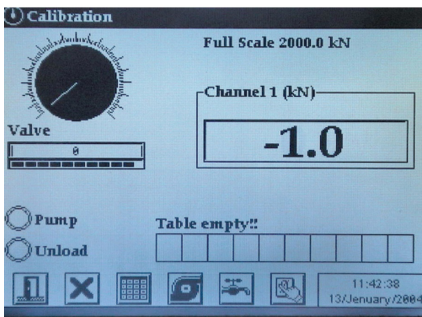


Deviation of the strain values measured by each transducer compared to the average reading (red line)

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Detail of MCC display used basically for calibration purpose



Calibration menu

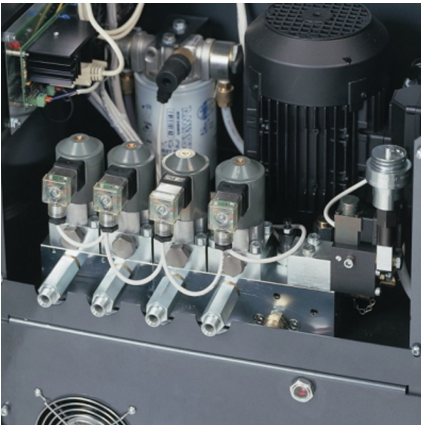


Detail of rear panel of MCC series

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Specimen fitted with 55-C0222/F compressometers



MCC console upgraded with 50-C7022/UP2 distribution block for connection to up to 4 frames (mcc)

Products

50-C8422/M

MCC, stand alone closed loop automatic control console for up to 2 test frames, expandable to 4. 230 V, 50 Hz, 1 Ph

50-C8423/M

MCC, stand alone closed loop automatic control console for up to 2 test frames, expandable to 4. 220 V, 60 Hz, 1 Ph

50-C8424/M

MCC, stand alone closed loop automatic control console for up to 2 test frames, expandable to 4. 110 V, 60 Hz, 1 Ph

Accessories and consumables

50-C7022/UP1

Upgrading of the SERCOMP7 and MCC (CLASSIC and MULTITEST) control console for the connection of a third frame

50-C7022/UP2

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Upgrading of the SERCOMP7 and MCC (CLASSIC and MULTITEST) control console for the connection of a third and a fourth frame.