itTECH

CYBER PLUS PROGRESS

C104-03N

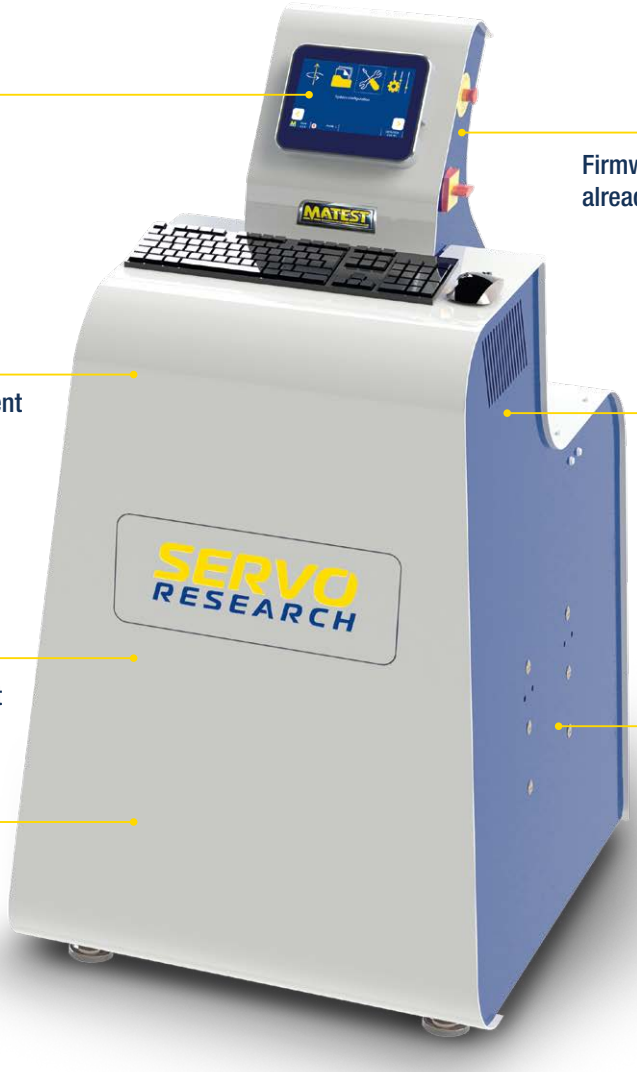
SERVO RESEARCH

HIGH PERFORMANCE SERVO-PLUS SERVO STRAIN

STANDARDS: EN 14488-3, 14488-5, 14651 I ASTM C1609, C1018, C1550

Servo Research is the ultimate Matest control unit which combines the highly reactive Cyber-Plus Progress electronics together with a hydraulic system specifically designed to execute accuracy tests where the highest performances are required.

Its versatility and number of possibilities make this control unit the best choice for R&D activities and research laboratories, perfect to perform and play with test conditions not yet described by any standards.



Fully customizable test ramps (with suitable accessories)

Firmware and software for FRC tests already included

Performs tests in load, displacement and strain rate control

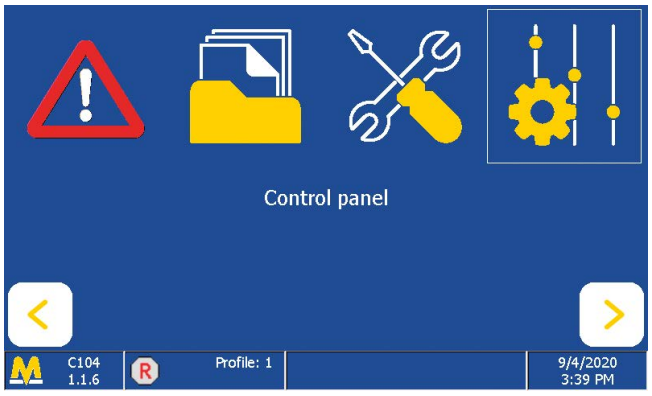
Completely automatic, no need of PID adjustments during the test

Proportional valve granting prompt reaction for FRC tests

Fully automatic frames control expandable to four with electrovalves

Inverter device for decreasing noise pollution, heating and mechanical stress

INTERFACE WITH MODERN ICONS



Show active alarms
Errors or malfunctions

Test archive
Saved test data / results

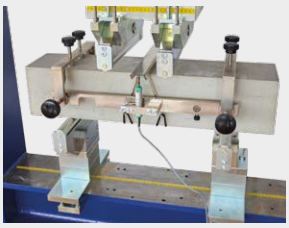
System configuration
Channels, profiles and parameters setup

Control panel
Date, time, language and firmware configurations

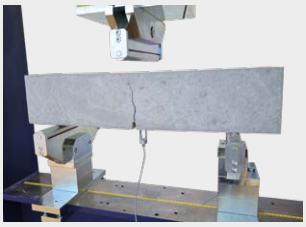
ADVANCED APPLICATIONS

In addition to the common and standard practices, **Servo Research runs high reactivity tests like those on fiber reinforced concrete** (Deflection, CMOD, CTOD, Energy Absorption, Post Faillure Behaviour etc.) and **modulus of elasticity** on several types of materials, allowing customization of ramps and cycles (upgrade kit C125-03N) and displaying load, stress, displacement and strain related graphs.

All tests can be run through its compact-PC touch interface, making personal computer not mandatory. An external PC can however be connected (H009-01, order separately) to control all tests from remote.



Deflection (ASTM C1609)



CMOD (EN 14651)

Flexural toughness (ASTM C1550)

Elastic modulus

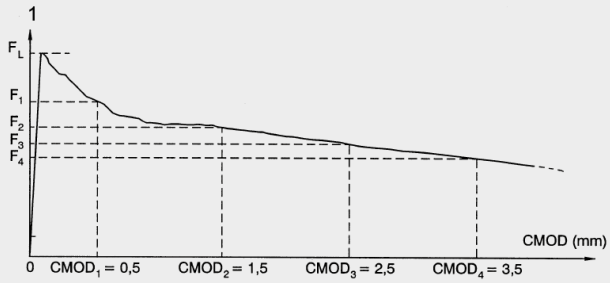
Triaxial tests

CASE STUDIES

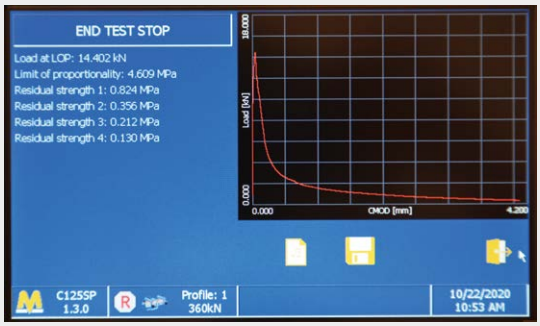
Samples: FRC beams 150x150x700 mm. Class C70/85 with flex value after 28 days 10.2 MPa and with 6 mm PP fibers.

CMOD according to EN 14651

Servo Research is capable of controlling text execution even at very low loads. Measured load at LOP less than 15kN and minimum residual strength is 0.130 MPa.



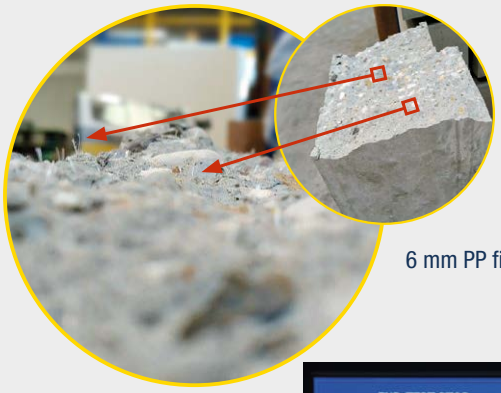
Typical behavior of synthetic fibers according to EN 14651



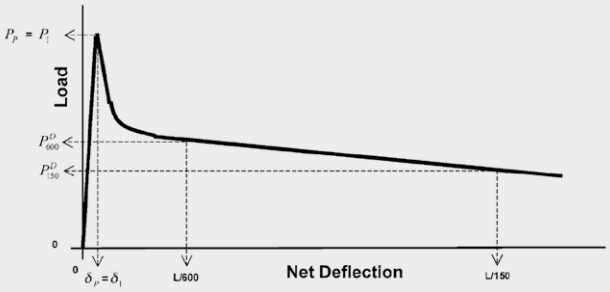
CMOD test results

Deflection according to ASTM C1609

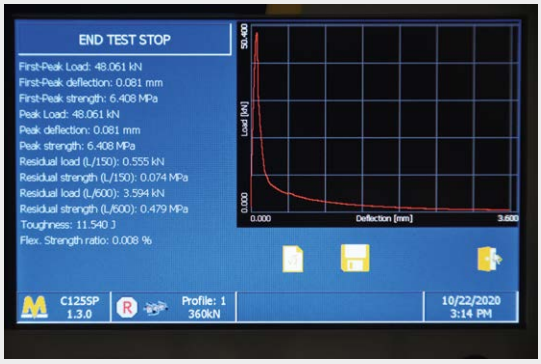
The superior control of our Servo Research allows the measurement of a residual load of 0.555 kN corresponding to 0.074 MPa with high stability and precision.



6 mm PP fibres



Typical behavior of synthetic fibers according to ASTM C1609



Deflection test results

HYDRAULIC SYSTEM SPECIFICATIONS

- Max hydraulic pressure: 700 bar
- 4 pistons pump granting oil supply up to 1.35 l/min
- Servo controlled proportional valve with high control frequency
- Inverter device
- Optional forced ventilation oil cooling system

HARDWARE AND FIRMWARE SPECIFICATIONS

- 16 channels, each one able to control the test and each one suitable to connect load sensors (load cells or pressure transducers), displacement transducers (potentiometric, full bridge, LVDT, magnetostrictive) and deformation transducers (extensometers, strain gauges)
- Each channel effective resolution 24-bit, 16'777'216 divisions
- Closed loop PID control
- Real time adjustment of PID parameters and pace rate during the test (on request)
- Control frequency up to 1 KHz
- Sampling frequency up to 2 kHz
- 7" LCD touch-screen

ANALOG INPUT CHANNELS

- Selectable power voltage for connection of load, displacement, deformation, LVDT, temperature (PT100, PT1000, NTC) transducers and strain gauges
- Data acquisition synchronized on all channels
- Calibration of the 16 channels in divisions (up to 40 steps), with polynomial function which allows the best approximation of readings accuracy over the whole test range

TEST EXECUTION

Compact PC for local control and software for remote control in order to perform the following tests:

- Compression, flexure and splitting
- Elastic modulus and Poisson's Ratio on rocks and concrete (add C125-03N)
- Triaxial test on rocks (add C125-03N and C104MLPP for lateral pressure)
- Toughness of FRC and energy absorption of sprayed concrete tests
- FRC tests: deflection, CMOD, CTOD and flexural test

C096F + C104-03N3 + C089F + E183F

MODELS

C104-03N
SERVO-RESEARCH CONTROL UNIT for the connection of one frame.

C104-03N2
SERVO-RESEARCH CONTROL UNIT for the connection of two frames.

C104-03N3
SERVO-RESEARCH CONTROL UNIT for the connection of three frames.

ACCESSORIES

C125-03N
UPGRADE KIT for elastic modulus and Poisson's Ratio tests allowing pace rate control also when releasing the load.

C127N
ON-BOARD GRAPHIC PRINTER

C128
BENCH LASER PRINTER
For the graphic and test certificate printing. The connection is direct by USB interface also without PC

H009-01
PERSONAL COMPUTER
Complete with LCD monitor, keyboard, mouse, connection cables. The PC supply includes the installation and the setting up of the purchased Software.

ORDERING INFO

	FRC TESTS		FRC TESTS ELASTIC MODULUS TESTS	FRC TESTS ELASTIC MODULUS TESTS TRIAXIAL TEST
	ASTM C1609	ASTM C1550	EN 12390-13, EN 13412,	EN 14580, EN 1926, EN 1926, EN 14580
	EN 11039-2			
	EN 14651		ASTM C469	ASTM D7012,
	EN 14488-3		ISO 6784	ASTM D2664,
	EN 14488-5		UNI 6556	ASTM D3148,
			DIN 1048	ASTM D5407
			BS 1888:121	ISRM
C104-03N	•	•		
C104-03N2			•	•
C125-03N			•	•
Flexural frames:				
C090-06CF 200 kN, basic model	• (choose a frame)	• (choose a frame)	• (choose a frame)	• (choose a frame)
C095F 320 kN, advanced model				
C096F 360 kN, advanced model				
Compression frames:				
C086, C087, C088, C089 series 2000 up to 5000 kN and E183F (300/15 kN) frames only			•	•
C104MLPP (lateral pressure)				•

Notes: All accessories for C104-03N must be installed in factory
Specific accessories must be added basing on each test
Other suitable compression frames can be connected on request