

Testing systems
for determining
the mechanical properties
of concrete and cement

**Compression and Flexural
testing machines**





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of concrete and cement**

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This catalogue concern just a limited thus important part of our production line which includes all the other testing equipment for Concrete and Cement, Roads (Pavelab® Systems) and Soil mechanics (Wykeham Farrance).



For more information and detail, visit our web site or ask for catalogues.

Discover our
complete range of
Concrete Products





A solid leadership
in compression machines
and testing systems

CONTROLS have been active in the testing equipment industry since 1968. We have supplied our machines around the whole world, for many years our systems have been used intensively by the key laboratories of most countries. We count the total number of machines supplied globally over the years at more than 15,000 units. Our robust machines are still in use with total reliability after more than 40 years.

Continuous product development always keeps us in the lead, our innovations are milestones for our clients.

The new automatic control systems PILOT, AUTOMAX, MCC and ADVANTEST, follow this line and set new standards for productivity, accuracy of results and modern technology.

Compression and Flexural testing machines

Index

AUTOMATIC COMPRESSION TESTING MACHINES

Selection criteria for the Compression frame and Control System	5
Automatic Power and Control Systems (Compact-Line and Smart-Line)	8
DATAMANAGER , Universal Testing Software.....	15
PILOT , Automatic EN, ASTM and General Utility testers	18
AUTOMAX , Super- Automatic EN and ASTM testers	26

TESTING FRAMES

Compression testing frames	32
Flexural and transverse testing frames	36
Compression-flexure cement testing frames	38

CEMENT AUTOMATIC TESTERS

WIZARD2 Multipurpose 1500 kN testers and frame	38
PILOT Multipurpose 600, 15/600 kN testers and frame	40
PILOT Compression-Flexural cement testers	42
AUTOMAX Compression-Flexural cement testers	42
Four column 15/300 kN cement frames	44

ACCESSORIES FOR COMPRESSION TESTING MACHINES AND FRAMES	46
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AUTOMATIC TESTING SYSTEMS

Selection guide	48
Models overview	50
AUTOMAX Smart-Line	52
AUTOMAX E-Modulus	54
MCC Classic, MCC Multitest	58
ADVANTEST	63
Accessories for compression and flexural tests	64
Accessories for Elastic Modulus determination	65
Accessories for displacement and strain controlled tests (FRC/Shotcrete testing)	66
Open structure flexural frame, 300 kN capacity	68

VERIFICATION AND CALIBRATION APPARATUS

Force transfer verification	70
Force indicator verification and calibration	72

TRACEABILITY OF READY-MIX CONCRETE, TEST SPECIMENS

AND STRENGTH RESULTS	74
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Standard index, Code index	75
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TESTING SYSTEMS FOR DETERMINING THE MECHANICAL PROPERTIES OF CONCRETE AND CEMENT

The wide range of Control Systems that we propose, may cause, sometimes, doubts in the selection of the appropriate model. For this reason, in order to steer our client into the best solution for the requested application, we summarize, hereunder, the main tests on building materials.

COMPRESSION TESTING MACHINES

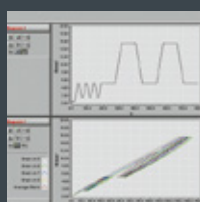
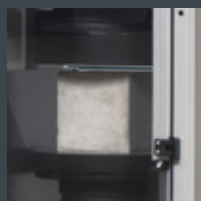
for automatic compression and flexural strength tests on concrete and cement specimens.

AUTOMATIC TESTING SYSTEMS

relating to Power and Control Consoles connectable to up to four frames, performing more sophisticated determinations such as the Modulus of Elasticity and deformability/ductility tests under load, displacement and strain control.

The pages which follow should guide you in the identification of your ideal machine or system, and at the same time, present a summary of our products which, we believe, are the most complete, modern and advanced available in the world market today. Each model/version is described in detail to enable you to make an informed choice.

CONTROLS



Selection criteria for a compression tester

Compression testing machines

The compression testers are primarily characterized by the current testing standards (e.g. ASTM/AASHTO or EN) which prescribe the shape and dimensions of specimens (e.g. cylinders, cubes or blocks). This requirement determines the type of frame (capacity, spherical seat, compression platen dimensions) as follows:

- ◆ **EN** testing frames for testing cubes, cylinders and blocks (see table 1)
- ◆ **ASTM/AASHTO** testing frames for testing cylinders (see table 1)
- ◆ **General Utility*** testing frames for cubes, cylinders and blocks (see table 2)

* The General Utility frames mainly relate to previous European National Standards (eg. NF, UNI etc)

The other important feature is the Power and Control System which also refers to the standards in terms, mainly, of Load Application, Strength Measurement and Accuracy. We propose two versions, Pilot and Automax.

PILOT

Automatic Control System
with closed loop control

AUTOMAX

Super-Automatic Control System
with closed loop control

Both Power and Control Systems are proposed in two versions: COMPACT-Line, which is laterally connected to a designated compression frame, and SMART-Line, which is housed in a stand-alone console and offers a more flexible solution, with its ability to control the designated compression/flexural frames and different frames in the laboratory.

COMPACTline

SMARTline

The COMPACT and SMART-Line compression testers with appropriate Power and Control Systems can satisfy all client requirements in terms of cost, use (e.g. site lab or principal lab), level of accuracy, automation and future applications.

The following pages summarize the main features of the Frames and Power and Control Systems, indicating the pages where each series of related Compression Testers are individually described.



COMPACT-Line

SMART-Line

Selection criteria for

EN and ASTM models

table 1

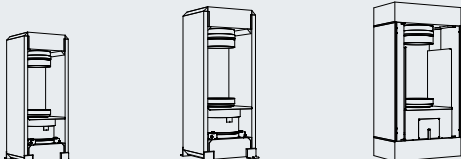
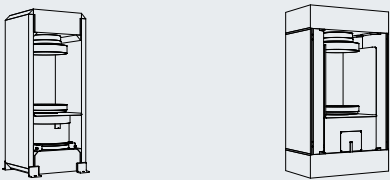
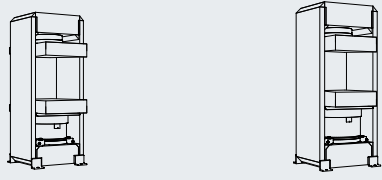
			Power/Control System	Capacity	Code
STANDARD EN 12390-4 C46 2000 kN C56 3000 kN C68 4000 kN					
 EN Compression testing frames for cubes up to 200 mm (300 mm) and cylinders up to dia. 150 x 300 mm (250 x 500 mm) (for 4000 kN and 5000 kN models only)			PILOT Automatic System " " " "	2000 kN 3000 kN 4000 kN	50-C46C02 50-C56C02 50-C68C02
			AUTOMAX Super-Auto. System " " " "	2000 kN 3000 kN 4000 kN	50-C46D02 50-C56D02 50-C68D02
			Frame only¹ EN12390-4 frame EN 12390-4 frame EN 12390-4 frame EN 12390-4 frame	2000 kN 3000 kN 4000 kN 5000 kN	50-C46Z00 50-C56Z00 50-C68Z00 50-C78Z00
STANDARD EN 772-1 C49 2000 kN C59 3000 kN C69 4000 kN					
 EN Compression frames for cubes up to 200 mm (300mm), cylinders up to 100 x 200 mm (150 x 300 mm for 4000 kN and 5000 kN models) and blocks			PILOT Automatic System " " " "	2000 kN 3000 kN 4000 kN	50-C49C02 50-C59C02 50-C69C02
			AUTOMAX Super Auto. System " " " "	2000 kN 3000 kN 4000 kN	50-C49D02 50-C59D02 50-C69D02
			Frame only¹ EN 772-1 frame EN 772-1 frame EN 772-1 frame EN 772-1 frame	2000 kN 3000 kN 4000 kN 5000 kN	50-C49Z00 50-C59Z00 50-C69Z00 50-C79Z00
STANDARD ASTM C39, AASHTO T22ASTM C12 1500 kN C22 2000 kN C32 3000 kN C42 2000 kN					
 ASTM Compression frames for cylinders up to 150 x 300mm (6" x 8") (dia. x h)			PILOT Automatic System " " " " " "	1500 kN 2000 kN 2000 kN 3000 kN	50-C12C02 50-C22C02 50-C42C02 ♦ 50-C32C02
			AUTOMAX Super Auto. System	2000 kN	50-C42D02 ♦
			Frame only¹ ASTM C39 frame ASTM C39 frame ASTM C39 frame ASTM C39 frame	1500 kN 2000 kN 2000 kN 3000 kN	50-C12Z00 50-C22Z00 50-C42Z00 ♦ 50-C32Z00

Frame only¹: for use with stand-alone control consoles: Smart-Line and Automatic testing System

♦ **High Stiffness** four column welded frames

Selection criteria for GENERAL Utility* models

table 2

GENERAL Utility*			Power/Control System	Capacity	Code
C13 1500 kN	C23 2000 kN	C43 2000 kN			
 <p>Compression frames for cubes up to 150 mm and cylinders up to dia. 160 x 320 mm</p>			PILOT Automatic System " " " "	1500 kN 2000 kN 2000 kN	50-C13C02 50-C23C02 50-C43C02 ♦
			Frame only¹ 1500 kN cap., General Utility frame 2000 kN cap., General Utility frame 2000 kN cap., General Utility frame	1500 kN 2000 kN 2000 kN	50-C13Z00 50-C23Z00 50-C43Z00 ♦
C34 3000 kN	C54 3000 kN				
 <p>Compression frames for cubes up to 200 mm and cylinders up to dia. 160 x 320 mm</p>			PILOT Automatic System " "	3000 kN 3000 kN	50-C34C02 50-C54C02 ♦
			Frame only¹ 3000 kN cap., General Utility frame 3000 kN cap., General Utility frame	3000 kN 3000 kN	50-C34Z00 50-C54Z00 ♦
C29 2000 kN	C39 3000 kN				
 <p>Compression frames for cubes up to 200 mm, cylinders up to dia. 100 x 200 mm and blocks</p>			PILOT Automatic System " "	2000 kN 3000 kN	50-C29C02 50-C39C02
			Frame only¹ 2000 kN cap., General Utility frame 3000 kN cap., General Utility frame	2000 kN 3000 kN	50-C29Z00 50-C39Z00

* The General Utility frames mainly relate to previous European National Standards (eg. NF, UNI etc)

PILOT / AUTOMAX

All our Automatic Compression Testers are fitted with the PILOT or AUTOMAX Power and Control System. In the **COMPACT-Line** versions, the control unit is connected laterally to the compression frame while, in the **Smart-Line** version, the units are housed in a stand-alone console which can be connected to all our compression and flexural frames.

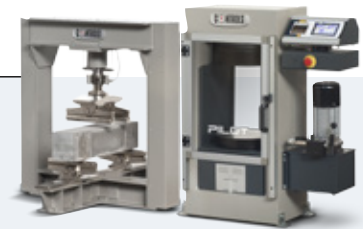
PILOT and AUTOMAX have the same technical features in common except for the enhanced hydraulic control and firmware of the AUTOMAX Super Automatic Systems (see pag. 10)

PILOT

PILOT COMPACTline

Automatic Power and Control System

Fits all our compression frames up to 4000 kN.
With the suitable upgrade option (code 50-C10C/2F), can control a second frame (e.g. flexural or cement compression).



PILOT Compact Line configuration with two frames: compression and flexural.

PILOT SMARTline

Stand-alone Power and Control Console

As an alternative to the COMPACT-Line, this version of the PILOT Automatic Power and Control System is a stand-alone model, suitable for connection to all our compression and flexural frames. It can also be profitably used to update any make of existing machine.



PILOT Smart Line configuration with two frames: compression and flexural.

Ordering information

50-C10C02

PILOT, stand-alone Power and Control Console, for the control of one testing frame.

Second frame facility available on request.

230 V, 50-60 Hz, 1 ph

- Overall dimensions: 1292x350x450 mm,

- Weight approx.: 80 kg

50-C10C04

Same as above but 110V, 60 Hz, 1 ph

+ All compression testers are fully described in the following pages:

PILOT, Automatic EN testers for cubes, cylinders and blocks (see page 20)

PILOT, Automatic ASTM testers for cylinders (see page 22)

PILOT, Automatic General Utility testers for cubes, cylinders and blocks (see page 24)

CVI TECH
CUSTOMER'S VALUE
DRIVES
THE INNOVATION

Considering its high performance and flexibility, the AUTOMAX System can play a very important role in a modern laboratory, with the complete automation of all basic concrete tests: Compression, Flexure and Compression/Flexure of Cement.

AUTOMAX

AUTOMAX COMPACTline

Super-Automatic Power and Control System

The Super-Automatic AUTOMAX Power and Control System, in the COMPACT-Line format, fits all our compression frames up to 5000 kN. It can control a second frame and, with the suitable upgrade option (code 50-C10D/3F), a third frame (e.g. flexural frame or cement compression).



AUTOMAX Compact-Line configuration with three different frames: compression on concrete, compression on cement and flexure on concrete

AUTOMAX SMARTline

Super-Automatic Power and Control System

As an alternative to the COMPACT-Line, this version of the Super Automatic AUTOMAX Power and Control System is a stand-alone model, suitable for connection to all our compression and flexural frames. It can also be profitably used to update any make of existing machines.



AUTOMAX Smart Line configuration with three different frames: compression on concrete, compression on cement and flexure on concrete

Ordering information

50-C10D02

AUTOMAX, stand-alone Power and Control Console, for the not simultaneous control of two (expandable to three) testing frames

230 V, 50-60 Hz, 1 ph

- Overall dimensions: 1292x350x450 mm

- Weight approx.: 80 kg

50-C10D04

Same as above but 110V, 60 Hz, 1 ph

⊕ All compression testers are fully described in the following pages:
AUTOMAX, Super Automatic EN testers for cubes, cylinders and blocks (see page 28)
AUTOMAX, Super Automatic ASTM testers for cylinders (see page 30)

PILOT / AUTOMAX

COMMON MAIN FEATURES

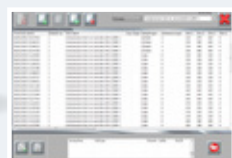
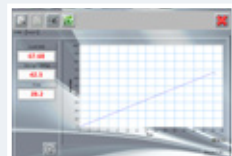
PILOT AUTOMAX

- > Automatic test execution with closed-loop digital feedback
- > Adopts the latest ES Energy Saving technology for reduction of power consumption
- > Silent operation
- > Double-stage hydraulic pump with rapid approach and precise oil flow control allowing high throughput of accurate tests (up to 40 per hour)
- > Soft platen-to-specimen contact and smooth load rate control from the very beginning of the ramp
- > Control of a second frame (option for PILOT)
- > Optional internal graphic printer including load/time plot
- > Connects to laboratory network via LAN port/ DATAMANAGER
- > Connectable to PC via DATAMANAGER software (see page 15)
- > Dual user-interface via console display and PC

In addition to the above,
the AUTOMAX System also features:

AUTOMAX

- > Automatic performance of the complete test cycle with closed-loop digital feedback by pressing the start button. Automatic loading and unloading by electronic on/off valve
- > Fully computerized System. Connectable to PC via DATAMANAGER software (see page 15). The software includes the remote control function for full computerization of the system
- > Control of an additional third frame as optional, with active frame selection (second and third) via console display or software



TECHNICAL SPECIFICATIONS

HYDRAULICS

- Dual stage pump: centrifugal low pressure for fast approach automatically switches to radial multi-piston high pressure for loading
- DC motor, 720 W, 50-60 Hz
- Max working pressure 700 bar
- Second frame option by valve selector (PILOT System) and third frame option with active frame selection by display or software (AUTOMAX System)
- ES, Energy Saving technology to reduce the power consumption and enable silent operation



Dual stage pump

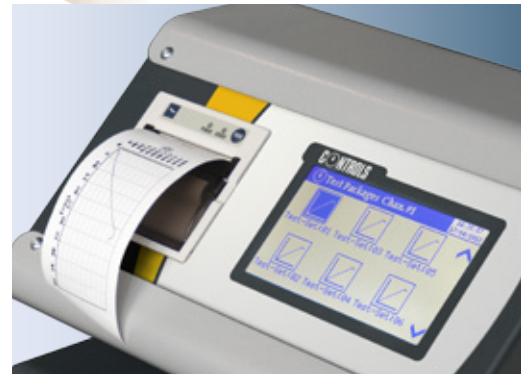
HARDWARE

- 132000 point high-resolution/stability analogical channels
- 240 x 128 pixel, icon-driven touch screen graphic display, showing data and plots
- Large storage capacity for test data on a USB pen drive
- Ethernet port for communication to PC
- Optional integrated graphic printer

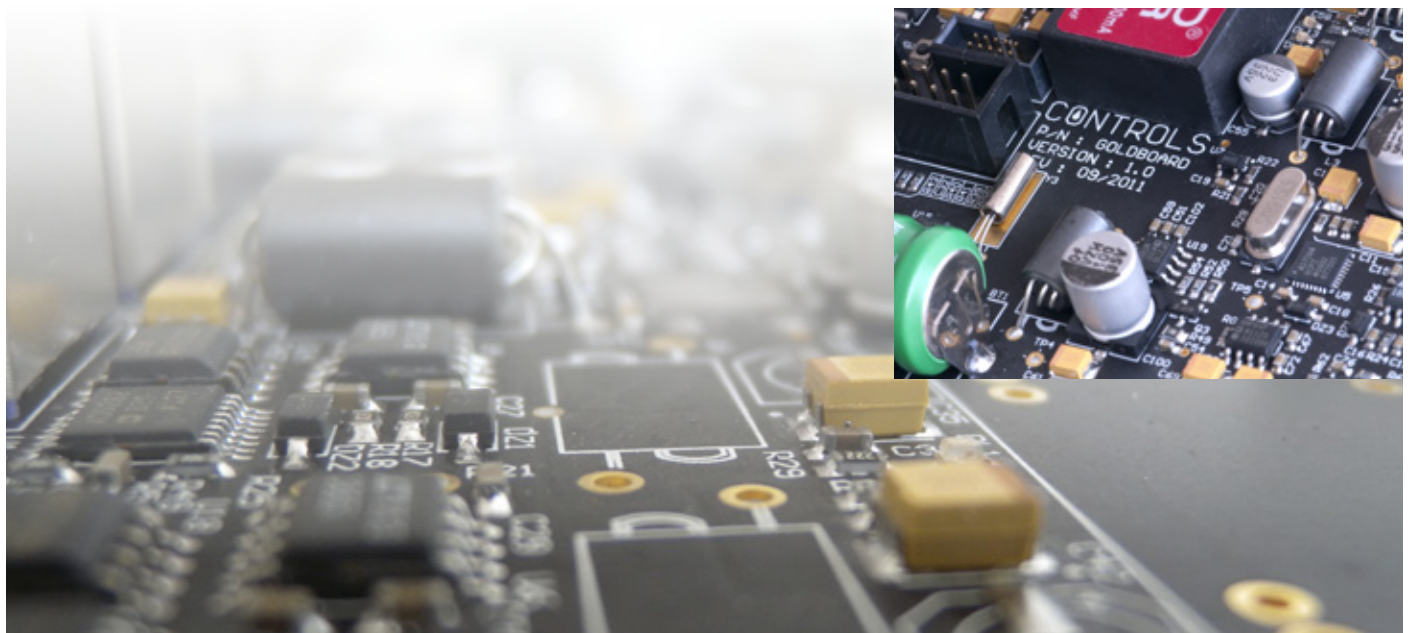


FIRMWARE

- Simultaneous display of load, specific load, actual load rate and load/time graph
- Memory management with options to display stored tests, download data to internal printer (optional) or PC, delete single tests or reset the entire memory
- Multi-coefficient calibration curve
- Automatic force verification procedure
- Recording facility of up to 10 test profiles for each channel including type of test (e.g. compression, flexural, indirect tensile), specimen size and shape, load rate, standard in use and other general information. Each one of the recorded test profile can be recalled automatically to save time
- Compatible with the newly-released DATAMANAGER software, tailored to the requirements of construction material testing laboratories, for real time data acquisition, display and management



Printer option



PILOT / AUTOMAX

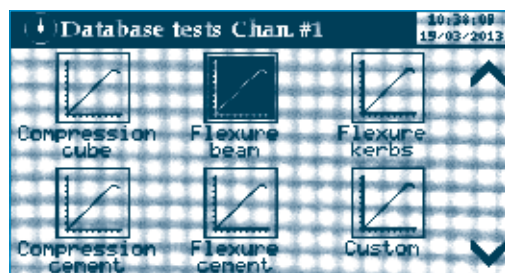
TECHNICAL SPECIFICATIONS

- > 9 languages
- > Unit selection: kN, ton
- > Real time clock/date
- > Execution of compression, flexure or indirect tensile tests in automatic mode. The load rate is controlled by a closed-loop P.I.D. system
- > Link to PC via LAN port
- > Display of load rate (e.g. N/s) or stress rate (e.g. MPa/s), data and plot.

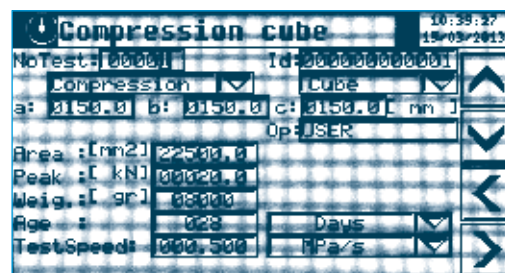
AUTOMATIC TEST PROCEDURE

Once the specimen has been positioned and centered the test procedure is:

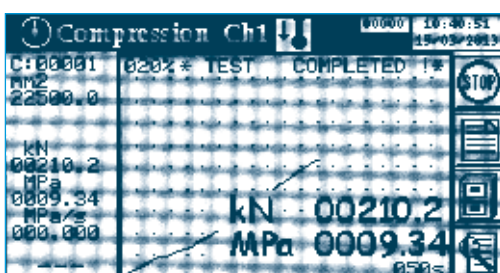
- > The user sets the test parameters, including load rate, on the touch screen (or PC with DATAMANAGER software). This operation can be avoided by using a pre-saved test profile for repetitive tests.
- > The user presses the start button on the touch screen (or PC). For Pilot System the loading/unloading valve shall be switched to loading position.
- > The machine automatically starts the rapid platen approach, softly contacts the specimen, switches to the test speed and applies load to the specimen with a smooth load-rate control and, finally, releases the pressure upon specimen failure. For Pilot System the loading/unloading valve shall be switched to unloading position.
- > The machine automatically saves the test including data results and load/time graph. Conformance of the test execution to standards can be easily proven.



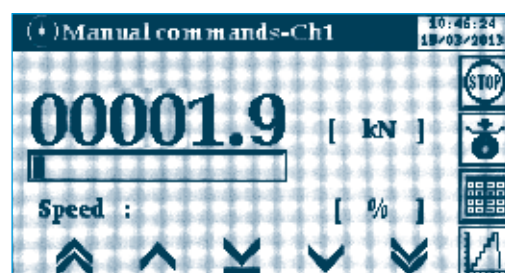
Selection of the test profile (specimen type, load rate, ref. standards, etc.)



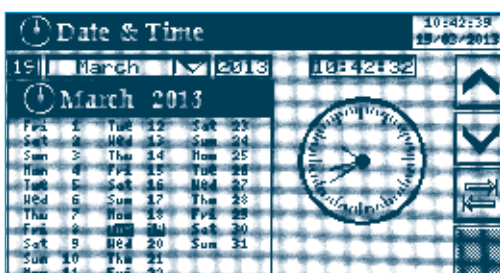
Test profile data



Test results



Manual commands for calibration purpose



Date and time



Language selection menu

PC SOFTWARE 82-SW/DM DATAMANAGER

This new intuitive and smart software is very easy to use and comes complete with many functions, is totally flexible and open to network communications.

(Optional, for more information see page 15)

It's compatible with PILOT and AUTOMAX compression machines and SMART-Line control consoles.

It allows real time acquisition and management of all test data and remote control of the machine.



UPGRADING OPTIONS

Graphic printer

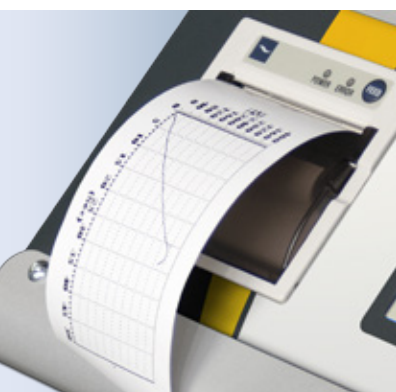
The front display/control panel of PILOT and AUTOMAX Power and Control Systems can incorporate a graphic printer.

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Power and Control Systems.

Specifications:

- Silent printing
- High speed: 50 mm/sec
- High resolution: 203 dpi=8 dots/mm
- Prints data and graphs
- Paper width: 57.5 mm

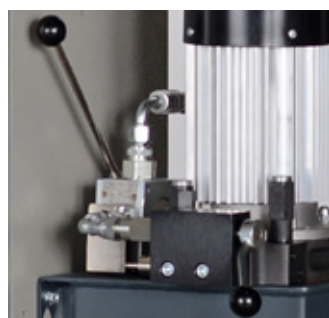


Second frame connection (PILOT system)

The PILOT System, in the COMPACT-Line (fitted laterally to the machine) and in the SMART-Line (stand-alone console) format, can be upgraded with a two-way valve for controlling (not simultaneously) a second frame.

50-C10C/2F

Two-way valve for PILOT system to control a second frame. This item must be factory installed.



Detail of two way valve selector (left) and loading/unloading valve (right).



Third frame connection (AUTOMAX System)

The AUTOMAX System, which can control two frames as standard, can be upgraded with a hydraulic valve for controlling (not simultaneously) a third frame.

50-C10D/3F

Hydraulic valve for AUTOMAX system to control a third frame. This item must be factory installed.



Detail of 50-C10D/3F valve to control up to three frames.
Active frame selection via console display/software



PILOT Smart Line console controlling two frames, compression and flexural by the hydraulic valve 50-C10C/2F



AUTOMAX SMART-Line console controlling three frames: compression on concrete, flexure on concrete and compression on cement by the hydraulic valve 50-C10D/3F

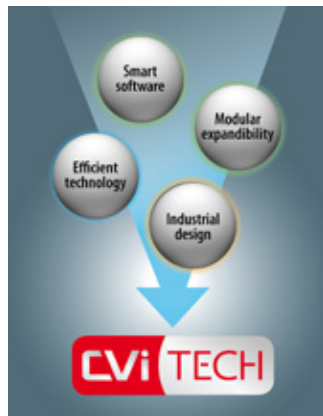
PILOT / AUTOMAX

efficient
+
technology

High technology, modern design, simplicity, essentiality, high performance

Both versions, COMPACT and SMART-Line, are characterized by the extremely simple and elementary nature of the system. Due to the modern design and the adoption of advanced technologies, the following advantages can be attributed:

- > Control and Power panels are directly connected without external wiring
- > Oil flow is automatically controlled, delivering only the required quantity for silent operation and low consumption (Energy Saving Technology).
- > Total accessibility for easy maintenance
- > Ergonomic design



CVI-TECH CONCEPT

CUSTOMER'S VALUE DRIVES THE INNOVATION

CVI-tech is an innovative distinctive concept which leads CONTROLS' development strategy.

New products, technologies and services feature the MAXIMUM POSSIBLE VALUE for the customer.

- > As a result of the CVI-tech philosophy CONTROLS proposes:
- > superior performance-to-price value;
- > strict conformity to Standards;
- > ergonomic and industrial design;

- > high and constant value over time even after intensive use;
- > outstanding pre-after sales service matching the clients' highest expectations.

CVI-Tech is built on 4 key principles which also drove the development of the SMART-Line control consoles and COMPACT-Line compression machines:

- > Efficient Technology
- > Intuitive and Smart Software
- > Functional & Industrial Design
- > Modular Expandability

INDUSTRIAL DESIGN

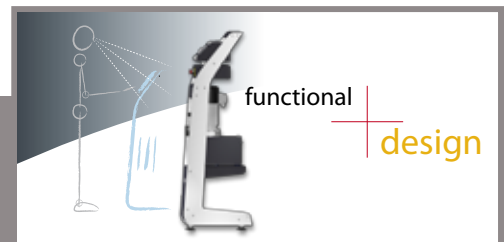
CONTROLS is a modern industrial company adopting:

- > advanced production technologies: laser cut, CAD-CAM systems, precise machining and finishing;
- > extensive quality control of parts, components and finished products;
- > refined procedures introduced since the first ISO9000 certification in 1994

We pay particular attention to the ergonomic interaction of the operator with the testing machine. Suggestions from our customers always help us to maximize the products functionality.

The rich and stylish design of our products is a perfect balance of functionality, technology and industrialization requirements.

Products' safety and conformity to international regulations are looked after by specialized engineers from the very beginning of the development process and monitored along the whole products lifetime.



intuitive
+
smart software

DATAMANAGER 82-SW/DM

Universal Testing Software

The Datamanager software, running under the RTM (Real Time Management) environment, is compatible either with PILOT and AUTOMAX Control Systems or with more sophisticated AUTOMAX E-Modulus consoles and it is especially designed for data acquisition and report of compression, flexure and indirect tensile tests performed on different type of specimens and materials.

The Control System of the testing machine is connected to the PC via the RTM software using a high-speed Ethernet link, passing data and commands to the software in real time allowing live readings of load, strength and elapsed time, and a load/time graph to be displayed on the screen.

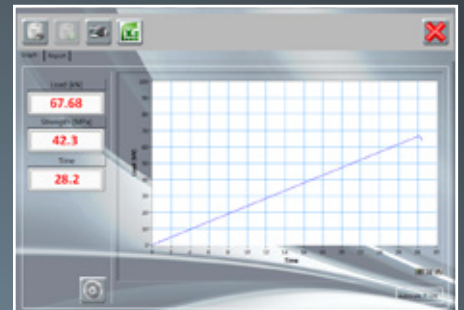
When connected to the AUTOMAX Control System, tests can be fully performed remotely, using the software.

Test data is stored using a database system, allowing previous tests to be quickly and easily recalled for reviewing or creating reports. MS Excel® test reports can be generated singly, or as batch files containing all the required test results for a single client or project or other criteria (see page 17)

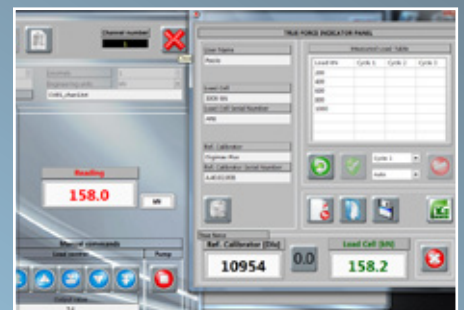
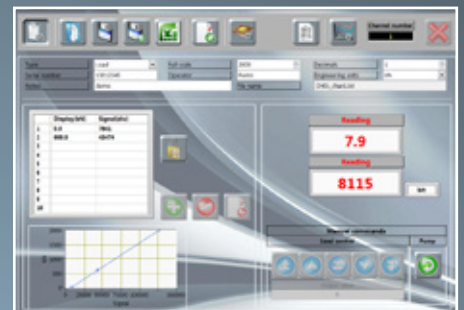
Test types and descriptive sample and test information are fully customisable, meaning that test reports can be tailored to the client's specific requirements, and ensuring that results can be reported in accordance with the relevant testing standards.

In addition, by connecting the PC to our digital readout unit mod. 82-P0801/E (or 82-P0804/E) and suitable load cells, it will be possible to perform via software automatic load measurement verification procedure including data acquisition and printing of traceable calibration certificates.

Control console directly connected via software to our digital readout unit and load cell to perform automatic force verification procedure.



Test ID	Test Name	Test Type	Test Date	Test Time	Test Result	Test Status
001	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:00	1000	Pass
002	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:05	1000	Pass
003	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:10	1000	Pass
004	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:15	1000	Pass
005	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:20	1000	Pass
006	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:25	1000	Pass
007	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:30	1000	Pass
008	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:35	1000	Pass
009	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:40	1000	Pass
010	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:45	1000	Pass
011	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:50	1000	Pass
012	Compression Test on concrete (C20/25)	Compression	2010-10-10	10:55	1000	Pass
013	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:00	1000	Pass
014	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:05	1000	Pass
015	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:10	1000	Pass
016	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:15	1000	Pass
017	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:20	1000	Pass
018	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:25	1000	Pass
019	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:30	1000	Pass
020	Compression Test on concrete (C20/25)	Compression	2010-10-10	11:35	1000	Pass



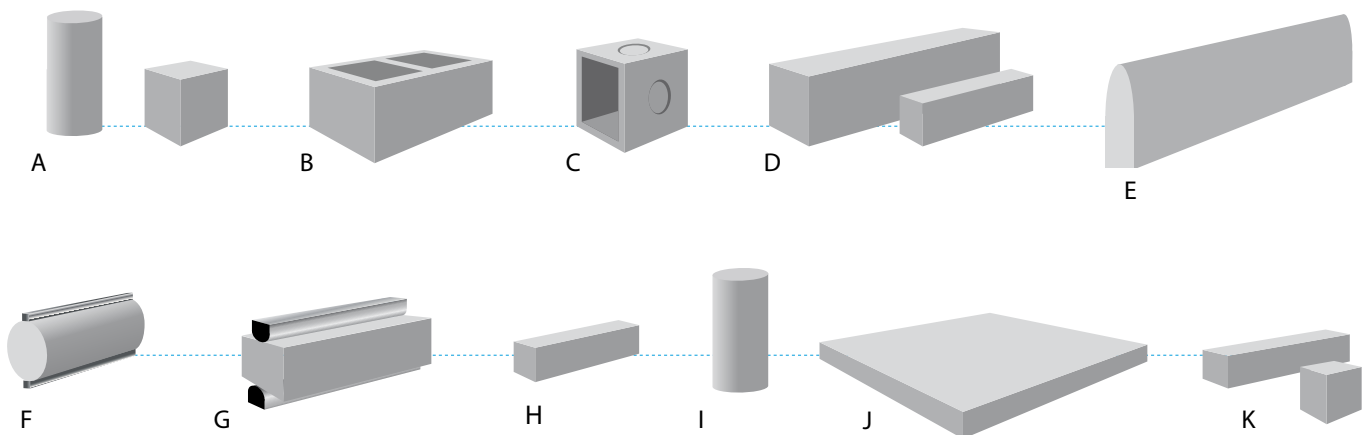
intuitive

smart software

**DATAMANAGER 82-SW/DM****Universal Testing Software**

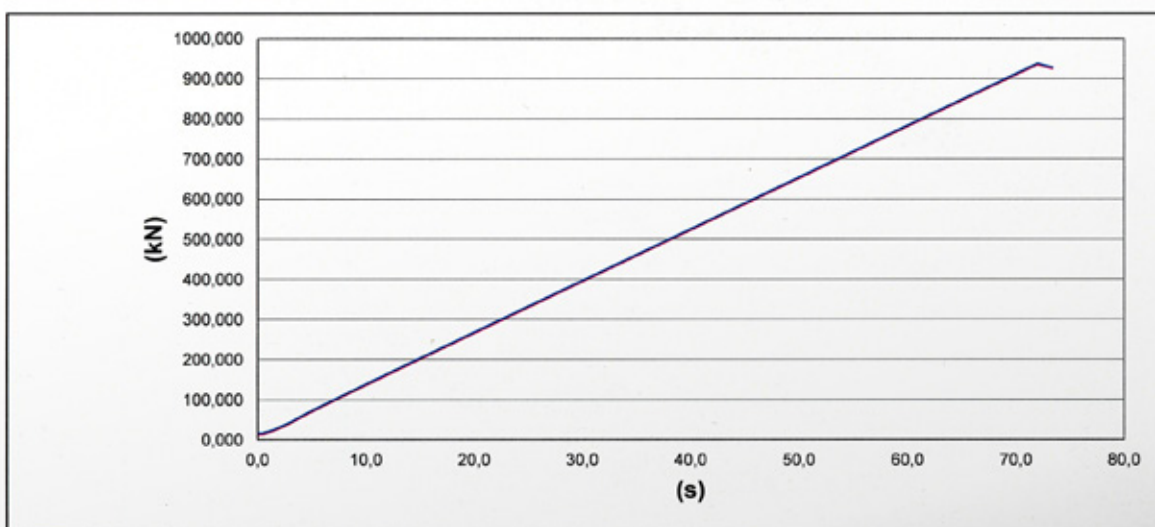
For Compression, Flexural, Indirect tensile Testing on Concrete, Cement and similar

Standard	Test	Specimen
◆ EN 12390-3	Compressive strength of Concrete test specimens	A
◆ EN 772-1	Compressive strength of masonry units	B
◆ EN 1917	Concrete unreinforced, manholes and inspection chambers, compressive strength	C
◆ EN 12390-5	Flexural strength of concrete test specimens	D
◆ EN 1340	Flexural test on Concrete kerb units	E
◆ EN 12390-6	Tensile splitting test on concrete test specimens	F
◆ EN 1338	Indirect tensile test on concrete paving blocks	G
◆ EN 196-1	Compression and flexural strength of cement specimens	H
◆ ASTM C39 ◆ AASHTO T22	Compressive strength of cylindrical concrete specimens	I
◆ ASTM C78	Flexural strength of concrete using third-point loading	D
◆ ASTM C293	Flexural strength of concrete using center-point loading	D
◆ ASTM C496	Splitting tensile strength of cylindrical concrete specimens	F
◆ EN 1339	Flexural test on concrete flagstones	J
◆ ASTM C109 ◆ C348	Compression and flexural strength of cement specimens	K



Compression test on concrete: EN 12390-3

Certificate number	: 9		Sampling date	: 28/02/2013
Testing machine	:			
Client	: STR			
Reference	:			
Specimen type	: Cubo		Cement quantity [kg/m ³]	: 50
Cement type	: CEM 2		Test date	: 28/02/2013
Sample conditions:				
Condition when received	:		Condition at test time	:
Sampling location	: Job site		Sampling date	: 28/02/2013
Preparation method	:			
Specimen ID	: 1.524.235			
Dimensions	: a(mm) : 150.0 b(mm) : 150.0		Mass [kg]	: 0.1
	: c(mm) : 150		Density [kg/m ³]	: 29.63
Load Rate(MPa/s)	: 0.6			
Area [mm ²]	: 22500.0 Specimen age :		Preparation date	: 28/02/2013
Load [kN]	: 938.1		Strength [MPa]	: 41.69
Failure type	: Satisfactory			
Notes	:			



Operator

Marc

It is forbidden to reproduce this certificate or any part of it

Example of single test report

Batch 1									
Saving time	Testing tool	Specimen	Age	Mass [kg]	Test date	Specimen ID	Breaking Load [kN]	Specific Load [MPa]	Time [sec]
28/02/2013 13:49:29	Autotest E	Cube	28	260	28/02/2013	1.524.235	600	43,67	62,1
28/02/2013 13:53:58	Autotest E	Cube	28	260	28/02/2013	1.524.235	449,1	22,91	34,8
28/02/2013 13:53:58	Autotest E	Cube	28	260	28/02/2013	1.524.235	449,1	22,91	34,8
28/02/2013 13:59:12	Autotest E	Cylinder	28	260	28/02/2013	1.524.235	579,8	22,78	40,5
Breaking Load [kN]				Specific Load [MPa]					
Average				Average					
Sigma				Sigma					
518,5				27,57					
81,708				9,402					

Example of multiple test report (batch file)

PILOT

» This new generation of COMPACT-Line Automatic compression testers, adopting the innovative CVI TECH concept, is the result of our continuous application and research to upgrade testing machines with the latest technologies, taking into account client requirements and international standards. The PILOT Automatic compression testers are proposed, as indicated, in three different series characterized by the compression frames, which are designed for EN or ASTM Standards and for General Utility purposes (which mainly relate to previous European national standards).

STANDARD	EN 12390-4	EN 772-1 - block	ASTM C39	GENERAL UTILITY*
	EN series		ASTM series	series

- > Automatic test execution with closed-loop digital feedback
- > Dual user interface via console display and PC
- > Accuracy Class 1 (EN) or Class A (ASTM) starting from 10% of full scale.
- > Special calibration starting from 1% available on request.
- > Compatible with the new DATAMANAGER software
- > Adopts the latest ES Energy Saving technologies for reduction of power consumption
- > Silent operation
- > Double-stage hydraulic pump with rapid approach and precise oil flow control allowing high throughput of accurate tests (up to 40 per hour)
- > Soft platen-to-specimen contact and smooth load rate control from the very beginning of the ramp
- > Optional control of a second frame
- > Connects to laboratory network via LAN port/ DATAMANAGER
- > Allows remote verification of settings and performances via internet/software



PILOT Compact-Line EN 12390 and EN 772-1 Series described on page 20. ASTM and General Utility series are described on page 22 and 24.

Upgrading options

All the following options have to be factory installed or, preferably, specified at time of ordering the machine.

Second frame connection

50-C10C/2F

Two-way valve for PILOT system to control a second frame

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Specifications:

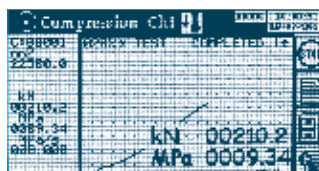
- Silent printing
- High speed: 50 mm/sec
- High resolution: 203 dpi=8 dots/mm
- Prints data and graphs
- Paper width: 57.5 mm



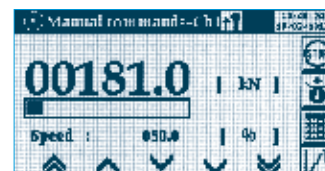
Selection of the test profile (specimen type, load rate, ref. standards, etc.)



Test profile data



Test results

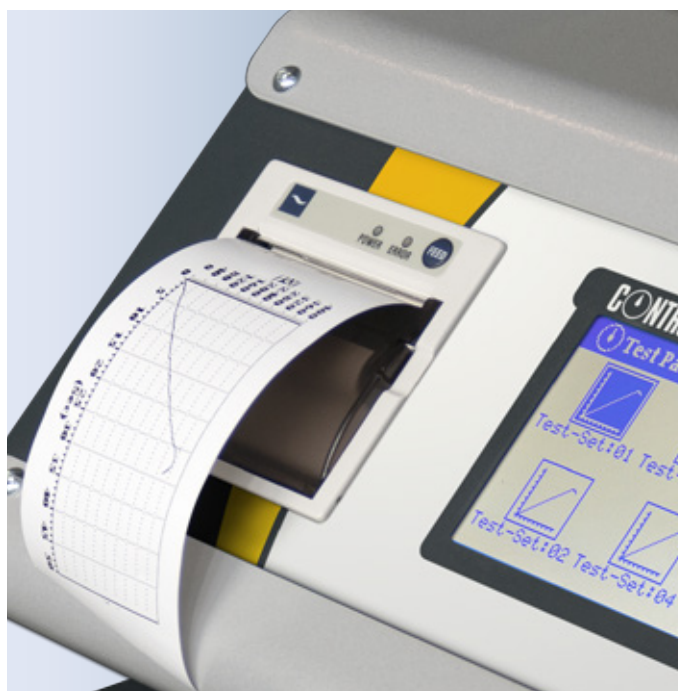


Manual commands for calibration purpose

COMMON SPECIFICATIONS

The three series of PILOT COMPACT-Line testers: EN, ASTM and General Utility, differ from one another in the frame and compression platens.

The PILOT Power and Control Console is identical in all three series and it is fully described on pages 10 to 14.



PILOT COMPACT-Line compression tester controlling a second flexural frame by the two way valve selector 50-C10C/2F



Standard	EN 12390-4	Code	50-C46C02	50-C56C02	50-C68C02
	EN 772-1 - block series ▶		50-C49C02	50-C59C02	50-C69C02

50-C56C02
with printer50-C49C02
with printer

PILOT

FRAME

Four-column high-stiffness welded frame tested for stability to EN 12390-4. Heavy duty spherical seat in lubricating oil bath, allowing free alignment at the initial contact with the specimen and automatic jamming up to the end of the test.

COMPRESSION PLATENS

Series 50-C46C02 and 50-C56C02 are fitted with 300 mm dia. platens.

Series 50-C68C02 is fitted with 305x305 mm platens.

For both, surface hardness is 55 HRC, flatness tolerance 0.03 mm. Traceable certificate of surface hardness available on request.

Series 50-C49C02, 50-C59C02 and 50-C69C02 are fitted with rectangular platens 310x510 mm.

Surface hardness 55.5 HRC (600

HV), flatness tolerance 0.05 mm. Traceable certificate of surface hardness available on request.

PILOT AUTOMATIC CONTROL SYSTEM

See detailed description on page 10 to 14.

SAFETY FEATURES

Max. pressure valve to avoid machine overloading; piston travel limit switch; emergency stop button; front door and rear transparent fragment guard.

MACHINE accessories

- Distance pieces to reduce the vertical daylight (see page 46)
- Frame pedestals (see page 21)
- DATAMANAGER PC Software (see page 15)

50-C9060/A

Lifting assembly for bottom block platen of compression testing machines.

TEST accessories

(see page 46)

These machines can be equipped with accessories to perform:

- Splitting tensile test
- Compression on cement samples
- Flexural test on concrete beams

Upgrading options

Second frame connection

50-C10C/2F

Two-way valve for PILOT system to control a second frame

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Power and Control Systems.

See page 14

▶ Upon request we can also supply models for testing both blocks to EN 772-1 and cubes/cylinders to EN 12390-4. Contact us for more informations

Fragment guard locking device

50-C50/L

Useful in case of explosive failure to avoid the opening of the fragment guard.

Fragment guard lock switch

50-C50/P

Prevents test execution with the safety guard open.

Special calibration procedure

50-C0050/CAL

Special calibration procedure to obtain Class 1 from 1% of load full scale

Certified platen hardness

50-C0050/HRD4

Traceable 300 mm dia. platen hardness certificate. Min. hardness 53 HRC.

50-C0050/HRD6

Traceable hardness certificate for platens 305x305 mm. Min. hardness 53 HRC.

50-C0050/HRD7

Traceable hardness certificate for platens 310x510 mm. Min. hardness 55.5 HRC.

Series for cubes and cylinders to **EN 12390-4**

Models 50-	C46C02	C56C02	C68C02**
Capacity, kN	2000	3000	4000
Platens dimens. mm	dia. 300 mm	dia. 300 mm	305x305 mm square
Ram travel mm	50	50	50
Max vertical daylight*	350 mm	350 mm	520 mm
Horizontal daylight	350 mm	370 mm	425 mm
For specimen size:			
Cubes cm	10, 15, 20	10, 15, 20	10, 15, 20, 30
Cylinders cm (dia.xh)	10x20 15x30 16x32	10x20 15x30 16x32	10x20, 15x30 16x32, 25x50
Overall dimensions (lxdxh) mm	875x440x1030	965x495x1100	1070x560x1470
Weight approx. kg	700	1050	2030

Series for cubes, cylinders and blocks to **EN 772-1**

Models 50-	C49C02	C59C02	C69C02**
Capacity, kN	2000	3000	4000
Platens dimens. mm	310x510 mm	310x510 mm	310x510 mm
Ram travel mm	50	50	50
Max vertical daylight*	260 mm	260 mm	420 mm
Horizontal daylight	350 mm	370 mm	425 mm
For specimen size:			
Cubes cm	10, 15, 20	10, 15, 20	10, 15, 20, 30
Cylinders cm (dia.xh)	10x20	10x20	10x20 15x30 16x32
Blocks	Within platen dim.	Within platen dim.	Within platen dim.
Overall dimensions, (lxdxh) mm	875x600x1030	965x625x1100	1070x700x1470
Weight approx. kg	880	1250	2200

Ordering information

For Cubes and Cylinders to **EN 12390-4**

2000 kN cap.

50-C46C02

PILOT Automatic Compact-Line compression tester, 2000 kN cap. for cubes up to 200 mm and cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C46C04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap.

50-C56C02

PILOT Automatic Compact-Line compression tester, 3000 kN cap. for cubes up to 200 mm and cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C56C04

Same as above but 110 V, 60 Hz, 1 ph

4000 kN cap.

50-C68C02

PILOT Automatic Compact-Line compression tester, 4000 kN cap. for cubes up to 300 mm and cylinders up to dia. 250x500 mm. 230 V, 50-60 Hz, 1 ph

50-C68C04

Same as above but 110 V, 60 Hz, 1 ph

For Cubes, Cylinders and Blocks to **EN 772-1**

2000 kN cap.

50-C49C02

PILOT Automatic Compact-Line compression tester, 2000 kN cap. for blocks, cubes up to 200 mm and cylinders up to dia. 100 x 200 mm. 230 V, 50-60 Hz, 1 ph

50-C49C04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap.

50-C59C02

PILOT Automatic Compact-Line compression tester, 3000 kN cap. for blocks, cubes up to 200 mm and cylinders up to dia. 100 x 200 mm. 230 V, 50-60 Hz, 1 ph

50-C59C04

Same as above but 110 V, 60 Hz, 1 ph

4000 kN cap.

50-C69C02

PILOT Automatic Compact-Line compression tester, 4000 kN cap. for blocks, cubes up to 300 mm and cylinders up to dia. 160 x 320 mm. 230 V, 50-60 Hz, 1 ph

50-C69C04

Same as above but 110 V, 60 Hz, 1 ph

Frame pedestal

**50-C49/B**

Frame pedestal for 50-C46C02 and 50-C49C02

50-C59/B

Frame pedestal for 50-C56C02 and 50-C59C02

*To be adjusted using the suitable distance pieces. See accessories, page 46.

**If a second frame (cement or flexural) has to be connected to this 4000 kN model, the Pressure regulator 65-L1400/X5 has to be used. See page 39



PILOT 50-C46C02 with printer



PILOT 50-C68C02

PILOT 50-C59C02
with pedestal

PILOT 50-C69C02

Standard	ASTM C39	AASHTO T22	Code	50-C12C02	50-C22C02	50-C32C02
				50-C42C02	50-C52C02	



PILOT

FRAME

The 1500, 2000 and 3000 kN models series 50-C12xxx, 50-C22xx and 50-C32xxx feature a standard welded steel construction while the 2000 kN cap. series 50-C42xxx and 3000 kN series 50-C52xxx, feature a four-column high-stiffness welded frame. Spherical seat allows free alignment at the initial contact with the specimen and automatic jamming up to the end of test.

COMPRESSION PLATENS

Platen dimensions are indicated in the following table. Surface hardness 55 HRC, flatness tolerance 0.02 mm. Traceable certificate of surface hardness available on request.

PILOT AUTOMATIC CONTROL SYSTEM

See detailed description on pages 10 to 14.

SAFETY FEATURES

Max. pressure valve to avoid machine overloading; piston travel limit switch; emergency stop button; front and rear transparent fragment guard.

MACHINE accessories

- Distance pieces to reduce the vertical daylight (see page 46)
- Frame pedestals (see page 23)
- DATA MANAGER PC Software (see page 15)

TEST accessories

- (see page 46)
- These machines can be equipped with accessories to perform:
- Splitting tensile test
 - Compression on cement samples
 - Flexural test on concrete beams.

Upgrading options

Second frame facility

50-C10C/2F

Two-way valve for PILOT system to control a second frame

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Power and Control Systems.
See page 14

Fragment guard lock device

(High stiffness models only)

50-C50/L

Useful in case of explosive failure to avoid the opening of the fragment guard.

Fragment guard lock switch

(High stiffness models only)

50-C050/P

Prevents test execution with the safety guard open

Special calibration procedures

50-C0050/CAL

(High stiffness models only)

Special calibration procedure to obtain Class 1 from 1% of load full scale

50-C0050/CAL2

Special calibration procedure to obtain Class 1 from 2% of load full scale

Certified platen hardness

50-C0050/HRD2

Traceable 165 mm dia.platen hardness certificate. Min. hardness 55 HRC.

Models 50-	C12C02	C22C02	C32C02	C42C02 ♦ High stiffness frame	C52C02 ♦ High stiffness frame
Capacity, kN	1500	2000	3000	2000	3000
Platens dim. mm	dia. 165	dia. 165	dia. 165	dia. 165	dia. 165
Ram travel mm	50	50	50	50	50
Max vertical daylight*	370	380	380	405	405
Horizontal daylight mm	280	340	370	350	370
For specimen size: Cylinders cm (dia.xh)	10x20 (4"x8"), 15x30 (6"x12"), 16x32	10x20 (4"x8"), 15x30 (6"x12"), 16x32	10x20 (4"x8"), 15x30 (6"x12"), 16x32	10x20 (4"x8"), 15x30 (6"x12"), 16x32	10x20 (4"x8"), 15x30 (6"x12"), 16x32
Overall dimensions (lxdxh) mm	655x375x930	725x410x1000	765x455x1070	875x440x1030	965x495x1100
Weight approx. kg	370	530	730	600	1100

*To be adjusted using the suitable distance pieces. See accessories, page 46

♦ High stiffness four column welded frame

Frame pedestal



50-C49/B

Frame pedestal for 50-C42C02
and 50-C43C02

50-C59/B

Frame pedestal for 50-C52C02 and
50-C54C02

Ordering information

1500 kN cap.

50-C12C02

PILOT, Automatic COMPACT-Line compression tester, 1500 kN cap. for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph
50-C12C04

Same as above but 110 V, 60 Hz, 1 ph

2000 kN cap.

50-C22C02

PILOT, Automatic COMPACT-Line compression tester, 2000 kN cap. for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph
50-C22C04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap.

50-C32C02

PILOT, Automatic COMPACT-Line compression tester, 3000 kN cap. for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C32C04

Same as above but 110 V, 60 Hz, 1 ph

2000 kN cap. (high stiffness frame)

50-C42C02

PILOT, Automatic COMPACT-Line compression tester, 2000 kN cap., high stiffness frame, for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C42C04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap. (high stiffness frame)

50-C52C02

PILOT, Automatic COMPACT-Line compression tester, 3000 kN cap., high stiffness frame, for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C52C04

Same as above but 110 V, 60 Hz, 1 ph



PILOT 50-C22C02
with printer



PILOT 50-C32C02
with printer



PILOT 50-C52C02

General Utility* series

Code	50-C13C02	50-C23C02	50-C43C02	50-C34C02	50-C54C02
	50-C29C02	50-C39C02			

* These series generally relate to previous European national standards



PILOT

FRAME

All models feature a standard welded steel construction, while 50-C43xxx and 50-C54xxx series feature a four-column high-stiffness welded frame, assuring high rigidity. Spherical seat allows initial free alignment at the initial contact with the specimen and automatic jamming up to the end of test.

COMPRESSION PLATENS

Series 50-C13xxx, 50C23xxx and 50-C43xxx are fitted with 216 mm dia. platens.

Series 50-C34xxx and 50-C54xxx are fitted with 300 mm dia. platens. For both, surface hardness is 55 HRC, flatness tolerance 0.03 mm. Series 50-C29xxx and 50-C39xxx are fitted with rectangular platens 310x510 mm.

Surface hardness 55.5 HRC (600 HV), flatness tolerance 0.05 mm. Traceable certificate of surface hardness available on request.

PILOT AUTOMATIC CONTROL SYSTEM

See detailed description on page 10 to 14.

SAFETY FEATURES

Max. pressure valve to avoid machine overloading, piston travel limit switch, emergency stop button, front door and rear transparent fragment guard.

MACHINE accessories

- Distance pieces to reduce the vertical daylight (see page 46)
- Frame pedestals (see page 23)
- DATAMANAGER PC Software (see page 15)

50-C9060/A

Lifting assembly for bottom block platen of compression testing machines.



50-C9060/A

TEST accessories

(see page 46)

These machines can be equipped with accessories to perform:

- Splitting tensile test
- Compression on cement samples
- Flexural test on concrete beams

Upgrading options

Second frame facility

50-C10C/2F

Two-way valve for PILOT system to control a second frame. See page 14

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Power and Control Systems. See page 14

Fragment guard lock device (High stiffness models only)

50-C50/L

Useful in case of explosive failure to avoid the opening of the fragment guard.

Fragment guard lock switch (High stiffness models only)

50-C50/P

Prevents test execution with the safety guard open

Special calibration procedures

50-C0050/CAL

(High stiffness models only)

Special calibration procedure to obtain Class 1 from 1% of load full scale

50-C0050/CAL2

Special calibration procedure to obtain Class 1 from 2% of load full scale

Certified platen hardness

50-C0050/HRD3

Traceable 216 mm dia. platen hardness certificate. Min. hardness 55 HRC.

50-C0050/HRD4

Traceable 300 mm dia. platen hardness certificate. Min. hardness 53 HRC.

50-C0050/HRD7

Traceable hardness certificate for platens 310x510 mm. Min. hardness 55.5 HRC.

1500 and 2000 kN cap. for cylinders and cubes

Models 50-	C13C02	C23C02	C43C02 ♦ High stiffness frame
Capacity, kN	1500	2000	2000
Platens dim. mm	dia. 216	dia. 216	dia. 216
Ram travel, mm	50	50	50
Max vertical daylight* mm	340	350	375
Horizontal daylight	280	340	350
For specimen size, Cylinders, cm (dia x h) Cubes, cm	15x30, to 16x32 10, 15	15x30, to 16x32 10, 15	15x30, to 16x32 10, 15
Overall dimensions (l x d x h) mm	655x375x930	725x410x1000	875x440x1030
Weight approx. kg	390	550	650

3000 kN cap. for cylinders and cubes

Models 50-	C34C02	C54C02 ♦ High stiffness frame
Capacity, kN	3000	3000
Platens dim. mm	dia. 300	dia. 300
Ram travel, mm	50	50
Max vertical daylight* mm	350	375
Horizontal daylight	370	370
For specimen size, Cylinders, cm (dia x h) Cubes, cm	15x30, to 16x32 10, 15, 20	15x30, to 16x32 10, 15, 20
Overall dimensions (l x d x h) mm	765x455x1070	965x495x1100
Weight approx. kg	780	1060

*To be adjusted using the suitable distance pieces. See accessories, page 46

♦ High stiffness four column welded frame



PILOT 50-C23C02
with printer.



PILOT 50-C34C02
with printer.

3000 kN cap. for cylinders, cubes and blocks

Models 50-	C29C02	C39C02
Capacity, kN	2000	3000
Platens dim. mm	310x510	310x510
Ram travel, mm	50	50
Max vertical daylight* mm	260	260
Horizontal daylight	340	370
For specimen size, Cylinders, cm (dia x h) Cubes, cm Blocks	10x20 10, 15, 20 Within platen dim.	10x20 10, 15, 20 Within platen dim.
Overall dimensions (l x d x h) mm	765x455x1070	965x495x1100
Weight approx. kg	750	960

*To be adjusted using the suitable distance pieces. See accessories, page 46

Ordering information

General utility testing machines for cubes and cylinders

1500 kN cap.

50-C13C02

PILOT, COMPACT-Line Automatic compression tester, 1500 kN cap. for testing cylinders up to dia. 160x320 mm, cubes up to 150 mm. 230 V, 50-60 Hz, 1 ph

2000 kN cap.

50-C23C02

PILOT, COMPACT-Line Automatic compression tester, 2000 kN cap. for testing cylinders up to dia. 160x320 mm, cubes up to 150 mm. 230 V, 50-60 Hz, 1 ph

2000 kN cap. (high stiffness frame)

50-C43C02

PILOT, COMPACT-Line Automatic compression tester, 2000 kN cap., high stiffness frame, for testing cylinders up to dia. 160x320 mm, cubes up to 150 mm. 230 V, 50-60 Hz, 1 ph

3000 kN cap.

50-C34C02

PILOT, COMPACT-Line Automatic compression tester, 3000 kN cap., for testing cylinders up to dia. 160x300 mm and cubes up to 200 mm. 230 V, 50-60 Hz, 1 ph

3000 kN cap. (high stiffness frame)

50-C54C02

PILOT, COMPACT-Line Automatic compression tester, 3000 kN cap., high stiffness frame, for testing cylinders up to dia. 160x300 mm and cubes up to 200 mm. 230 V, 50-60 Hz, 1 ph

General utility testing machines for cubes, cylinders and blocks

2000 kN cap.

50-C29C02

PILOT, COMPACT-Line Automatic compression tester, 2000 kN cap. for testing cylinders up to dia. 100 x 200 mm, cubes up to 200 mm and blocks. 230 V, 50-60 Hz, 1 ph

3000 kN cap.

50-C39C02

PILOT, COMPACT-Line Automatic compression tester, 3000 kN cap. for testing cylinders up to dia. 100 x 200 mm, cubes up to 200 mm and blocks. 230 V, 50-60 Hz, 1 ph

Note:

110 V, 60 Hz, version also available. Please specify

AUTOMAX

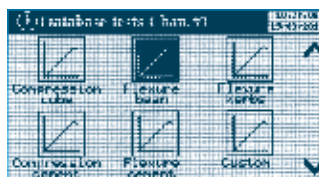
» The AUTOMAX COMPACT-Line, Super-Automatic Compression Testers, adopting the innovative CVI TECH concept, is the result of our continuous application and research to update testing machines with the last technologies, taking into account client requirements and International Standards. The AUTOMAX COMPACT-Line testers are proposed, as indicated, in two different series characterized by the compression frames, which are designed for EN or ASTM Standard.

STANDARD	EN 12390-4	EN 772-1 - block	ASTM C39
	EN series		ASTM series

- > Fully automatic test cycle with closed-loop digital feedback. The complete test cycle is automatically performed by simply pressing the start button (both via display and via software)
- > PC control option. Double user interface based on display and PC. When connected to PC, the system is fully computerized and controlled by the DATAMANAGER Software
- > Accuracy Class 1 (EN) and Class A (ASTM) starting from 10% of full scale. Special calibration starting from 1% available on request.
- > Adopts the latest ES Energy Saving technologies. For reduction of power consumption and silent operation
- > Double stage hydraulic pump with rapid approach and precise oil flow control. Allows high throughput of accurate tests (up to 40 per hour)
- > Soft platen-to-specimen contact and smooth load rate control from the very beginning of the ramp
- > Double frame control as standard, with optional third frame control. Active frame selection via display/PC
- > Connects to laboratory network via LAN port/DATAMANAGER
- > Allows remote verification of settings and performances via internet/software



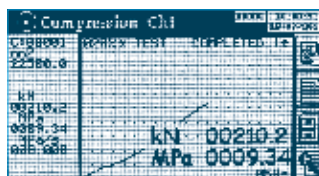
AUTOMAX COMPACT-LINE
EN 12390-4 series described on page 28
ASTM-AASTHO series are described
on page 30



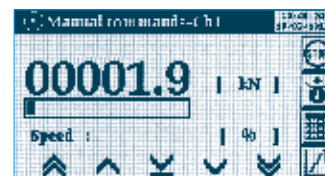
Selection of the test profile (specimen type, load rate, ref. standards, etc.)



Test profile data



Test results



Manual commands for calibration purpose

COMMON SPECIFICATIONS

The two series of AUTOMAX COMPACT-Line testers: EN and ASTM, differ from one another in the frame and compression platens.

The AUTOMAX Power and Control Console is identical in both series and it is fully described on page 10, 14.

UPGRADING OPTIONS

All the following options, have to be factory installed or, preferably, specified at time of ordering the machine.

Third frame connection

50-C10D/3F

Hydraulic valve for AUTOMAX system to control a third frame.

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Specifications:

- Silent printing
- High speed: 50 mm/sec
- High resolution: 203 dpi=8 dots/mm
- Prints data and graphs
- Paper width: 57.5 mm



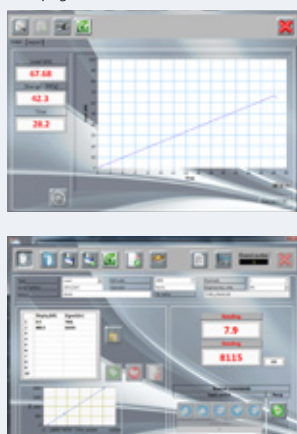
AUTOMAX

Dual control mode: display and PC

AUTOMAX compression tester controlling Flexural concrete and Compression cement frames by the hydraulic valve 50-C10D/3F

DATAMANAGER 82-SW/DM Universal Testing Software

(see pages 15)



Standard	EN 12390-4	Code	50-C46D02	50-C56D02	50-C68D02
	EN 772-1 - block series ▶		50-C49D02	50-C59D02	50-C69D02



50-C56D02



50-C59D02

AUTOMAX

FRAME

Four-column high-stiffness welded frame tested for stability to EN 12390-4. Heavy duty spherical seat in lubricating oil bath, allowing free alignment at the initial contact with the specimen and automatic jamming up to the end of the test.

COMPRESSION PLATENS

Series 50-C46D02 and 50-C56D02 are fitted with 300 mm dia. platens. Series 50-C68D02 is fitted with 305x305 mm platens.

For both, surface hardness is 55 HRC, flatness tolerance 0.03 mm. Traceable certificate of surface hardness available on request.

Series 50-C49D02, 50-C59D02 and 50-C69D02 are fitted with rectangular platens 310x510 mm. Surface hardness 55.5 HRC (600 HV), flatness tolerance 0.05 mm.

Traceable certificate of surface hardness available on request.

AUTOMAX, SUPER-AUTOMATIC CONTROL SYSTEM

See more on pages 10 to 14.

SAFETY FEATURES

Max. pressure valve to avoid machine overloading; piston travel limit switch; emergency stop button; front door and rear transparent fragment guard.

MACHINE accessories

- Distance pieces to reduce the vertical daylight (see page 46)
- DATAMANAGER PC Software (see page 15)

50-C9060/A

Lifting assembly for bottom block platen of compression testing machines.

TEST accessories (see page 46)

These machines can be equipped with accessories to perform:

- Splitting tensile test
- Compression on cement samples
- Flexural test on concrete beams

Upgrading options

Third frame connection

50-C10D/3F

Hydraulic valve for AUTOMAX system to control a third frame.

Note: The second frame control is supplied as standard

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Power and Control Systems. See page 14

Fragment guard locking device

50-C50/L

Useful in case of explosive failure to avoid the opening of the fragment guard.

50-C50/L1

Same as above, but for 50-C46D02 and 50-C56D02 models.

Fragment guard lock switch

50-C50/P

Prevents test execution with the safety guard open.

50-C50/P1

Same as above, but for 50-C46D02 and 50-C56D02 models.

Special calibration procedure

50-C0050/CAL

Special calibration procedure to obtain Class 1 from 1% of load full scale

Certified platen hardness

50-C0050/HRD4

Traceable 300 mm dia. platen hardness certificate. Min. hardness 53 HRC.

50-C0050/HRD6

Traceable hardness certificate for platens 305x305 mm. Min. hardness 53 HRC.

50-C0050/HRD7

Traceable hardness certificate for platens 310x510 mm. Min. hardness 55.5 HRC.

For cubes and cylinders to **EN 12390-4**

Models 50-	C46D02	C56D02	C68D02**
Capacity, kN	2000	3000	4000
Platens dimens. mm	dia. 300	dia.300	305x305 square
Ram travel mm	50	50	50
Max vertical daylight*	350 mm	350 mm	520 mm
Horizontal daylight	350 mm	370 mm	425 mm
For specimen size:			
Cubes cm	10, 15, 20 10x20	10, 15, 20 10x20	10, 15, 20, 30 10x20
Cylinders cm (dia.xh)	15x30 16x32	15x30 16x32	15x30 16x32 25x50
Overall dimensions (lxdxh) mm	895x410x1440	980x465x1460	1095x560x1500
Weight approx. kg	760	1120	2040

For cubes, cylinders and blocks to **EN 772-1** ▶

Models 50-	C49D02	C59D02	C69D02**
Capacity, kN	2000	3000	4000
Platens dimens. mm	310x510 mm	310x510 mm	310x510 mm
Ram travel mm	50	50	50
Max vertical daylight*	260 mm	260 mm	420 mm
Horizontal daylight	350 mm	370 mm	425 mm
For specimen size:			
Cubes cm	10, 15, 20 10x20	10, 15, 20 10x20	10, 15, 20, 30 10x20
Cylinders cm (dia.xh)			15x30 16x32
Blocks	Within platen dim.	Within platen dim.	Within platen dim.
Overall dimensions (lxdxh) mm	895x600x1440	980x625x1440	1095x700x1470
Weight approx. kg	930	1300	2280



50-C69D02



50-C68D02



50-C46C02

Ordering information

For Cubes and Cylinders to **EN 12390-4**

2000 kN cap.

50-C46D02

AUTOMAX, Super-Automatic Compact-Line compression tester, 2000 kN cap. for cubes up to 200 mm and cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C46D04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap.

50-C56D02

AUTOMAX, Super-Automatic Compact-Line compression tester, 3000 kN cap. for cubes up to 200 mm and cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C56D04

Same as above but 110 V, 60 Hz, 1 ph

4000 kN cap.

50-C68D02

AUTOMAX, Super-Automatic Compact-Line compression tester, 4000 kN cap. for cubes up to 300 mm and cylinders up to dia. 250x500 mm. 230 V, 50-60 Hz, 1 ph

50-C68D04

Same as above but 110 V, 60 Hz, 1 ph

*To be adjusted using the suitable distance pieces.

See accessories, page 46

**If a second frame (cement or flexural) have to be connected to this 4000 kN model, the Pressure regulator 65-L 1400/X5 has to be used. See page 39.

For Cubes, Cylinders and Blocks to **EN 12390-4** and **EN 772-1**

2000 kN cap.

50-C49D02

AUTOMAX, Super-Automatic Compact-Line compression tester, 2000 kN cap. for blocks, cubes up to 200 mm and cylinders up to dia. 100 x 200 mm.

230 V, 50-60 Hz, 1 ph

50-C49D04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap.

50-C59D02

AUTOMAX, Super-Automatic Compact-Line compression tester, 3000 kN cap. for blocks, cubes up to 200 mm and cylinders up to dia. 100 x 200 mm.

230 V, 50-60 Hz, 1 ph

50-C59D04

Same as above but 110 V, 60 Hz, 1 ph

4000 kN cap.

50-C69D02

AUTOMAX, Super-Automatic Compact-Line compression tester, 4000 kN cap. for blocks, cubes up to 300 mm and cylinders up to dia. 160 x 320 mm.

230 V, 50-60 Hz, 1 ph

50-C69D04

Same as above but 110 V, 60 Hz, 1 ph



AUTOMAX COMPACT-Line compression tester controlling Flexural on concrete and Compression cement frames by the hydraulic valve 50-C10D/3F

▶ Upon request we can also supply models for testing both blocks to EN 772-1 and cubes/cylinders to EN 12390-4. Contact us for more informations

Standard | **ASTM C39**| **AASHTO T22****Code** | 50-C42D02 50-C52D02

50-C42D02



50-C52D02

AUTOMAX

FRAME

Four-column high-stiffness welded frame. Spherical seat allows initial free alignment at the initial contact with the specimen and automatic jamming up to the end of test.

COMPRESSION PLATENS

All these models are fitted with round platens 165 mm dia. suitable for testing cylinders up to dia. 160x320 mm conforming to ASTM and AASHTO standards. Surface hardness 55HRC, flatness tolerance 0.02 mm. Traceable certificate of surface hardness available on request.

AUTOMAX, SUPER-AUTOMATIC CONTROL SYSTEM

See detailed description on pages 10 to 14.

SAFETY FEATURES

Max pressure valve to avoid machine overloading, piston travel limit switch, emergency stop button, front door and rear transparent fragment guard.

MACHINE accessories

- Distance pieces to reduce the vertical daylight (see page 46)
- DATAMANAGER PC Software (see page 15)

TEST accessories

(see page 46)

These machines can be equipped with accessories to perform:

- Splitting tensile test
- Compression on cement samples
- Flexural test on concrete beams.

Upgrading options

Third frame connection

50-C10D/3F

Hydraulic valve for AUTOMAX system to control a third frame.

Note: the second frame control is supplied as standard.

Graphic printer

50-C10B/PR

Graphic printer for AUTOMAX and PILOT Power and Control Systems.

For more information see page 14.

Fragment guard locking device

50-C50/L1

Useful in case of explosive failure to avoid the opening of the fragment guard.

Fragment guard lock switch

50-C50/P1

Prevents test execution with the safety guard open

Special calibration procedure

50-C0050/CAL

Special calibration procedure to obtain Class 1 from 1% of load full scale

Certified platen hardness

50-C0050/HRD2

Traceable 165 mm dia. platen hardness certificate. Min. hardness 55 HRC.

Series for cubes and cylinders to **ASTM C39, AASHTO T22**

Models 50-	C42D02	C52D02
Capacity, kN	2000	3000
Platens dim. mm	dia. 165	dia. 165
Ram travel, mm	50	50
Max vertical daylight* mm	405	405
Horizontal daylight	350	370
For specimen size, Cylinders, cm (diaxh)	10x20 (4"x8"), 15x30 (6"x12"), 16x32	10x20 (4"x8"), 15x30 (6"x12"), 16x32
Overall dimensions (lxdxh) mm	895x410x1440	980x465x1460
Weight approx. kg	680	1060

*To be adjusted using the suitable distance pieces. See accessories, page 46.

Ordering information

2000 kN cap.

50-C42D02

AUTOMAX, Super-Automatic COMPACT-Line compression tester, 2000 kN cap. for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C42D04

Same as above but 110 V, 60 Hz, 1 ph

3000 kN cap.

50-C52D02

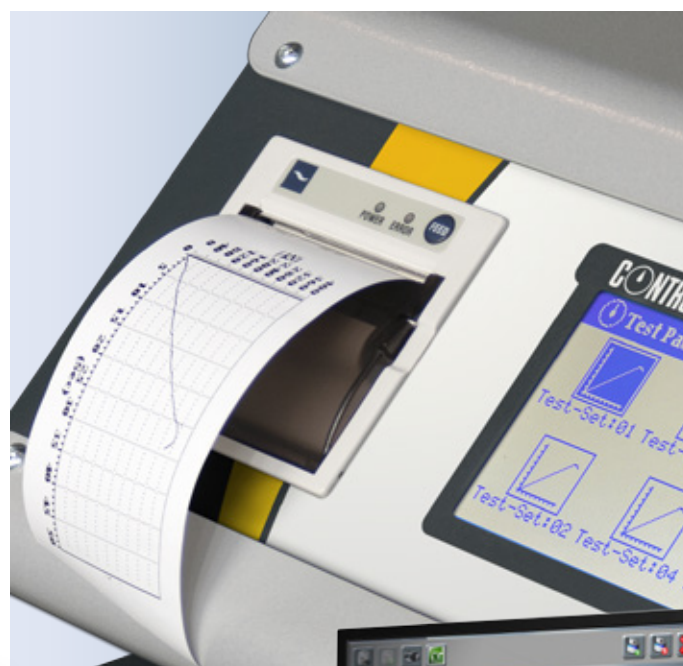
AUTOMAX, Super-Automatic COMPACT-Line compression tester, 3000 kN cap. for testing cylinders up to dia. 160x320 mm. 230 V, 50-60 Hz, 1 ph

50-C52D04

Same as above but 110 V, 60 Hz, 1 ph



Example of a second and third frame control option: 50-C42D02 connected, using the 50-C10D/3F option, to a cement compression frame and to a flexural frame. The second frame control is included as standard.



50-C10B/PR Graphic printer installed in the control panel.

Dual control mode, display or PC



STANDARD	EN 12390-4	EN 772-1	ASTM C39 and AASHTO T22	GENERAL UTILITY*
	Series for cubes and cylinders	Series for cubes, cylinders and blocks	Series for cylinders	Series for cubes, cylinders and blocks

All the following compression testing frames are proposed for connection to the various Power and Control Systems such as, for example, the SMART-Line PILOT and AUTOMAX units, or the more sophisticated AUTOMAX E Modulus Consoles and the MCC and ADVANTEST System for tests under load/stress, displacement or strain rate control, to form an AUTOMATIC TESTING SYSTEM.

We propose the following different versions that can be selected depending on the relevant standard and the maximum capacity (which depends on the expected strength of the concrete specimens).

(kit 1) Supplied complete with connection kit for separate control console (including pressure transducer) and base.

(kit 2) Supplied complete with connection kit for separate control console (including pressure transducer).

TEST and frame accessories

(See page 46)

For Distance pieces to adjust the vertical daylight, Splitting tensile test device, Flexural test devices, Compression devices for cement, see page 46

Safety features

Includes: piston travel limit switch, front door and rear transparent fragment guard.

Technical specification

See table page 34

SERIES

EN 12390-4
Frames for cylinders and cubes

Ordering information



50-C46Z00



50-C56Z00



50-C68Z00

50-C46Z00

2000 kN cap.
compression frame for cubes up to 200 mm and cylinders up to dia., 160x320mm, tested for stability to EN 12390-4. (kit1)

50-C56Z00

3000 kN cap.
compression frame, for cubes up to 200 mm and cylinders up to dia., 160x320mm, tested for stability to EN 12390-4. (kit1)

50-C68Z00 50-C78Z00

4000 and 5000 kN cap.
cap. compression frames, for cubes up to 300 mm and cylinders up to dia., 250x500mm, tested for stability to EN 12390-4. (kit2)

SERIES

EN 12390-4
Frames for cylinders and cubes.

Four-column
pre-stressed version

Ordering information



50-C86Z00

50-C86Z00

3000 kN cap.
compression frame, for cubes up to 200 mm and cylinders up to dia., 160x320mm, tested for stability to EN 12390-4. 4 pre-stressed columns version. (kit1)

50-C86Z00 and 50-C86Z10

Balanced pre-tensioning system

The columns consist of two elements, one contained within the other. The internal part is the column and works in tension, whilst the external part is a tube and works in compression. This configuration guarantees tensional uniformity at all load levels. The other specifications concerning compression platens, spherical seat and safety features are identical to those of the EN Four column welded structures.



50-C86Z10

3000 kN cap.
compression frame, for cubes up to 200 mm and cylinders up to dia., 160x320mm, tested for stability to EN 12390-4. 4 pre-stressed columns version.
High precision load cell incorporated in the piston. (kit1)



SERIES

◆ EN 772-1

for cylinders,
cubes and blocks

Ordering information

► Upon request
we can also supply
models for testing both
blocks to EN 772-1
and cubes/cylinders
to EN 12390-4.
Contact us for more
informations.

50-C49Z00

2000 kN cap.

compression frame for blocks,
cubes up to 200 mm and cylinders
up to dia. 100 x 200 mm. (kit1)

50-C59Z00

3000 kN cap.

compression frame for blocks,
cubes up to 200 mm and cylinders
up to dia. 100 x 200 mm. (kit1)

50-C69Z00 50-C79Z00

4000 and 5000 kN cap.

compression frame for blocks,
cubes up to 300 mm and cylinders
up to dia. 160 x 320 mm. (kit2)



SERIES

◆ ASTM C39, AASHTO T22

for cylinders

Ordering information

50-C12Z00

1500 kN cap.

compression frame for cylinders
up to dia., 160x320 mm. (kit2)

50-C22Z00

2000 and 3000 kN cap.

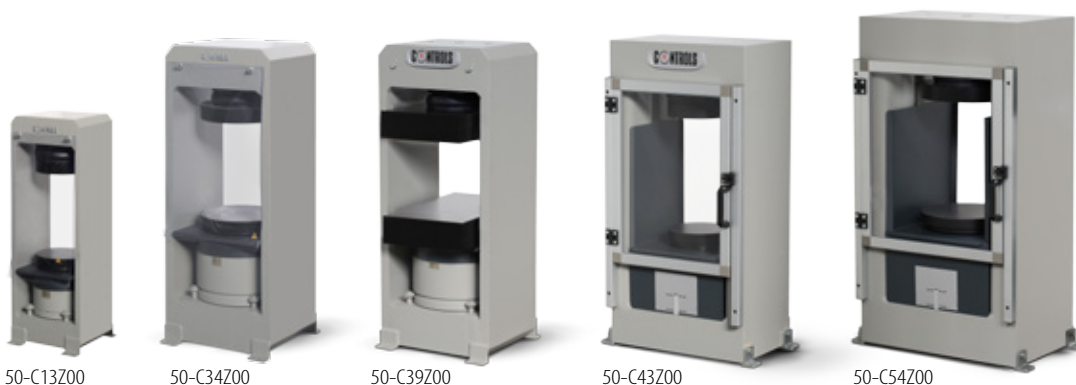
compression frames for cylinders
up to dia., 160x320 mm. (kit2)

50-C32Z00

50-C42Z00 50-C52Z00

2000 and 3000 kN cap.

high stiffness compression frames
for cylinders up to dia. 160x320
mm. (kit2)



SERIES

◆ General Utility Frames

for cylinders,
cubes and blocks

Ordering information

50-C13Z00

1500 kN cap., and

50-C23Z00

2000 kN cap.

compression frames for cylinders
up to dia., 160x320 mm and cubes
up to 150 mm. (kit2)

50-C34Z00

3000 kN cap.

compression frame for cylinders up
to dia., 160x320 mm and cubes up
to 200 mm. (kit2)

50-C29Z00

2000 kN cap.

compression frame for cylinders
up to dia., 100x200 mm cubes up
to 200 mm and blocks. (kit2)

50-C39Z00

3000 kN cap.

compression frame for cylinders
up to dia., 100x200 mm cubes up
to 200 mm and blocks. (kit2)

50-C43Z00

2000 kN cap. high stiffness


compression frame for cylinders
up to dia. 160x320 mm and cubes
up to 150 mm. (kit2)

50-C54Z00

3000 kN cap. high stiffness

compression frame for cylinders
up to dia. 160x320 mm and cubes
up to 200 mm. (kit2)

Technical Specifications

Standard	Frame description
◆ EN 12390-4 for cubes and cylinders	Four-column, high-stiffness welded frames. Spherical seat in lubricated oil enclosure. Tested and certified for stability conforming to EN 12390-4, Clause 4.4 Force transfer. Supplied complete with a connection kit for separate console and pressure transducer. 2000 and 3000 kN frames also include the steel base. Ram travel 50 mm for all models. Traceable certificate of platen surface hardness available on order.
◆ EN 12390-4 Pre-stressed column versions for cubes and cylinders	Four pre-stressed column 3000 kN cap. frames, assuring high stability and tensional uniformity at all levels. The model 50-C86Z00 is supplied with a pressure transducer, and 50-C86Z10 incorporates a high accuracy load cell in the piston and features high precision at low load levels too. Other performances are identical to those of the EN 12390-4 models above.
◆ EN 772-1  for cubes, cylinders and blocks	Four column, high-stiffness welded frame. Supplied complete with connection kit for separate console and pressure transducer. 2000 and 3000 kN frames also include the steel base. Traceable certificate of platen surface hardness available on order.
◆ ASTM C39 ◆ AASHTO T22 For cylinders	The 50-C12Z00, 50-C22Z00 and 50-C32Z00 models feature a standard welded steel construction while models 50-C42Z00 and 50-C52Z00 feature a four-column high-stiffness welded frame. The spherical seat allows free alignment at the initial contact with the specimen and automatic jamming up to the end of test. All frames are supplied complete with connection kit for separate control console, including pressure transducer.
General Utility** for cubes, cylinders and blocks	These frames feature a rigid welded steel construction. Spherical seat allows initial free alignment at the initial contact with the specimen and automatic jamming up to the end of test. Models 50-C43Z00 and 50-C54Z00 feature a four-column high-stiffness structure. The three series differ, essentially, in the compression platen dia.: 216 mm for cubes up to 15 cm and cylinders up to 16x32 cm, 300 mm for cubes up to 20 cm and cylinders up to 16x32 cm, and rectangular 310x510 mm also suitable for block testing. See table Supplied complete with connection kit for separate console and pressure transducer. Traceable certificate of platen surface hardness available on order.

Test and frame accessories: see pages 46

◆ Upon request we can also supply models for testing both blocks to EN 772-1 and cubes/cylinders to EN 12390-4. Contact us for more informations.

*Including steel base

**This series mainly relates to previous European National standards

	Cap. kN	Code...	Platen dim. mm	Max. vert. daylight, mm	Horiz. daylight, mm	For specimen size	Overall dim. mm	Weight approx. kg
	2000	50-C46Z00	dia. 300	350	350	Cubes 10, 15, 20 cm Cylinders up to 16x32 cm	530x310x1500*	740
	3000	50-C56Z00	dia. 300	350	370	"	600x370x1500*	970
	4000	50-C68Z00	305x305 sq.	520	425	Cubes 10, 15, 20, 30 cm Cylinders up to 25x50 cm	705x445x1500	1950
	5000	50-C78Z00	305x305 sq	520	425	"	705x445x1500	1950
	3000	50-C86Z00	dia. 300	350	330	Cubes 10, 15, 20 cm Cylinders up to 16x32 cm	560x380x1400*	1040
	3000	50-C86Z10	dia. 300	350	330	"	560x380x1400*	1150
	2000	50-C49Z00	310x510	260	350	Cubes 10, 15, 20 Cylinders up to 10 x 20 cm Blocks	530x600x1483*	910
	3000	50-C59Z00	310x510	260	370	"	600x600x1464*	1140
	4000	50-C69Z00	310x510	420	425	Cubes 10, 15, 20, 30 cm Cylinders up to 16 x 32 cm Blocks	705x445x1500	2120
	5000	50-C79Z00	310x510	420	425	"	705x445x1500	2120
	1500	50-C12Z00	dia. 165	370	280	Cylinders up to 16x32 cm	330x260x926	300
	2000	50-C22Z00	dia. 165	380	340	"	370x300x977	500
	3000	50-C32Z00	dia. 165	380	370	"	440x340x1070	700
	2000	50-C42Z00 ♦	dia. 165	405	350	"	530x310x1500	740
	3000	50-C52Z00 ♦	dia. 165	405	370	"	600x370x1500	1000
	1500	50-C13Z00	dia. 216	340	280	Cubes 10, 15 cm Cylinders up to 16X32 cm	330x260x926	340
	2000	50-C23Z00	dia. 216	350	340	"	370x300x977	500
	2000	50-C43Z00 ♦	dia. 216	375	350	"	510x410x1023	589
	3000	50-C34Z00	dia. 300	350	370	Cubes 10, 15, 20 cm Cylinders up to 16X32 cm	440x340x990	700
	3000	50-C54Z00 ♦	dia. 300	375	370	"	600x470x1186	981
	2000	50-C29Z00	310x510	260	340	Cubes 10, 15, 20 cm Cylinders up to 10 x 20 cm Blocks	370x600x977	720
	3000	50-C39Z00	310x510	260	370	"	440x600x990	870

♦High stiffness four column welded frames

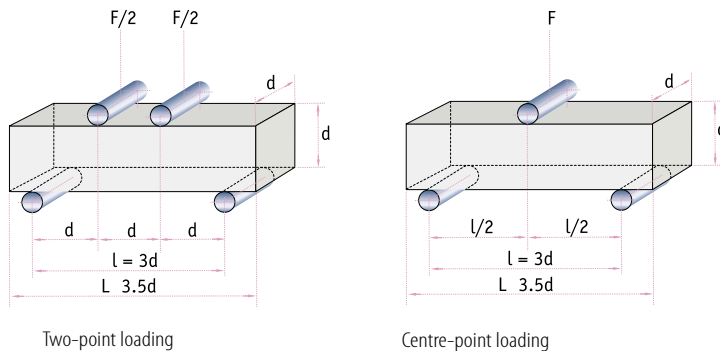
FLEXURAL AND TRANSVERSE TESTING FRAMES

for standard concrete beams / flagstones / kerbs / tiles / fibre-reinforced and sprayed concrete etc. conforming to the relevant **EN** and **ASTM** Standards

Testing standard concrete beams in flexure

EN and ASTM standards prescribe either the two-point or the centre-point methods which are illustrated in the sketch below. The two-point loading method (third-point for ASTM) however, has been taken as the reference method by the EN 12390-5.

Regarding the maximum capacity required for testing standard concrete beams, please consider that there is not a definite correlation between the compression and flexural strength even if a 10 to 1 ratio may be used to identify the appropriate machine and load measuring system.



Note:
All our Flexural frames are fitted or can be fitted with accessories to perform either the two-point or the centre-point loading.

The following flexural and transverse frames are designed for connection to our Power and Control Systems, such as our PILOT and AUTOMAX COMPACT and SMART-Line; AUTOMAX Classic, E-Modulus, MCC and ADVANTEST.

We also propose a 300 kN cap. open structure Flexure frame, C1600 series, particularly suitable for advanced testing on FRC and Shotcrete, which is fully described on pages 66 to 69.

C1400 series

150 kN capacity

UNIVERSAL FLEXURAL TESTING FRAME WITH ADJUSTABLE VERTICAL CLEARANCE

For standard concrete beams, Flagstones, Kerbs, and large specimens in general

◆ **STANDARD** See page 37

50-C0910/FR

100 kN cap.

Flexure frame complete with loading bearers for testing standard concrete beams. Includes: pressure transducer, connection kit for control console and pedestal.

◆ EN 12390-5, ASTM C78, ASTM C293

A simple and practical frame designed for testing standard concrete beams 100x100x400/500 mm and 150x150x600/700 mm.

Technical specifications

See table page 37

C1200 series

100-150 kN capacity

UNIVERSAL FLEXURAL TESTING FRAME

For standard concrete beams, Flagstones, Kerbs, FRC/Shotcrete specimens

◆ **STANDARD** See page 37

This versatile flexural frame has been designed to test either standard concrete beams or other concrete products as the spacious testing area can accommodate large specimens. It is proposed

in two versions: with a pressure transducer, 150 kN cap (model 50-C1200/BFR), and with a load cell, 100kN cap (model 50-C1201/BFR), granting high accuracy for testing low strength specimens and also suitable for testing FRC/Shotcrete concrete specimens. All models are fitted with a piston travel limit switch and connection kit for the control console. Bearers are not included. See accessories, page 37

Technical specifications

See table page 37

This versatile flexural frame has been designed to test either standard concrete beams or other concrete products as the spacious testing area can accommodate large specimens. It is proposed in two versions: with a pressure transducer (Model 50-C1400/FR) and with a load cell (Model 50-C1401/FR) granting high accuracy for testing low strength specimens. Supplied complete with piston travel limit switch and connection kit for the control console. The frames don't include the loading bearers so they must be ordered separately. See accessories, page 37

Technical specifications

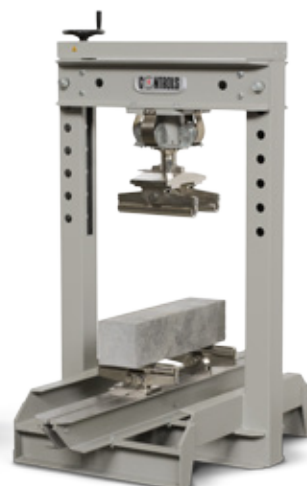
See table page 37



50-C1601/FR



50-C0910/FR



50-C1400/FR with 50-C1400/8



50-C1201/BFR with 50-C1200/8

Ordering information

100 kN cap.

50-C0910/FR

Flexure frame complete with loading bearers for testing standard concrete beams. Includes: pressure transducer, connection kit for control console and pedestal.

50-C1201/BFR

Flexural frame, complete with load cell and connection kit for separate control console. Rollers not included.

150 kN cap.

50-C1200/BFR

Flexural frame, complete with pressure transducer and connection kit for separate control console. Rollers not included.

50-C1401/FR

Flexural frame with adjustable vertical clearance, complete with load cell and connection kit for separate control console. Rollers not included.

50-C1400/FR

Flexural frame with adjustable vertical clearance, complete with pressure transducer and connection kit for separate control console. Rollers not included.

Models 50-	C0910/FR	C1200/BFR	C1201/BFR	C1400/FR	C1401/FR
Max. load cap. kN	100	150	100	150	150
Load sensor	Pressure Transducer	Pressure Transducer	Load cell	Pressure Transducer	Load cell
Horizontal daylight, mm	180	720	720	660	660
Max. vertical daylight, mm with accessories:	160				
50-C1x00/8	-	207	182	483	443
50-C1x00/3 (LP)	-	213	188	405	365
50-C1x00/3 (LR)	-	232	207	510	470
50-C1x00/3 + C1200/4	-	181	156	458	418
50-C1x00/7	235	383	358	600	560
Distance between upper Bearers, mm	150, 100 or single bearer	100, 150, 200 or single roller (adjustable)	100, 150, 200 or single roller (adjustable)	100, 150, 200 or single roller (adjustable)	100, 150, 200 or single roller (adjustable)
Distance between lower rollers, mm	450 or 300	100 to 900	100 to 900	100 to 1200	100 to 1200
Piston travel, mm	75	130	130	110	110
Piston return by	counterweight	counterweight	counterweight	Spring	spring
Overall dimensions, mm (lxwxh)	350x530x665 1343 with base	950x1000x 981	950x1000x981	860x1400x1453	860x1400x1453
Weight approx. kg	105 frame 152 with base	130	130	216	224

*Note: The accessories 50-C1200/3 and 50-C1400/3 include lower bearers and either top loading pad for testing kerbs, or upper central loading roller for testing flagstones. The two different vertical clearances refer to the use of the loading pad (LP) or the use of the loading roller (LR). See accessories descriptions.

ACCESSORIES

Flexural tests on standard concrete beams

◆ **EN 12390-5, ASTM C78, ASTM C293**

50-C1200/8

Roller bearing assembly for flexural frames series 50-C1200-C1201, for centre- and

two-point loading on concrete beams. Bearer dimensions 40 mm dia. x 300 mm. Weight approx.: 37

50-C1400/8

Same as above but for flexural frames series C1400-C1401

Flexural tests on flagstones and kerbs

◆ **EN 1339, EN 1340**

50-C1200/3

Accessory for flexural frames series 50-C1200-C1201, for testing flagstones and kerbs consisting of two loading supports and central loading roller 620 mm long, 40 mm dia., and top loading swivel jointed pad 40 mm dia. Weight approx. 45 kg

50-C1400/3

Same as above but for flexural frames series C1400-C1401

50-C1200/4

Accessory for flexural frames series 50-C1200-C1201, C1400-C1401 to complete the 50-C1200/3 or C1400/3 to perform the third point and centre point flexure test to EN 12390-5, including two rollers 300 mm long, 40 mm dia. (one removable for centre point) and support plate with cylindrical seat, roller span 100, 150 and 200 mm. Lower rollers not included. Weight approx. 23 kg

Compression test on small/low strength specimens

50-C1200/7

Set of platens dia. 165 mm for flexural frame series 50-C1200-C1201 and 50-C0910/FR model. Upper platen spherically seated. Weight: 12 kg approx.

50-C1400/7

Same as above but for flexural frames series C1400-C1401



50-C1200/7



50-C1200/BFR
with 50-C1200/3

Special calibration procedure

50-C0050/CAL

Special calibration procedure to obtain Class 1 from 1% of load full scale. Suitable for frames fitted with load cells only.

50-C0050/CAL5

Special calibration procedure to obtain Class 1 from 5% of load full scale

Product Range

>> We propose a wide range of compression/flexural testers for various applications which includes not only the traditional tests on cement mortars, as for example the Automatic models 15/300 kN cap., series 65-L18XXX, 65-L27XXX and 65-L28XXX shown on page 42, 43, but also the Multipurpose Semi-Automatic and Automatic models, 500/600 kN cap., series 50-C92AXX and 50-C92CXX, which can be used for many other applications as, for example, compression test on low strength concrete, on soil-cement, resins, refractories etc.

WIZARD2

STANDARD	EN 196-1	ASTM C109	ASTM C348	ASTM C349
	EN series	ASTM series		

- > A multipurpose machine ideal for Central laboratories, for testing Cement, Mortars, Resins, Refractory, Lightweight concrete, Soil-cement specimens etc.
- > Large testing space
- > High capacity, ideal for high strength mortars, resins etc.
- > High rigidity solid one piece steel frame
- > Ergonomic design
- > Featuring the best QUALITY/PRICE RATIO

A unique high accuracy tester, suitable for both flexural and compression tests, fitted with high precision load cell, available in Class 1 from 0.5 to 500 kN.



50-C92A12 with pedestal 50-C99/B and printer 50-C10A/PR

50-C92Z10 with pedestal 50-C99/B

50-C92A12

WIZARD2, 500 kN cap., Semi-Automatic Compact-Line high accuracy compression tester.

FRAME

High stiffness welded structure. Spherical seat allows free alignment at the initial contact with the specimen. Compression platens 165 mm dia., surface hardness 55 HRC, flatness tolerance 0.02 mm. Pedestal not include.

See accessories.

Semi-Automatic Power and Control system

See detailed description on next page.

Other PCS options

The tester is also available as frame only (code 50-C92Z10), which can be connected and controlled by PILOT Automatic Power control system, Smart-Line control consoles (see page 8, 9),

and all other stand alone systems as AUTOMAX E, MCC and ADVANTEST.

SAFETY FEATURES

Includes: pressure valve to avoid machine overloading; piston travel limit switch; emergency stop button; front door and rear transparent guard.

MACHINE ACCESSORIES

- Distance pieces to reduce the vertical daylight (see page 46)

50-C99/B

Machine/Frame pedestal

Models	65-C92A12	65-C92Z10 (frame only)
Capacity, kN	500	500
Class 1 range	From 50 to 500 kN	From 50 to 500 kN
Class 1 range with 50-C0050/1 CAL	From 0.5 to 500 kN	From 0.5 to 500 kN**
Platens dia. mm	165x30	165x30
Ram travel, mm	50	50
Max vertical daylight*, mm	260	260
Horizontal daylight, mm	265	265
Overall dimensions, mm (lxdxh)	760x400x1100	450x400x1100
Weight approx. Kg:	270	225

*To be adjusted using the suitable distance pieces.

** When connected to our Power and Control Systems only.

TEST ACCESSORIES

This machine can be equipped with accessories to perform:

- Splitting tensile test
- Compression on cement samples
- Flexural test on concrete beams

For complete description and detail see page 46

UPGRADING OPTIONS

Second frame facility

50-C10B/2F

Two-way valve for WIZARD 2 system to control a second frame.

Graphic printer

50-C10A/PR

Internal serial printer for WIZARD 2 Power and Control Systems

Certified platen hardness

50-C0050/HRD2

Traceable 165 mm dia. platen hardness certificate. Min hardness 55 HRC

Special calibration procedures

50-C0050/CAL

Special calibration procedure to obtain class 1 from 1% of the 500 kN scale

50-C0050/1CAL

Special calibration procedure to obtain class 1 from 0.1% of the 500 kN scale

Ordering information

50-C92A12

500 kN cap., Wizard 2, semi-automatic Compact-Line compression tester, load measurement by high precision load cell. 230 V, 50-60 Hz, 1 ph.

50-C92A14

Same as above but 110 V, 60 Hz, 1 ph

50-C92Z10

500 kN cap., compression frame fitted with high precision load cell for load measurement. Complete with connection kit to control console.

WIZARD2

Semi-Automatic Power and control system

The WIZARD 2 Semi Automatic Power and Control System comprehend the Readout/Digital interface and the Power pump with proportional valve which are connected laterally to the frame.

WIZARD 2 represents the more simple power and control system available on the market, which combines high accuracy and functional capacity.



Technical specifications

- Readout/Digital interface
- Digital readout unit with wide high-contrast display 4x20 characters and 6 keys membrane keyboard
- Real time display of load and stress and applied load rate by symbols for easy adjustment
- Multi-coefficient calibration allowing Class 1 from 1 % of full scale with suitable frame
- LAN port for PC connection and data transmission during test execution
- Possibility of data storage on removable USB pen drive

Power pump

- Dual stage pump: low pressure/high delivery for fast piston approach and high pressure/low volume for loading
- AC motor, 720 W, 50-60 Hz
- Max working pressure 700 bar
- Second frame option by valve selector
- Fitted with special pressure-compensated proportional valve for the manual preset of load rate requiring just occasional operator's intervention.

Hardware

- Two 16 bit analogic channels for load sensors
- Wide alphanumeric display 4x20 characters and 6 keys membrane keyboard
- Sampling rate 50 Hz
- Large storing capacity on USB pen drive of test data downloadable to PC
- Ethernet port for communication with PC
- Integrated printer as optional

Firmware

- Real time display of load and stress and applied load rate by symbols for easy adjustment.
- LAN connection to PC for transmission, in real time, during loading, of load and time values.
- Memory management with display of tests stored in USB pen, download of data to internal printer or PC.
- Multi-coefficient calibration procedure (using a suitable load cell and readout unit).
- Compatible with SW Terminal software allowing real time data processing.
- 3 measurement units: Lbf / Ton / kN.
- Easy firmware update through Ethernet port.

STANDARD EN 196-1 EN 13286-41 EN 933-5 ASTM C109 ASTM C348 ASTM C349

- > Compression and flexural tests on cement to EN 196-1, ASTM C109, C348, C349
- > Compression tests on lightweight concrete and soil-cement specimens to EN 13286-41
- > Compression tests on high strength cement and refractory to EN 933-5



50-C92C22 with pedestal 50-C99/B, printer 50-C10B/PR and accessories

50-C92C02 with pedestal 50-C99/B, printer 50-C10B/PR and accessories

» These Multipurpose compression testers have been designed for various applications in which a limited maximum load is requested, together with a large testing space such as, for instance, compressive strength on lightweight concrete and soil-cement specimens using, if necessary, the suitable accessory. It is also ideal for testing high strength cement specimens and refractory. The large testing space is ideal for performing, with the suitable accessory, splitting tests and flexural tests on concrete specimens. The pedestal is not included and has to be ordered separately. See accessories.

The machines have to be completed by the appropriate accessories depending on the test to be performed. See accessories. They are available in the two different following versions and as frame only for connection to separate control consoles.

50-C92C02, 50-C92C22 series

PILOT,

Automatic Compact-Line testers. 600 and 600/15 kN cap.

50-C92C02, 600 kN cap.

for compression tests on low strength specimens. The Class 1 accuracy can be extended from 1% of testing machine full scale with special calibration: accuracy Class 1 within range 6-600 kN (see code 50-C0050/CAL)

50-C92C22 double station model, 600/15 kN cap.

extends the possible applications to flexural tests on cement and compression tests on low strength specimens. The Class 1 accuracy can be extended from 1% of testing machine full scale with special calibration for 600 kN chamber and 5% for 15 kN chamber: accuracy Class 1 within range 6-600 kN and 0.75-15 kN

50-C92Z00 and 50-C92Z20 frames only.

The above models are also available as frame only, codes, respectively, 50-C92Z00 and 50-C92Z20, for connection to Smart-Line control consoles (see pages 8, 9) and all other stand alone systems as AUTOMAX E, MCC and ADVANTEST

Single testing chamber

Models 50-	C92C02	C92Z00 Frame only
Capacity, kN	600	600
Load measurement sensor	Pressure transducer	Pressure transducer
Class 1 range	From 60 to 600 kN	From 60 to 600 kN
With 50-C0050/CAL and 50-C0050/CAL5	From 6 kN -	From 6 kN -
Platens dia., mm	165 x30	165 x30
Ram travel, mm	50	50
Max vertical daylight*, mm	345	345
Horizontal daylight, mm	265	265
Overall dimensions, mm (lxdxh)	760x400x1100	450x400x1100
Weight approx. Kg:	270	225

Double testing chamber

C92C22	C92Z20 ² Frame only
600/15	600/15
P. transducer/Load cell	P. transducer/Load cell
From 60 to 600 kN and from 1.5 to 15 kN	From 60 to 600 kN and from 1.5 to 15 kN
From 6 to 600 kN and from 0.75 to 15 kN	From 6 to 600 kN and from 0.75 to 15 kN
165 x30	165 x30
50/30	50/30
345/205	345/205
265	265
1010x400x1100	700x400x1100
340	290

*To be adjusted using the suitable distance pieces.

²When connected to AUTOMAX or PILOT Power and Control Systems, the pressure regulator model 65-L1400/X5 must be used. See page 45

FRAME

High stiffness welded structure. Spherical seat allows free alignment at the initial contact with the specimen. Compression platens 165 mm dia., surface hardness 55 HRC, flatness tolerance 0.02 mm. Pedestal not included. See accessories, 50-C99/B

PILOT Automatic Power and Control System

See detailed description on page 10 to 14.

SAFETY FEATURES

Includes: pressure valve to avoid machine overloading; piston travel limit switch; emergency stop button; front door and rear transparent guard.

MACHINE ACCESSORIES

- Distance pieces to reduce the vertical daylight (see page 46)

50-C99/B

Machine/Frame pedestal

TEST ACCESSORIES

This machine can be equipped with accessories to perform:

- Splitting tensile test
- Compression on cement samples
- Flexural test on concrete beams
- For complete description and detail see page 46

UPGRADING OPTIONS

Second frame facility

50-C10C/2F

Two-way valve for PILOT system to control a second frame.

Graphic printer

50-C10B/PR

Internal serial printer for PILOT and AUTOMAX Power and Control Systems

Certified platen hardness

50-C0050/HRD2

Traceable 165 mm dia. platen hardness certificate. Min hardness 55 HRC

Special calibration procedures

50-C0050/CAL

Special calibration procedure to obtain Class 1 from 1% of the 600 kN scale

50-C0050/CAL05

Special calibration procedure to obtain Class 1 from 5% of the 15 kN scale

Ordering information

Single testing chamber models

600 kN cap.

50-C92C02

600 kN cap., PILOT Automatic COMPACT-Line compression tester, load measurement by pressure transducer. 230 V, 50-60 Hz, 1 ph

50-C92C04

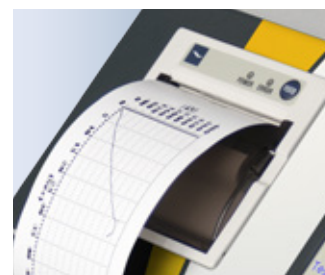
same as above but 110V, 60 Hz, 1ph

50-C92Z00

600 kN cap. Compression frame, fitted with pressure transducer. Complete with connection kit to control console.



50-C92Z00 with pedestal



Detail of graphic printer.



50-C92Z20 with accessories and pedestal

Double testing chambers models

15/600 kN cap.

50-C92C22

15/600 kN cap., PILOT Automatic COMPACT-Line Double Station compression tester, load measurement of the 15 kN station by high precision load cell and 600 kN station by pressure transducer. 230 V, 50-60 Hz, 1 ph

50-C92C24

same as above but 110V, 60 Hz, 1ph

50-C92Z20

15/600 kN cap., Double station compression frame, load measurement of the 15 kN station by high precision load cell and 600 kN station by pressure transducer. Complete with connection kit for control console.

STANDARD

EN 196-1

ASTM C109

ASTM C348

ASTM C349

EN series

ASTM series



65-L27C12 with flexural jig and compression device conforming to EN 196-1



65-L28D12 with Flexural jig 65-L0019/B

» These machines have been designed for testing cement specimens either in compression or in flexure and compression.

They are fitted with the PILOT or AUTOMAX Automatic/Super Automatic Power and Control System which are fully described on pages 10 to 13. The available versions satisfy all EN and ASTM requirements.

Common main features

- > Automatic test cycle with closed loop digital feedback.
- > Dual user interface display and PC
- > Accuracy Class 1 (EN) and Class A (ASTM) starting from 10% of full scale. Special calibration starting from 3 kN for 300 kN chamber and from 0.75 kN for 15 kN available on request. See upgrading options.
- > Compatible with the new, intuitive and smart DATAMANAGER software. See page 15.
- > Soft platen-to specimen contact and smooth load rate control from the very beginning of the ramp.
- > Optional control of a second frame for 65-L18xxx single chamber testers. Active frame selection via valve selector.
- > Optional internal graphic printer including Load-Time plot
- > Universal compression testers, suitable to house various accessories for testing cement, mortar, resins and other materials.

Additional features of the AUTOMAX Super-Automatic System

- > Fully automatic test cycle with closed loop digital feedback. When connected to PC, the system is fully computerized and controlled by the DATAMANAGER Software. See page 15.
- > Double frame control as standard, with optional third frame control. Active frame selection via display/PC.

FRAME

Very rigid four columns frames, fitted with with inbuilt flexural and compression jig conforming to EN (models 65-L28xxx), or round platens suitable for receiving all compression and flexural accessories

UPGRADING OPTIONS

- Second frame facility. See page 13.
- Graphic printer. See page 13.
- Special calibration procedures. See page 45.

Fragment guards

65-L1800/P

Transparent rigid fragment guard for 65-L18xxx testers

65-L2701/P

Same as above for 65-L27xxx testers

65-L2800/P

Same as above for 65-L28xxx testers

MACHINE ACCESSORIES

- Distance pieces to reduce the vertical daylight. See page 46.
- DATAMANAGER Testing software. See page 15.

TEST ACCESSORIES

For compression and flexural devices for cement and mortars. See page 46



65-L18D12

Ordering information

300 kN cap.

65-L18C12

300 kN cap., PILOT automatic compression tester. Load measurement by precision load cell. Round platens 165 mm dia. 230 V, 50–60 Hz, 1 ph.

65-L18C14

Same as above, but 110 V, 60 Hz, 1 ph.

65-L18D12

300 kN cap., AUTOMAX Super- automatic compression tester. Load measurement by precision load cell. Round platens 165 mm, 230 V, 50–60 Hz, 1 ph.

65-L18D14

Same as above, but 110 V, 60 Hz, 1 ph.

15/300 kN cap.

65-L27C12

15/300 kN double chamber PILOT automatic compression tester, inbuilt flexural jig and compression platens for 40x40x160 mm prisms conf. to EN 196-1. Load measurement by precision load cells. 230 V, 50–60 Hz, 1 ph.

65-L27C14

Same as above, but 110 V, 60 Hz, 1 ph.

65-L27D12

15/300 kN double chamber AUTOMAX Super- automatic compression tester, inbuilt flexural jig and compression platens for 40x40x160 mm prisms conf. to EN 196-1. Load measurement by precision load cells. 230 V, 50–60 Hz, 1 ph.

65-L27D14

Same as above, but 110 V, 60 Hz, 1 ph.

65-L28C12

15/300 kN double chamber PILOT automatic compression tester. Load measurement by precision load cells. Round compression platens 165 mm dia. 230 V, 50–60 Hz, 1 ph.

65-L28D12

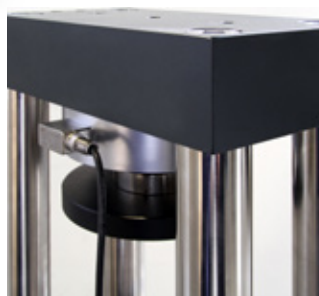
15/300 kN double chamber AUTOMAX Super- automatic compression tester. Round compression platens 165 mm dia. 230 V, 50–60 Hz, 1 ph. Load measurement by precision load cells. Round compression platens 165 mm dia. 230 V, 50–60 Hz, 1 ph.

Models 65-	L18C12 (P) L18D12 (A)	L27C12 (P) L27D12 (A)	L28C12 (P) L28D12 (A)
Max. load kN	300	15/300	15/300
Ram travel mm	50	30/50	30/50
Vert. span, mm	200	-/50	200/200
Horiz. span, mm	220	-/220	-/220
Platen dim. mm	dia. 165	40x40	dia. 165
Flexural jig 40x40x160 mm	-	included	-
Overall dim. mm l x g x h	862x344x964	922x337x964	890x337x964
Weight approx, kg	215	260	266
Class 1 measuring Range from, kN:	30 to 300	1.5 to 15 30 to 300	1.5 to 15 30 to 300
Class 1 measuring range from, kN:*	3 to 300	0.75 to 15 3 to 300	0.75 to 15 3 to 300

(P)= Fitted with PILOT Automatic system

(A)= Fitted with AUTOMAX Super-Automatic system

* Available with the special calibration procedure, code 50-C0050/CAL for the 300 kN load scale and with procedure 50-C0050/CAL5 for the 15 kN load scale. To be specified at time of order.



Detail of the high stiffness 4 columns structure and High precision load cell which fits all single and double station frames.



50-C9030/H EN 196-1 Compression device



50-C9032/H ASTM C109 Compression device for 50 mm (2") cubes



65-L0019/B (EN 196-1), 65-L0019/C (ASTM C109), Flexural devices

STANDARD	EN 12390-4	ASTM E74
	EN series	ASTM series

- > Load measurement by high precision load cell
- > Class 1 (EN) and A (ASTM) accuracy available from 1% of the 300 kN scale and from 5% of the 15 kN scale
- > Robust 4 column frame
- > Piston travel limit switch included
- > Pedestal included
- > Complete with connection kit to control console.



65-L18Z10



65-L28Z10

» Four-column robust frame with single or twin test chamber. All models, single or twin test chambers, are fitted with 165 mm dia. round compression plates and must be completed with the suitable accessories. These models can be supplied, on request, complete with a surface hardness certificate (code 65-L0050/HRD).

CONNECTION TO CONTROL CONSOLES

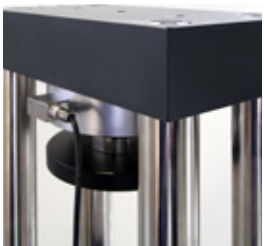
The 15 kN load piston of the twin test chamber model 65-L28Z10 and single chamber model 65-L58Z10, when connected to PILOT and AUTOMAX Power and Control Systems, require the 65-L1400/X5 pressure regulator. However, this is not necessary when connected to MCC and Advantest 9 consoles. See upgrading options. All frames includes pedestal and connection kit for control console.

MACHINE/FRAMES PRECISION CLASS. EN 12390-4, ASTM E74

All frames, when connected to a suitable control console, can be calibrated to Class 1 starting from 10% of load scale as indicated in the specification table. With a special calibration procedure, it is possible to obtain Class 1 starting from 3 to 300 kN. See table.

SAFETY FEATURES

All models are fitted with a ram travel switch and can be completed with the relevant protection. See accessories.



Detail of the high stiffness 4 columns structure and High precision load cell which fits all single and double station frames.

65-L58Z10 with Flexural device 65-L0019/B

Ordering information

300 kN cap.

65-L18Z10

300 kN cap. compression testing frame, fitted with round platens 165 mm dia. and precision load cell for load measurements.

15/300 kN cap.

65-L28Z10

15/300 kN double chamber testing frame, fitted with round platens 165 mm dia. and precision load cells for load measurements.

15 kN cap.

65-L58Z10

15 kN cap. flexural/compression testing frame, fitted with round platens 165 mm dia. and precision load cell for load measurements.

Test accessories

For compression and flexural devices for cement and mortars. See page 46.

Machine accessories

Distance pieces to reduce the vertical daylight. See page 46.

65-L1400/X5

Hydraulic pressure regulator for frames 65-L28Z10 and 65-L58Z10 connected to PILOT and AUTOMAX Power and control systems.

Fragment guards

65-L1800/P

Transparent rigid fragment guard for 65-L18xx testers

65-L2800/P

Same as above for 65-L28xxx testers

65-L0050/P

Fragment guard locking switch. Prevents test execution with the safety guard open.

Certified platens hardness

50-C0050/HRD5

Traceable hardness certificate for platens 40 x 40 mm. Min. hardness 60 HRC.

50-L0050/HRD

Traceable hardness certificate for platens 165 mm dia. Min. hardness 55,5 HRC.

Special calibration procedures

50-C0050/CAL

Special calibration procedure to obtain class 1 from 1% of the 300 kN scale

50-C0050/CAL5

Special calibration procedure to obtain class 1 from 5% of the 15 kN scale

Models 65-	L18Z10**	L28Z10***	L58Z10
Max. Load kN	300	15/300	15
Ram travel, mm	50	30/50	30
Vert. span. mm	200	200	200
Horiz. span. mm	220	220	220
Platen dim. Dia. mm	165	165	165
Overall dim. mm lxdxh	567x405x1621	567x405x1621	567x405x1621
Weight approx, kg	160	240	150
Class 1 measuring range from kN	30 to 300	1.5 to 15 30 to 300	1.5 to 15
Class 1 measuring range from, kN:*	3 to 300	0.75 to 15 3 to 300	0.75 to 15

* Available with the special calibration procedure code 50-C0050/CAL for the 300 kN scale and procedure 50-C0050/CAL5 for the 15 kN load scale

** This model is also available, on request, with increased vertical and horizontal daylight.

*** When connected to AUTOMAX or PILOT PCS, the pressure regulator model 65-L1400/X5 must be used. See accessories.

ACCESSORIES FOR COMPRESSION TESTING MACHINES AND FRAMES

Flexure and Splitting test sets,
Cement compression/flexure devices, Distance pieces

SPLITTING TEST DEVICES

50-C9000/B

Splitting test device for cylinders up to dia. 160x320 mm

◆ EN 12390-6, ASTM C496

Two-column steel frame with self-centering base specimen holder. Weight approx. 28 kg

50-C9002

Hardboard packing strips 4x10x 345 mm to EN. Pack of 50. To be inserted between the specimen and the load beams.

50-C9002/A

Hardboard packing strips 4x15x 345 mm to ASTM. Pack of 50.

50-C9000/A

Splitting test device for cylinders up to dia. 250x500 mm

◆ EN 12390-6

Two column steel frame with self-centering base specimen holder. Weight approx. 28 kg

50-C9001/A

Hardboard packing strips 4x10x 550 mm to EN. Pack of 50.



50-C9070/B

Splitting test device for cubes and concrete block pavers

◆ EN 12390-6, EN 1338

Two column steel frame with self-centering base specimen holder. Vertical daylight adjustable with distance pieces. Weight approx. 28 kg

50-C9002

Hardboard packing strips 4x10x 345 mm to EN. Pack of 50. To be inserted between the specimen and the load beams.



FLEXURE TEST DEVICE FOR CONCRETE BEAMS

50-C9010/B

Flexure device for concrete beams 100x100x400/ 500 mm and 150x150x6900/750 mm.

◆ EN 12390-5, ASTM C78, ASTM C293, AASHTO T97

Total height 370 mm when adjusted for 150 mm beams and 320 mm for 100 mm beams.

The 370 mm vertical daylight can easily be obtained by removing the lower platen of the compression tester. Weight approx.: 33 kg



FLEXURE DEVICES FOR MORTAR PRISMS

65-L0019/B

Flexure device for 40X40X160 mm prisms

◆ EN 196-1

65-L0019/B1

Marking template for centering the mortar prism on the 65-L0019/B EN device.

65-L0019/C

Flexure device for 40X40X160 mm prisms

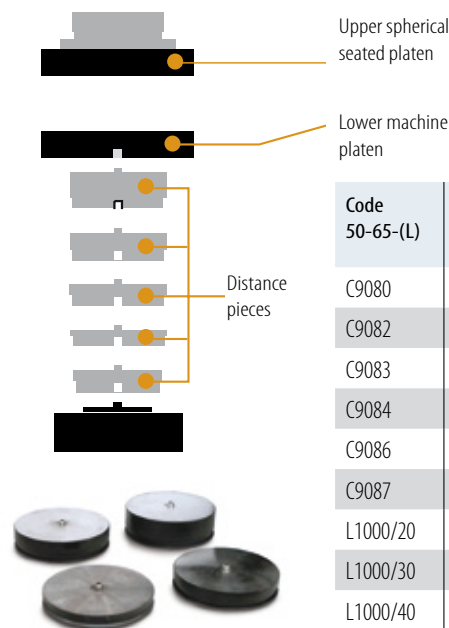
◆ ASTM C348

Both models feature a robust frame fitted with an upper and a lower tilting bearers. The distance between the two lower bearers is 100 mm for the EN and 119 mm for the ASTM versions.

Total height 188 mm
-Weight approx.. 8 kg

DISTANCE PIECES TO ADJUST THE VERTICAL DAYLIGHT

Made of steel. Used to reduce the vertical daylight of the compression machine depending on the size of the specimen and considering that, in general, the maximum piston travel is 50 mm.



Code 50-65-(L)	Dimensions Dia.xh mm	Weight approx. kg
C9080	200x30	7.3
C9082	200x50	12.3
C9083	200x68	16.7
C9084	96x158	9
C9086	200x100	25
C9087	96x130	7
L1000/20	165x20	3.5
L1000/30	165x30	5.5
L1000/40	165x40	7
L1000/68	165x68	11,1

COMPRESSION DEVICES FOR MORTAR SPECIMENS

50-C9030/H

Compression device to test portions of 40x40x160 mm prisms broken in flexure to EN 196-1

◆ EN 196-1

50-C9032/H

Compression device to test 50 mm (2") cubes to ASTM C109

◆ ASTM C109

Both models feature a robust frame with an upper platen with a spherical seat that moves vertically, sustained by a spring. The 50-C9030/H model is fitted with a platen for portions of 40x40x160 cement beams, while the 50-C9032/H model is fitted with round platens 75 mm dia. Vertical daylight 53 mm.

Weight approx.: 8 kg



50-C9030/H



50-C9032/H



65-L0019/B, 65-L0019/C

Distance pieces required for specimen size:

Machine and frames Series 50-	Vertical daylight approx. mm	*Cylinders 4"x8" and Ø 100x200mm		*Cylinders 6"x12", Ø 150x300 and 160x320 mm		Cube 100 mm		Cube 150 mm		Cube 200 mm		Cube 300 mm		Blocks up to 300x500x200 mm (WxDxH)
		Q.ty	code	Q.ty	code	Q.ty	code	Q.ty	code	Q.ty	code	Q.ty	code	Q.ty code
C12xxx	370	1x	C9084	1x	L1000/40	1x	C9084							-
				1x	L1000/20	2x	L1000/40	-		-		-		-
						1x	L1000/20							-
C13xxx	340	2x	C9083	1x	C9080	2x	C9082	1x	C9082	-		-		-
						2x	C9083	2x	C9083					-
C22xxx	380	1x	C9084	1x	L1000/40	1x	C9084							-
		1x	L1000/20	1x	L1000/30	2x	L1000/40	-		-		-		-
						1x	L1000/30							-
C23xxx	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	-		-		-
						2x	C9083	2x	C9083					-
C29xxx (block platens)	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	1x	C9080	2x C9083
						2x	C9083	2x	C9083					-
C32xxx	380	1x	C9084	1x	L1000/40	1x	C9084							-
		1x	L1000/20	1x	L1000/30	2x	L1000/40	-		-		-		-
						1x	L1000/30							-
C34xxx	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	1x	C9082	-		-
						2x	C9083	2x	C9083	1x	C9083			-
C39xxx (block platens)	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	1x	C9080	2x C9083
						2x	C9083	2x	C9083					-
C42xxx	405	1x	C9084	3x	L1000/30	1x	C9084							-
		1x	L1000/30			3x	L1000/30	-		-		-		-
						1x	L1000/40							-
C43xxx	375	1x	C9080	1x	C9083	1x	C9080	1x	C9080					-
		2x	C9083			2x	C9083	2x	C9083	-		-		-
						2x	C9082	1x	C9082					-
C46xxx	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	-		-
						2x	C9083	2x	C9083					-
C49xxx (block platens)	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	1x	C9080	2x C9083
						2x	C9083	2x	C9083					-
C52xxx	405	1x	C9084	3x	L1000/30	1x	C9084							-
		1x	L1000/30			3x	L1000/30	-		-		-		-
						1x	L1000/40							-
C54xxx	375	1x	C9080	1x	C9083	1x	C9080	1x	C9080	1x	C9080	-		-
		2x	C9083			2x	C9083	2x	C9083	2x	C9083			-
						2x	C9082	1x	C9082					-
C56xxx	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	-		-
						2x	C9083	2x	C9083					-
C59xxx (block platens)	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	1x	C9080	2x C9083
						2x	C9083	2x	C9083					-
C69xxx (block platens)	520	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x C9083
		2x	C9086	1x	C9086	3x	C9086	3x	C9086	2x	C9086	1x	C9086	2x C9086
		1x	C9082	1x	C9082	1x	C9082			1x	C9082	1x	C9082	1x C9082
C68xxx	520	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	-
		2x	C9086	1x	C9086	3x	C9086	3x	C9086	2x	C9086	1x	C9086	-
		1x	C9082	1x	C9082	1x	C9082			1x	C9082	1x	C9082	-
C79xxx (block platens)	520	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x C9083
		2x	C9086	1x	C9086	3x	C9086	3x	C9086	2x	C9086	1x	C9086	2x C9086
		1x	C9082	1x	C9082	1x	C9082			1x	C9082	1x	C9082	1x C9082
C78xxx	520	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	1x	C9083	-
		2x	C9086	1x	C9086	3x	C9086	3x	C9086	2x	C9086	1x	C9086	-
		1x	C9082	1x	C9082	1x	C9082			1x	C9082	1x	C9082	-
C86xxx	350	2x	C9083	1x	C9080	2x	C9082	1x	C9082	2x	C9083	-		-
						2x	C9083	2x	C9083					-

*The distance pieces here above listed refer to cylinders tested without capping devices.

AUTOMATIC TESTING SYSTEMS

The wide range of Control Systems that we propose, may cause, sometimes, doubts in the selection of the appropriate model. For this reason, in order to steer our client into the best solution for the requested application, we summarize, hereunder, the main tests on building materials.

Compression and flexural tests

One of the most important test parameter is the loading rate which, is common knowledge, shall be smooth and precisely controlled conforming to Standard requirement, independently on oil pressure or non-linear response of the specimen.

This performance is assured, at different level of sophistication, by all our AUTOMATIC TESTING SYSTEMS: AUTOMAX Smart-Line and E-Modulus, MCC Classic and Multitest, ADVANTEST



Determination of Modulus of Elasticity

An important test determination is the elastic deformability of concrete and mortar under loading before first cracking, known as ELASTIC MODULUS: longitudinal (Young's modulus) and transverse (Poisson's modulus).

International Standards prescribe the specimen to be submitted to a sequence of loading and unloading cycles under controlled load rate. The testing system shall control the oil flow with precise increments and decrements and measure longitudinal and transverse deformation.

This test can be performed, at different level of sophistication, by AUTOMAX E-Modulus, MCC Classic, MCC Multitest and ADVANTEST.



Tests under displacement and strain control (e.g. FRC/Shotcrete applications)

The above tests are mainly performed to determine the ductility of special construction materials which are used for their superior capacity of deformation after first cracking. This applies, in particular, to the following materials:

- > **FRC, Fiber Reinforced Concrete** > **SHOTCRETE for tunneling**
- > **Structural specimens reinforced with membranes or similar**

The above tests are performed in two phases (or steps):

Hardening:

Load applied to the specimen is gradually increased in order to produce a constant rate of deformation (for example the deflection rate of a beam) up to the peak load value and first cracking.

Softening:

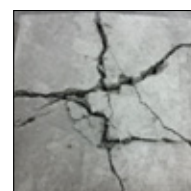
Load applied to the specimen is gradually decreased in order to maintain the same rate of deformation of the Hardening phase. The test is completed when the load bearing capacity of the specimen becomes zero.

The typical test result is the area below the Stress-Strain diagram. The higher is the value of this area, the higher is the deformation capacity of the tested material.

The testing system must have very fast reaction time and extremely accurate oil flow regulation, if not, at the end of the Hardening phase, facing the typical instability of the following stages, it is possible to loose the control of the test producing an early specimen failure and loosing the result (Stress-Strain diagram is partially lost and substandard area is not measurable).

The above tests can be performed by MCC Multitest and ADVANTEST.

The capacity of the above systems to fulfill perfectly the stringent requirements requested for deformation/strain controlled tests has been obtained after years of research and cooperation with the academic world and are outlined by the vast international references.



Selection guide

AUTOMATIC TESTING SYSTEMS



AUTOMAX Smart-Line ☐

AUTOMAX E-MODULUS ☐☐

The oil flow, and consequently the load rate, is controlled by a double stage hydraulic pump, specifically designed and optimized for construction material testing, powered by a variable speed DC motor with closed loop digital feedback and customized PID algorithm.

For the AUTOMAX E-Modulus version, the oil flow control is integrated by a Flow-Sharing device to allow loading and unloading cycles. Compatible with both small capacity frames (for cement and mortar specimens) and high capacity frames for concrete, high strength concrete, blocks and cores.

This technology, already in use in our machines by more than 10 years and continuously improved, combines high performances with the latest Energy Saving efficiency.

AUTOMAX represents the ideal solution to automatically perform with the required accuracy and superior productivity, the standard compression and flexural tests. AUTOMAX E-Modulus can also perform the determination of Modulus of Elasticity

MCC CLASSIC ☐☐

MCC MULTITEST ☐☐☒

Oil flow control is obtained by a double stage hydraulic pump powered by an AC motor combined with a Servo-controlled Proportional valve with closed loop digital feedback and customized PID algorithm.

This sophisticated technology permits:

- Extremely accurate oil flow regulation controlling precisely even minor flow variation (positive and negative).
- Very fast reaction time, fundamental for those tests in which the behaviour of the specimen is fragile and requires immediate system feedback.
- Wide oil flow range making the system compatible with different tests, materials and testing frames

MCC Classic and MCC Multitest represent the ideal solution to perform, with high accuracy, compression and flexural tests, determination of modulus of elasticity and deformation/strain controlled tests (MCC Multitest only)

ADVANTEST ☐☐☒

The advanced technology based on the Servo-controlled Proportional valve, featured by MCC, in this system is further extended: oil flow control and reaction time are nearly doubled and the total flexibility permits the system to perform ramp sequences, low frequency dynamic tests and user defined displacement/deformation tests.

ADVANTEST covers all the application of MCC and also represents the ideal solution for central laboratories and research centers, to perform all tests and non standard determinations.

Power and Control Consoles

» The testing world of the Construction Industry is continuously evolving. New building materials and new Standards require testing systems that are not only capable of performing the usual compression and flexural tests, but also more sophisticated determinations such as the Modulus of Elasticity and deformability/ductility tests under load/stress and displacement /strain control. Universal testing systems that are suitable for multiple applications on various materials are already available on the market but these are very expensive and not user friendly. From our inception, CONTROLS have been dedicated to the Construction Industry, following the evolution of testing step-by-step in order to produce advanced and automatic testing systems specifically designed for building materials. One of our major tasks has been to support our clients as a genuine partner in terms of providing advice on technical matters and on the suitability of their investment, taking potential future testing requirements into consideration. In accordance with the commitments mentioned above, CONTROLS propose series of control consoles based on DC motor - Flow sharing technology (AUTOMAX) and other series based on servo-controlled proportional valve technology (MCC and ADVANTEST).

AUTOMAX

- **AUTOMAX** Smart-Line
- **AUTOMAX** E-Modulus

AUTOMAX Smart-Line is the perfect solution for those clients interested basically in standard failure tests (e.g. compression, flexure, indirect tensile tests). AUTOMAX E-Modulus, in addition, allows Elastic Modulus and Poisson's ratio determination.

It is also available an expandable version of Smart-Line Control Console suitable to be upgraded in order to perform Elastic Modulus tests, should the need arise after the initial purchase (see code 50-C10D52 at page 53).

MCC Series

- **MCC** Classic
- **MCC** Multitest

MCC Classic performs standard compression, flexural and splitting tests, and the determination of Modulus of Elasticity. In addition, MCC Multitest also performs tests under load, displacement and strain control for fibre reinforced concrete and Shotcrete testing.

MCC Classic can be easily and economically upgraded to the Multitest version with suitable upgrading kit, should the need arise after the initial purchase. See page 61.

ADVANTEST

ADVANTEST is the most advanced and complete system performing general purpose test under load/stress, displacement and strain control with superior performances. See page 63



Smart-Line

E-Modulus



MCC Series



ADVANTEST

AUTOMAX series Smart-Line/ E-MODULUS

The AUTOMAX series of Power and Control system comprises two different versions:

AUTOMAX Smart-Line

Powers and controls up to two (expandable up to three) different frames (e.g. compression on concrete, flexure on concrete and compression on cement) to automatically perform compression, flexural and splitting tests on concrete and cement specimens conforming to EN and ASTM Standards. See detailed description on page 52.

AUTOMAX E-Modulus

Powers and controls up to two (expandable up to four) different frames to automatically perform the same tests as the AUTOMAX Smart-Line version plus the automatic determination of the Elastic Modulus applying Flow-Sharing technology with loading and unloading cycles.

The technologically advanced features of the unit will be described further.

See pages 54 to 57.

Expandability of performance

The AUTOMAX Smart-Line control console is also available in an expandable version (code 50-C10D52) to fulfill multi-step investment programs. This version, designed for standard failure tests, when upgraded with upgrading kit 50-C10D52/EM becomes also suitable for Elastic Modulus and Poisson's ratio determination.

With this expandability option, all our clients can select a system that will cover their possible future testing requirements without the risk of having to purchase a complete new system.

CViTECH
CUSTOMER'S VALUE
DRIVES
THE INNOVATION

- > Precise and accurate load control of testing frames from 15 to 5000 kN
- > DC motor ES-Energy Saving technology
- > Flow-Sharing technology for Expandable and E-Modulus versions

☐ Compression and flexural tests

☐ Compression and flexural tests
☐ Determination of modulus of elasticity



AUTOMAX Smart-Line

» AUTOMAX Smart-Line satisfies the requirements for an accurate and constant automatic load rate application conforming to Standards. The test cycle with closed-loop digital feedback is automatically performed by pressing the start button.

All the technical features of AUTOMAX Smart-Line Power and Control System are fully described on pages 10 to 14. When connected to the testing frame(s), the system has the following features:

☐ Compression and flexural tests

- > Test cycle with closed-loop digital feedback is automatically performed by pressing the start button
- > PC-control option. When connected to a PC, the system is fully computerized and controlled by the DATAMANAGER software (optional)
- > Dual user-interface via display and PC
- > Adopts the latest ES Energy Saving technology for reduction of power consumption
- > Silent operation
- > Double-stage hydraulic pump with rapid approach and precise oil flow
- > control allows high throughput of accurate tests (up to 40 per hour)
- > Soft platen-to-specimen contact and smooth load rate control from the very beginning of the ramp
- > Double frame control with optional control of a third frame
- > Active frame selection via display/software
- > Optional internal graphic printer including load/time plot
- > Connects to laboratory network via LAN port/DATAMANAGER



CVI TECH
CUSTOMER'S VALUE
DRIVES
THE INNOVATION

50-C10D02

Ordering information

50-C10D02

AUTOMAX stand-alone Power and Control Console for the (not simultaneous) control of up to two testing frames (expandable to three). Automatic selection of active frame. 230 V, 50-60 Hz, 1 ph. Overall dimensions: 1292 x 350 x 450 mm Weight approx.: 80 kg

50-C10D04

Same as above, but 110 V, 60 Hz, 1 ph

Upgrading options

Third frame connection

AUTOMAX System, which control two frames, can be upgraded with a hydraulic valve for controlling (not simultaneously) a third frame. This option is identified by the following code:

50-C10D/3F

Hydraulic valve for AUTOMAX System to control a third frame. This item must be factory installed.

Graphic printer

The display/control panel of AUTOMAX and PILOT can incorporate a Graphic printer. This option is identified by the following code:

50-C10B/PR

Graphic printer for AUTOMAX and PILOT. This item must be factory installed.

Specifications:

Silent printing, high speed (50 mm/sec), high resolution (203 dpi=8 dots/mm), prints data and graphs, 57.5mm paper width.

Testing frames and test accessories

The connectable testing frames and test accessories are fully described and shown on page:

- Compression testing frames, page 32
- Flexural testing frames, page 36
- Cement compression and flexural frames, page 38
- Test accessories, page 46

AUTOMAX Smart-Line 50-C10D02 controlling an ASTM 2000 kN compression frame 50-C42Z00 and a flexural frame 100 kN cap. 50-C1201/BFR



AUTOMAX Smart-Line is designed to perform compression, flexure and indirect tensile tests conforming to EN and ASTM Standards.

For enhanced test data and management, the system can be connected to the DATAMANAGER PC Software (82-SW/DM), including realtime management of the whole system and print-out/saving of customizable test reports in single or batch files. For more detailed information see page 15.

AUTOMAX Smart-Line, EXPANDABLE VERSION

Ordering information

50-C10D52

AUTOMAX Smart-Line, Expandable version, stand-alone Power and Control Console, for the (not simultaneous) control of up to two (expandable to three) testing frames, performing all tests of the 50-C10D02 standard model.
230 V, 50-60 Hz, 1 ph.
Overall dimensions: 1292 x 350 x 450 mm
Weight approx.: 80 kg

50-C10D54

Same as above but 110 V, 60 Hz, 1 ph.

Upgrading Kit

This expandable version, upgraded with the 50-C10D52/EM, can also perform the Modulus of Elasticity exactly in the same way of the the AUTOMAX E-Modulus 50-C20E82 described on pages 54 and 55.

We suggest this version in anticipation of future needs to perform, with a limited cost, also the determination of the Modulus of Elasticity by simply adding the 50-C10D52/EM option.

50-C10D52/EM

Upgrading Kit to perform the Modulus of Elasticity, consisting of control box, PC, DATAMANAGER software 82-SW/DM (see page 15) and E-MODULE Software (see page 55).

230 V, 50-60 Hz, 1 ph.

50-C10D54/EM

Same as above but 110 V, 60 Hz, 1 ph.

☐ Compression and flexural tests

☐ Determination of modulus of elasticity

Upgrading kit comprehends:



PC



Control box, to replace the one fitted on the console



Software: DATAMANAGER and E-Module

Upgrading Options

Third and fourth frame connection

50-C10D/3F

Hydraulic valve for AUTOMAX system, to control a third frame. This item must be factory installed.

The AUTOMAX Smart-Line Expandable version, when upgraded with the suitable kit, can control (not simultaneously) a fourth frame

50-C20E/4F

Hydraulic valve for AUTOMAX system, to control a fourth frame.



50-C10D/3F and 50-C20E/4F hydraulic valves for connection and control of four frames

Accessories

50-C20Z00

PC cabinet
Dimensions: 500x650x1350 mm (l x p x h)
Weight approx.: 46 kg
PC and printer not included



50-C10D52 upgraded with 50-C10D52/EM



PC cabinet

AUTOMAX E-MODULUS

» The AUTOMAX E-Modulus is concerned essentially with the automatic compression, flexural and splitting tests on concrete and cement (when connected to suitable testing frames, see pages 32 to 39) and determinations of Elastic Modulus and Poisson's ratio. Essentially the system consists of an ergonomic power and control console which houses the power unit and the PC. The other main features are as follows:

- ☐ Compression and flexural tests
- ☐ Determination of modulus of elasticity

- > Test cycle with closed-loop digital feedback is automatically performed by pressing the start button
- > Double-stage hydraulic pump with rapid approach and precise oil flow control allows high throughput of accurate tests (up to 40 per hour)
- > Flow-Sharing technology for automatic execution of loading and unloading cycles
- > Adopts the latest ES Energy Saving technology for reduction of power consumption and silent operation
- > Soft platen-to-specimen contact and smooth load rate control from the very beginning of the ramp
- > Double frame control expandable to up to four, with active frame selection via software
- > Complete with PC and DATAMANAGER testing software for EN and ASTM Standards relating to compression, flexural, splitting tests, etc.
- > Software for determination of Modulus of Elasticity and Poisson's ratio
- > Connects to laboratory network via LAN port/software



50-C20E82

TECHNICAL SPECIFICATIONS

HYDRAULICS

- Dual-stage pump: centrifugal low pressure for fast approach and automatic switching to radial multi-piston high pressure for loading
- DC motor, 720 W, 50-60 Hz
- Maximum working pressure 700 bar
- Third and fourth frame option, active frame selection by software
- Flow-Sharing technology to perform loading and unloading cycles
- ES Energy Saving technology to reduce power consumption
- Silent operation

HARDWARE

- 132,000 points effective resolution
- Closed-loop P.I.D. control
- 4 channels for load sensors (pressure transducers/load cells)
- 6 channels for strain/displacement transducers (potentiometers, magnetostrictive, LVDTs)
- 4 channels for strain gauges
- Memorization of the calibration curve enables sensors to be connected and used immediately
- Digital linearization of the calibration curve (multi-coefficient)

USER-INTERFACE

- The System is fully controlled by the PC



50-C20E82
AUTOMAX E-Modulus controlling a EN Compression frame with three electronic Compressometer-Extensometers fitted to a cylindrical specimen.

Determination of modulus of elasticity

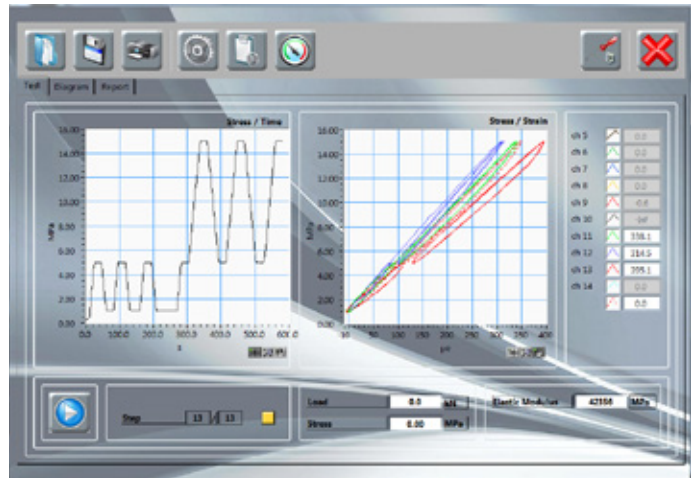
(Longitudinal: Young's Modulus-Transverse: Poisson's Modulus)

The specimen has to be submitted to a sequence of loading and unloading cycles under controlled load rate. The testing system shall control the oil flow with precise increments and decrements and measure longitudinal and transverse deformation.



For the AUTOMAX E-Modulus version, the oil flow control is integrated by a Flow-Sharing device to allow loading and unloading cycles. Compatible with both small capacity frames (for cement and mortar specimens) and high capacity frames for concrete, high strength concrete, blocks and cores.

This technology, already in use in our machines by more than 10 years and continuously improved, combines high performances with the latest Energy Saving efficiency.



E-MODULE software: Elastic Modulus test performed according to pr-EN 12390-13 (Procedure A)

PC and SOFTWARE

- > Remote control of the complete system (Console and Frame) for automatic test execution: rapid platen approach, zeroing, application of user-defined cycles of load/unload ramps, identification of the failure load, verification of conformity to the selected Standard, calculation of results, graphical and numerical management of results
- > DATAMANAGER software for compression, flexural, splitting tests to EN and ASTM standards (see page 15)
- > E-MODULE software for determination of young Modulus and Poisson's ratio allowing:
 - User-defined test cycles and step-programmable sequences
 - Real-time display of stress/time, stress/axial strain and stress/lateral strain diagrams
 - Automatic verification of sample centering and sensor functioning, as per standards requirements
 - Real- and/or deferred-time management of test results, either in graphical or table format
 - Remote selection of test frame
 - Memorization of single or batched test results
- Printing and backing-up in MS Excel® format of user-defined test reports for single or batched tests
- > Multi-language software, customizable with local languages
- > Automatic load measurement verification procedure via software by connecting our digital tester (model 82-P0801/E or 82-P0804/E) with a strain gauged calibration cell to the PC allowing automatic data acquisition and print-out of traceable calibration certificates.
- > Remote technical assistance/diagnostics via internet

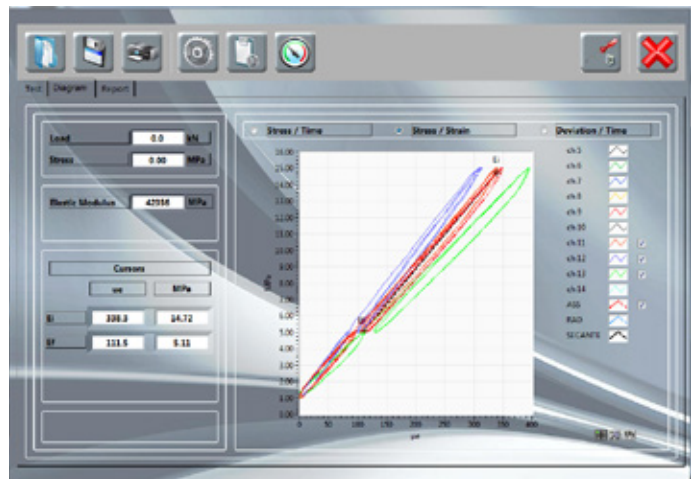
Ordering information

50-C20E82

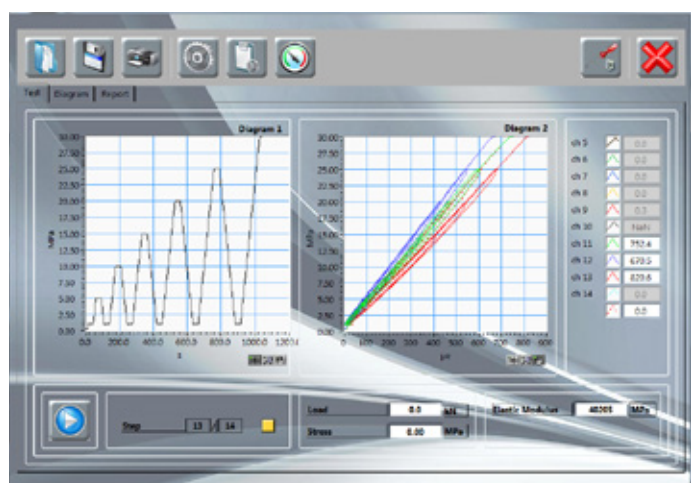
AUTOMAX E-Modulus stand alone power and control console, for the (non simultaneous) control of up to two testing frames (expandable to four).
230 V, 50-60 Hz, 1 ph
Overall dimensions (w x d x h): 500 x 650 x 1354 mm.
Weight approx.: Kg. 102

50-C20E84

Same as above but 110V, 60 Hz, 1 ph



E-MODULE software: detail of stress/strain graph showing measurements of each transducer and average readings (dashed red line)



E-MODULE software: Elastic Modulus test performed according to customized sequence of steps to fulfill any test procedure

AUTOMAX E-MODULUS

Upgrading Options

Third and fourth frame connection

The AUTOMAX E-Modulus which can control two different frames can be upgraded for controlling, not simultaneously a third and a fourth frame, adding, respectively the following valve system:

50-C10D/3F

Hydraulic valve for AUTOMAX System for connection and control of a third frame.

50-C20E/4F

Hydraulic valve for AUTOMAX System for connection and control of a fourth frame

These options shall be installed in factory or by authorized engineers technicians.



50-C20E82 fitted with 50-C10D/3F and 50-C20E/4F hydraulic valves for connection and control of a third and fourth frame



Accessories for the determination of the Modulus of Elasticity and Poisson's Ratio

◆ **EN 12390-13, EN 13412, EN 13286-43, ASTM C469, ISO 6784, DIN 1048, BS 1888:121, UNI 6556**

Elastic Modulus can be measured on different types of specimens and materials: concrete cores, cylinders and prisms, cement prisms, etc.

Accessories for Elastic Modulus determination are fully described on page 65.



Detail of electronics positioned in the sliding drawer of Automax E-Modulus Console



Concrete cylinder fitted with three Compressometer-extensometers 50-C0222/F



Concrete specimen fitted with Strain Gauges



Cement prism fitted with three Compressometer-extensometers 50-C0222/F

Testing frames

Connectable testing frames with relevant accessories are fully described and shown on pages 32 to 39.



50-C20E82 AUTOMAX E-Modulus
controlling a 2000 kN EN compression
frame 50-C46Z00



50-C20E82 AUTOMAX E-Modulus
controlling a 2000 kN
ASTM compression frame
50-C42Z00 and a 100 kN flexure
frame 50-C1201/BFR with accessory.

50-C20E82 AUTOMAX E-Modulus
controlling a 2000 kN EN
compression frame 50-C46Z00,
a 100 kN flexure frame
50-C1201/BFR with accessory
and a 300 kN cement
compression frame 65-L17Z10



MCC CLASSIC | MCC MULTITEST

» MCC Classic and MCC Multitest feature an advanced servo-hydraulic system for static and low-frequency dynamic test on building materials. Connected to the appropriate testing frame and fitted with the relevant accessories perform:

- Compression, flexure and splitting tests on concrete, cement, mortar, etc.
- Cyclic tests for determination of Secant Elastic Modulus (Young) and Poisson's ratio

MCC Multitest also performs tests under displacement and strain control for testing:

- Ductility and fracture energy of Fibre-Reinforced Concrete (FRC) and concrete lined with polymers (FRP)
- Toughness of sprayed concrete (Shotcrete) under concentrated load

Conforming to the modularity and expandability of our systems, MCC Classic can be subsequently easily and economically converted, as specified on page 61 to perform test under displacement and strain control same as MCC Multitest.

- > **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 to 5000 kN**
- > **MCC Classic can be upgraded to MCC Multitest with the suitable upgrading kit presented at page 61**

- ☐ Compression and flexural tests
- ☐ Determination of modulus of elasticity
- ☒ Tests under displacement and strain control



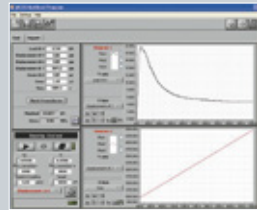
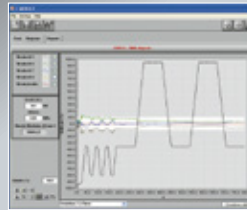
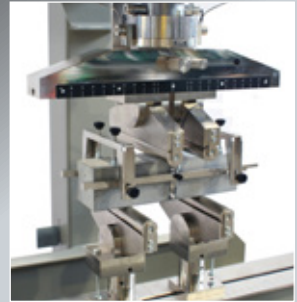
50-C8422/CP (or 50-C8422/MP)
with 82-D2999 PC cabinet.
Printer not included

Main features

- > Completely automatic execution of:
 - Compression, flexure and indirect tensile tests.
 - Determination of Secant Elastic Modulus
 - Tests on Fibre-Reinforced Concrete (FRC-FRP) and Shotcrete (MCC Multitest only)
- > High flexibility: connect up to four different frames from 15 to 5000 kN capacity
- > Accuracy and reliability for advanced electronics, efficient closed-loop control, high effective resolution, optimized P.I.D. algorithms
- > In addition to the four channels for connecting the test frames, an extra four channels are provided for connecting displacement transducers and strain gauges. Both models can acquire data measured by the sensors connected to the extra channels. With MCC Multitest one of these can be chosen as active channel, used by the console as feedback to control test execution.
- > Interactive user friendly software for:
 - Remote control
 - User-defined test procedures under load/specific load control (both models) and displacement/strain control (MCC Multitest only)
 - Monitoring and display of test data and parameters either in graphical or numerical format
 - File management for tests, specifications, clients etc.
 - Printing of standard or customized test reports both for single and multiple tests
- > Multi-language software with the facility to introduce user-defined text (Latin alphabet)

Applications

The various main applications are summarized on pages 64 to 67



Ordering information

50-C8422/CP

MCC Classic, stand-alone closed-loop Control Console for up to two test frames expandable to four. Includes software for compression, flexure and indirect tensile tests and Elastic Modulus determination. PC included. 220 V, 50 Hz, 1 ph.

50-C8423/CP

Same as above but 220 V, 60 Hz, 1 Ph

50-C8424/CP

Same as above but 110 V, 60 Hz, 1 Ph

50-C8422/MP

MCC Multitest, stand-alone closed-loop Control Console for up to two test frames expandable to four. Includes software for compression, flexure and indirect tensile tests, Elastic Modulus determination and displacement control testing facility. PC included. 220 V, 50 Hz, 1 ph.

50-C8423/MP

Same as above but 220 V, 60 Hz, 1 ph

50-C8424/MP

Same as above but 110 V, 60 Hz, 1 ph

Tests under displacement and strain control

As explained on page 48, to perform the above tests with the relevant stringent requirements related to the two testing phases (Hardening and Softening), the testing system must have very fast reaction time and extremely accurate oil flow regulation, if not, at the end of the Hardening phase, facing the typical instability of the following stages, it is possible to loose the control of the test and correct results (Stress-Strain diagram is partially lost and substandard area is not measurable).

The capacity of MCC Multitest and ADVANTEST to fulfill perfectly the stringent requirements requested for deformation/strain controlled tests has been obtained after years of research and cooperation with the academic world and are outlined by the vast international references.

Complete testing system controlled by the MCC Classic or Multitest, consisting of 4 frames: compression on concrete, compression and flexure on cement and flexure on concrete.

This configuration requires the upgrading of the system with two additional hydraulic ports 50-C7022/UP2. Printer not included



TECHNICAL SPECIFICATIONS

HYDRAULICS

- Maximum working pressure 700 bar
- Maximum oil delivery: 2 litres/min at low pressure; 0.7 litres/min at high pressure
- Two hydraulic valves for connection of two test frames, extendable to four (see upgrading options)
- Oil flow control via servo-controlled proportional valve
- Oil cooling system with forced ventilation
- Remote selection of the active frame

HARDWARE and FIRMWARE

Maximum resolution: 1/524,000 divisions

- 8 input channels:
 - 4 for load sensors (load cells or pressure transducers)
 - 4 for displacement transducers (potentiometric, LVDT amplified, magnetostrictive) and deformation transducers (strain gauge)
- 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
- Test execution with control of:
 - Load/specific load
 - Displacement (MCC Multitest only)
 - Strain (MCC Multitest only)
- Diagnostic system to detect possible malfunctions including oil level and dirty oil filter
- 320x240 pixel display
- Storage of multiple calibration curves enables various sensors to be connected and used immediately

PC and SOFTWARE

- Remote control of the system
- Graphical and numerical management of data, including the overlaying of various curves on the same axis (e.g. three different deformation curves on a single time axis)
- Printing of test reports
- Language selection: English, French, Spanish and Italian, plus another language which can be added by the user (Latin alphabet only)
- Printer not included

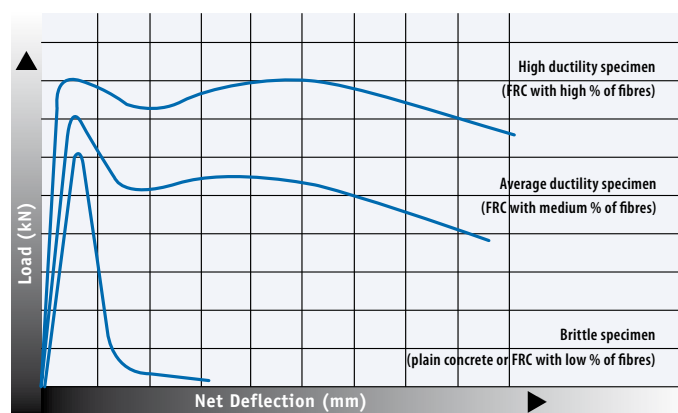


PHYSICAL Specifications

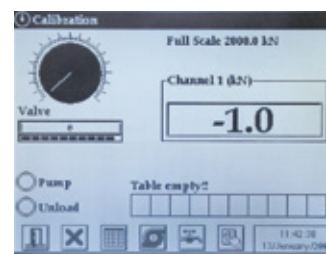
Power rating: 750 W

Dimensions (lxwxh): 470x410x1000 mm

Weight approx.:
120 kg, excluding PC



Detail of rear panel of MCC series



Calibration menu



Detail of MCC display used basically for calibration purpose

Expandability of performance

As specified, the MCC Classic can be subsequently easily and economically converted to MCC Multitest to perform test under load/stress, displacement and strain control by installing the following conversion set including hardware, firmware and software. This conversion, shall be executed by authorized technicians.

50-C8422/CM

Upgrading kit for MCC Classic to MCC Multitest, to perform tests under load/stress and displacement/strain control, including hardware, firmware and software.

Upgrading options

Third and fourth frame connection

50-C7022/UP1

Upgrading the MCC Classic and Multitest Control Consoles to control a third frame.

50-C7022/UP2

Upgrading the MCC Classic and Multitest Control Consoles to control a third and fourth frame.

Accessories

86-D2999

PC cabinet

230 V, 50 Hz, 1 ph

Overall dimensions (wxdxh):

500x550x915mm

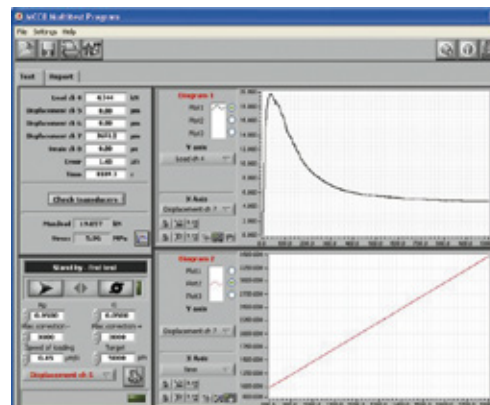
Weight approx.: 55 kg



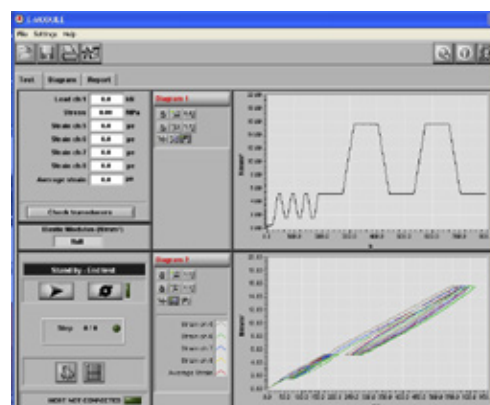
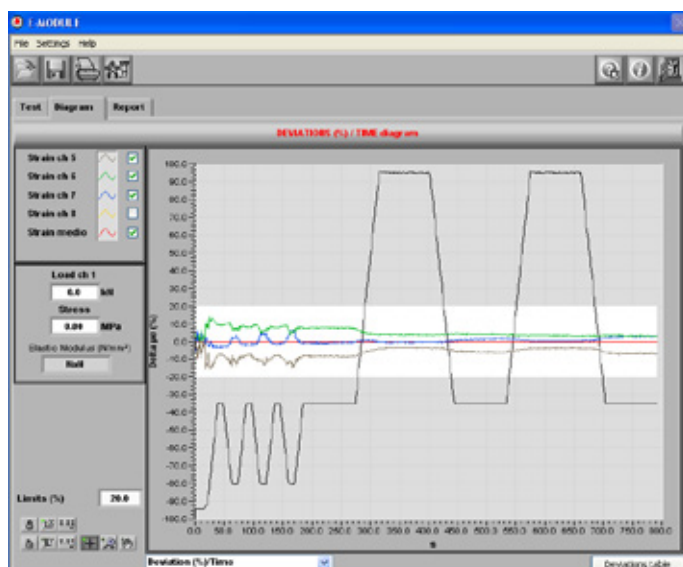
PC cabinet,
PC and printer not included



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



Results of flexure test on a fiber reinforced concrete beam performed under deflection rate control



Main screen of the software dedicated to Elastic Modulus determination

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

MCC CLASSIC | MCC MULTITEST

Testing Frames

As specified, the MCC Power and Control Consoles can be connected to up to four different frames (not for simultaneously use).

All these frames are described on pages 32 to 39

Compression frames

- ASTM C39, AASHTO T22 Compression frames
- EN 12390-4, EN 772-1 Compression frames
- General Utility compression frames

See pages 32 to 35

Compression-flexure cement testing frames

See pages 38 to 39

Flexural frames

- Universal flexural frame, 100-150 kN capacity
- Universal flexural frames 150 kN capacity, with adjustable vertical clearance
See pages 36 to 37
- Universal, open structure flexural frame, 300 kN capacity
See pages 66 to 69

**Accessories for the determination of the Modulus of Elasticity**

- Compressometer-Extensometer for Elastic Modulus determination.
- Strain gauges.
See page 65

Accessories for testing FRC/ Shotcrete concrete

- Measurement of beam deflection and toughness.
- Displacement transducer for crack opening measurement.
- Energy absorption tests on slabs.
See pages 66 to 67

**Optimization and simplification**

MCC and ADVANTEST are the outcome of more than 10 years of research, resulting in high performance and high-flexibility system suitable for many applications, together with optimization and simplification of major components

The power system can easily be lifted out of the console for ordinary maintenance and verification



Rear view of the MCC Power and Control Consoles. The four hydraulic ports for connection of test frames are visible (the MCC has two ports, extendable to four)

ADVANTEST

» The advanced technology based on the double stage hydraulic pump powered by AC motor combined with servo-controlled proportional valve with closed loop digital feedback, featured by MCC, in this system is further extended:

The oil flow control and reaction time are nearly doubled (compared to MCC models) and the total flexibility permits the system to perform ramp sequences, low frequency test cycles and user defined displacement/deformation tests.

- > **Unique advanced technology controlling load, displacement and strain rate**
- > **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)
 - Real time variation of settings, including the control method (load, displacement or strain), active channel used as feedback variable, load/displacement/strain rate, target valve
- > **Completely automatic execution of:**
 - Compression, flexural and indirect tensile tests
 - Determination of Secant Elastic Modulus
 - Tests on Fibre-Reinforced Concrete (FRC-FRP) and Shotcrete
- > **Rock testing version available for automatic Uniaxial and "Stress-Path" Triaxial testing on rock cores**



50-C9842 with
82-D2999 PC cabinet



ADVANTEST, Configuration for
Uniaxial and Triaxial tests on rock cores.

ADVANTEST represents the ideal solution for central laboratories and research centers to perform all tests and non standard determinations.

- ☐ Compression and flexural tests
- ☐ Determination of modulus of elasticity
- ☒ Tests under displacement and strain control

MAIN APPLICATIONS and TEST ACCESSORIES All above Systems, connected to the appropriate frame and accessory, can perform the following tests:

Compression and Flexural tests

◆ EN 12390-4, EN 196, ASTM C39, ASTM C109, ASTM C348, AASHTO T22

Compression tests on concrete and cement

◆ EN 1338, EN 12390-6, ASTM C496

Splitting tensile tests on concrete



Our automatic testing systems can be connected to all our concrete and cement testing frames. See pages 32 to 35 and 38 to 39.



50-C9030/H



50-C9032/H



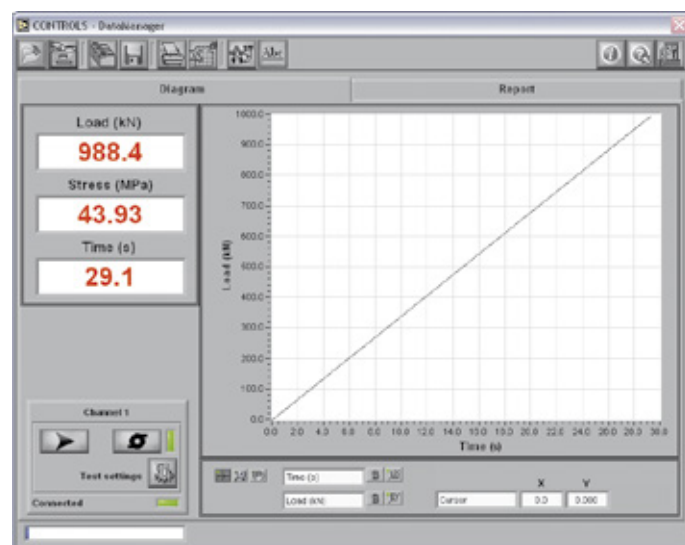
65-L0019/B, 65-L0019/C



The accessory fits all our compression frames. Two versions are available: one for prism and paving blocks and one for cylinders. See page 46



Compression and flexure devices for cement testing. See page 46



Main screen-shot of software supplied with MCC and ADVANTEST for standard failure tests.

◆ EN 1339, EN 1340, EN 12390-5, ASTM C78, ASTM C293, AASHTO T97

Flexural tests on concrete beams, kerbs and flagstone.



See our flexural frames. See page 36 to 37

Determinations of Modulus of Elasticity

◆ pr EN 12390-13, EN 13412, EN 13286-43, ASTM C469, ISO 6784, DIN 1048, BS 1888:121, UNI 6556

This test can be automatically performed with AUTOMAX E-Modulus, MCC Classic and Multitest or ADVANTEST Control Console, connected to suitable compression frame by using two different type of sensors measuring the sample strain:

- > Electronic universal compressometer-extensometer 55-C0222/F
- > Strain gauges

Electronic compressometer-extensometer

General description and specifications

Aluminium and steel structure incorporating high-precision inductive transducer. Three units are generally recommended for precise axial deformation measurement.

Inductive transducer:

- Sensitivity: 0.02 micron
- Feed: up to 10V
- Travel: ± 1.5 mm
- Gauge length: adjustable from 50 to 160 mm
- Minimum axial dimension: 150 mm
- Full-travel mechanical stop to prevent damage



Three compressometer-extensometers (55-C0222/F) fitted to a cylindrical specimen during compression stage.



Three compressometer-extensometers (55-C0222/F) fitted to a cement prism 40x40x160mm



Three compressometer-extensometers (55-C0222/F) fitted to a cylindrical specimen (150mm diameter x 300mm high) ready for elastic modulus test.

Ordering information

55-C0222/F

Electronic universal compressometer-extensometer for cylinders and prisms. Supplied with adapter for small specimens, template for correct mounting and elastic bands holding the devices onto the specimen.

Strain gauges

As an alternative to the Compressometer-Extensometers (55-C0222/F), strain gauges provide a very accurate electrical signal, directly proportional to the strain of a loaded specimen.

They can be applied to the specimen surface using a special adhesive-catalyst agent and other accessories, which are included with 82-P0399/B Strain gauge application kit.

Up to four $\frac{1}{4}$ bridge strain gauges,

can be directly connected to AUTOMAX E-Modulus, MCC Multitest and ADVANTEST Consoles using the interface 82-P0398.



82-P0399/B

Code 82-	P0390	P0391	P0392	P0393
Grid width, mm	4.53	3	2	1
Gauge length, mm	9.53	20	30	60
Resistance, ohm	120	120	120	120
Bridge	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
N° of gauges per package	10	10	10	10



Determination of Elastic Modulus using surface-mounted Strain gauges



82-P0398

Accessories

82-P0399/1

Connecting terminals, 50-pair sheet

82-P0398

Compensation device for up to 4 Wheatstone bridges with $\frac{1}{4}$ or $\frac{1}{2}$ bridge setup

82-P0399/B

Strain gauge application kit including: conditioner, neutralizer, acetone, two tweezers, adhesive with catalyst agent, 100 m of bipolar cable, solder, soldering iron and carrying case.

Ordering information

82-P0390

Strain gauge, 9.53 mm gauge length ($\frac{1}{4}$ bridge). Pack of 10

82-P0391

Strain gauge, 20 mm gauge length ($\frac{1}{4}$ bridge). Pack of 10

82-P0392

Strain gauge, 30 mm gauge length ($\frac{1}{4}$ bridge). Pack of 10

82-P0393

Strain gauge, 60 mm gauge length ($\frac{1}{4}$ bridge). Pack of 10

Tests under displacement and strain control

As specified, these tests are performed particularly on Fibre-Reinforced Concrete (FRC-FRP) and Shotcrete. MCC Multitest or ADVANTEST Power and Control Consoles are required to perform this type of test, controlling a suitable flexural frame. We offer the following model, 50-C1601/FR, which features high-rigidity and superior performance. However, the same tests can be performed with our frame 50-C1201/BFR described on page 36 and 37.

50-C1601/FR

Universal, open structure flexural frame, 300 kN capacity

The 50-C1601/FR flexural frame has been designed to satisfy the stringent requirements prescribed by the Standards relating to determination of deformability and ductility index of sprayed concrete and fibre-reinforced concrete. The 'C-shaped' open structure of the frame allows easy and practical front-loading but, once the specimen is in position, the structure is closed with hydraulically-clamped rod assuring high rigidity.

Fitted with a high-precision strain gauge load cell for accurate and reliable test results, the frame must be connected to a suitable control console and used with appropriate testing accessories, depending on type of test.

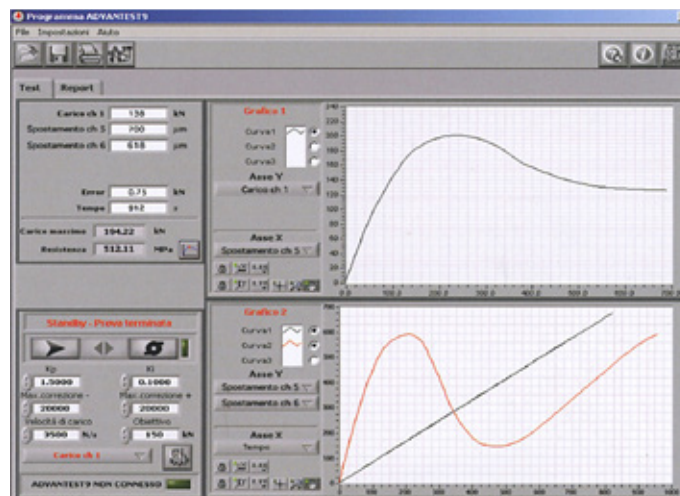
Main features

- Universal flexural frame, 300 kN capacity
- C-shaped open structure for easy specimen loading; closed for testing with hydraulically-clamped vertical rod
- Load measurement by high-precision load cell
- Large testing space houses a wide range of accessories for conventional tests and tests under displacement and strain control.

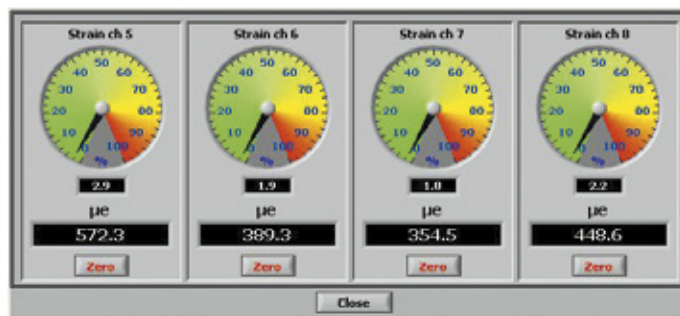
Technical specifications

- Maximum capacity: 300 kN
- Load sensor: load cell
- Maximum vertical clearance without accessories: 546 mm
- Horizontal clearance (between uprights): 900 mm
- Minimum/maximum distance between lower bearers: 80 to 1500 mm
- Minimum/maximum distance between upper bearers: 80 to 500 mm
- Overall dimensions (lxwxh): 1700x1266x1512 mm
- Weight approx.: 605 kg

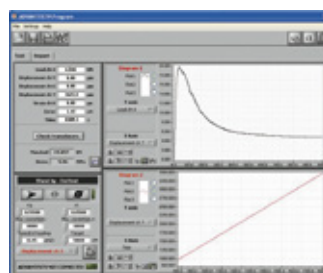
50-C1601/FR with accessory.
The vertical rod, hydraulically clamped in testing position, provides high rigidity and stability.



Main screen shot of software used for strain/displacement controlled tests.



Virtual gauges indicating the actual reading of the sensor in percentage respect the full scale. It's an excellent tool for transducers positioning.



Results of flexure test on a fiber reinforced concrete beam performed under deflection rate control

Tests under displacement and strain control

The following tests requires that the frame is controlled with our consoles MCC Multitest and ADVANTEST.

Important note: to perform all tests on FRC-FRP concrete and Shotcrete, we recommend that the 50-C1601/FR frame is fitted with:

50-C1601/9

Linear transducer, 100 mm travel, for measuring the piston displacement.

◆ ASTM C1550 Flexural toughness of FRC concrete

50-C1601/7

Lower support frame and upper loading element for slabs 800 mm diameter, 75 mm thick.

Weight approx.: 59 kg

50-C1601/8

Displacement transducer, 50 mm travel, for measuring the deformation of the slab centre under concentrated load.



800 mm dia.

50-C1601/FR Flexural frame fitted with the accessories to perform the test.

◆ EN 14488-5 and UNI 10834 Energy absorption of sprayed concrete

Test accessories for the 50-C1601/FR frame:

50-C1601/6

Supportive square base and upper loading element for testing 600x600x100 mm sprayed concrete slabs.

Weight approx.: 78 kg

50-C1601/8

Displacement transducer, 50 mm travel, for measuring the deformation of the slab centre under concentrated load.

Test accessories for the 50-C1201/BFR frame:

50-C1200/6

Supportive square base and upper loading element for testing 600x600x100 mm sprayed concrete slabs.

Weight approx.: 78 kg

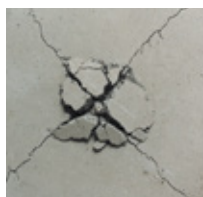
82-P0331/D1

High-precision displacement transducer, 50 mm travel

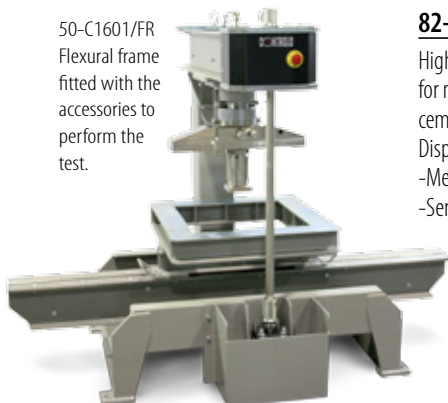
82-D1260

Magnetic transducer holder

50-C1601/FR Flexural frame fitted with the accessories to perform the test.



Typical failure under concentrated load



◆ EN 14651 Measurement of crack opening (CTOD-CMOD)

Test accessories for the 50-C1601/FR frame:

50-C1601/1B

Upper and lower roller assembly for centre and two-point tests on concrete beams. Bearers 30 mm diameter x 300 mm long. Weight approx 52 Kg.

50-C1601/KIT

Set of four distance pieces and two base plates for adjusting the vertical clearance. Weight approx.: 10 Kg.

Test accessory for the 50-C1201/BFR frame:

50-C1200/8B

Upper and lower roller assembly for centre- and two-point tests on concrete beams. Bearers 30 mm diameter x 300 mm long. Weight approx. 45 Kg.



High precision transducer, 82-P0331/E



First Crack CMOD test

Common accessory:

82-P0331/E

High-precision displacement transducer for measuring Crack Tip Opening Displacement (CTOD) and Crack Mouth Opening Displacement (CMOD).

-Measuring capacity: 5 (3 to 8) mm

-Sensitivity: 1000x10⁻⁶ strain/mm

◆ EN 14488-3, ASTM C1609, ASTM C1018 Beam deflection and toughness of FRC/Shotcrete

Test accessories for the 50-C1601/FR frame:

50-C1601/1B

Set of two supports and two loading rollers, 30mm diameter x 300 mm long.

50-C1601/KIT

Set of four distance pieces and two base plates to adjust the vertical clearance.

Test accessories for the 50-C1201/BFR frame:

50-C1200/8B

Set of 2 supports and 2 loading rollers dia. 30x300 mm.

Common accessories:

50-C1200/5

Auxiliary testing frame for measuring the deflection of beams 100x100x400/500 and 150x150x500/600 mm.

82-P0331/C

High-accuracy displacement transducer, 10 mm travel (n.2 pieces req.)

82-P0331/2

Electric mean device for displacement transducer 82-P0331/C.



82-P0331/2



Detail of the auxiliary frame and specimen



50-C1601/FR fitted with the accessories to perform the test

50-C1601/FR**UNIVERSAL, OPEN STRUCTURE FLEXURAL FRAME, 300 kN cap.**

Test Accessories for automatically performing standard flexural tests under load control

The 50-C1601/FR Universal frame can perform (when fitted with the proper accessory and connected to any of our control consoles) all flexural tests under load/stress control. As already specified, the open structure design and high load capacity facilitate the positioning of large and heavy specimens and permit other applications. The various test accessories and relevant standards are detailed below.

Main features

- > High load capacity
- > High accuracy strain gage load cell
- > C-shaped open structure for loading specimen and high stiffness closed structure during the test
- > Wide range of accessories for conventional and advanced tests on various building materials.

Technical specifications

- Max. Load: 300 kN
- Load sensor: strain gage load cell
- Max. vertical daylight without accessories: 546 mm
- Horizontal daylight between uprights: 900 mm
- Distance between accessory upper rollers: adjustable from 80 to 500 mm
- Distance between accessory lower rollers: adjustable from 80 to 1500 mm
- Piston travel: 110 mm

◆ **EN 12390-5, ASTM C78, ASTM C293**

Flexural tests on standard concrete beams

50-C1601/1B

Upper and lower assembly for centre and two-point loading tests on concrete beams.

- Bearers 30 mm diameter, 300 mm long
- Weight approx.: 52 kg

50-C1601/KIT

Set of four distance pieces and two base plates for adjusting the vertical clearance. Note: the remaining vertical clearance of the frame with the above accessory can be adjusted from 263 to 132 mm.

◆ **EN 1339**

Flexural strength of paving slabs

50-C1601/2

Set of one upper and two lower roller assemblies for testing paving flags.
-Bearers 40 mm diameter, 620 mm long
-Weight approx.: 66 kg

50-C1601/KIT

Set of four distance pieces and two base plates for adjusting the vertical clearance. Note: the remaining vertical clearance of the frame with the above accessory can be adjusted from 263 to 132 mm.



50-C1601/FR frame fitted with 50-C1601/1B assembly and 50-C1601/KIT



50-C1601/FR frame fitted with 50-C1601/2 assembly and 50-C1601/KIT

Compression tests on small/low strength specimens

The 50-C1601/FR Universal frame, 300 kN capacity, can also be profitably used, when equipped with the accessories described below, for compression tests on small/low strength specimens by placing the specimen directly on the 165 mm dia. platens, for splitting tests on concrete in conjunction with the accessory 50-C9070 or for cement testing with the suitable compression device (see page 46).

50-C1601/4

Set of spherically seated upper platen and lower platen, 165 mm diameter, for compression tests.

-Weight approx.: 19 kg

50-C1601/KIT

Set of four distance pieces and two base plates for adjusting the vertical clearance. Note: the remaining vertical clearance of the frame with the above accessories can be adjusted from 352 mm to 100 mm.



50-C9030/H



50-C9032/H



50-C1601/FR frame fitted with 50-C1601/4 assembly and 50-C1601/KIT



50-C9000/B



50-C9070/B

EN 1340

Flexural strength of kerbs

50-C1601/3

Swivel-jointed loading pad for testing kerbs. To be used with the 50-C1601/2 assembly and 50-C1601/KIT described above, removing the upper bearer and replacing it with the loading pad.

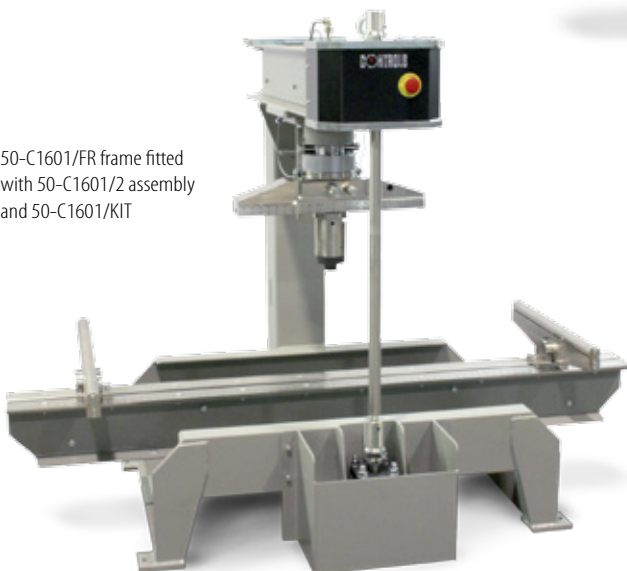
-Weight approx.: 5 kg

Note: the remaining vertical clearance of the frame with the above accessories can be adjusted from 221 to 90 mm.



Frame opening for easy and practical front loading

50-C1601/FR frame fitted with 50-C1601/2 assembly and 50-C1601/KIT



Specimen positioning

We propose a complete range of verification and calibration apparatus conforming to EN and ASTM Standards.

The EN 12390-4 concerning specifications for compression testing machines, describes procedures for **Verification of force transfer**, including:

- > Accuracy of force indication
- > Self-alignment of upper machine plate
- > Restraint of movement of the upper plate

These verifications can be performed using the 82-E0105/1 strain gauged cell connected to the 82-P0804/E tester. The data can be processed automatically on a PC with the testing software.

The verification may be limited to the Accuracy of force indication using the appropriate load cell (82-E0100/L5 to 82-E0100/500)

with a suitable tester such as our model 82-P0804/E. A detailed description of these items follows.

The ASTM C39 concerning Compressive Strength of Cylindrical Concrete Specimens states that the Force Verification of Testing Machines must conform to ASTM E4, which specifies procedures for **Use of Elastic calibration devices (load cells) over their Class A (ASTM E74)**

This verification can be performed using the appropriate load cell (82-E0100/L5 to 82-E0100/500) with a suitable tester such as our model 82-P0801/E. A detailed description of these items follows.

VERIFICATION OF FORCE TRANSFER

◆ EN 12390-4

Can be performed with the following equipment:

Strain gauge load cell

General description

The device consists of a 3000 kN capacity strain gauged column, 100mm diameter x 200mm high, with hardness and tolerances conforming to Standard. The column is gauged with temperature-compensated electrical resistance strain gauges. Four complete bridges are applied, each centered at one of the ends of a pair of orthogonal diameters half-way up the cylinder. Each bridge consists of two elements measuring axial strain and two measuring circumferential strain.

The column is supplied complete with auxiliary platen and spacers

for easy and precise placing of the column either centrally or 6 mm displaced from the centre.

It must be used with a dedicated strain measuring apparatus such as, for example, our model 82-P0804/E.

The column can also be used as a standard load cell to test the accuracy of force indication.

Specifications

- Non linearity and hysteresis: $\pm 0.1\%$ FS
- Repeatability: 0.03%
- Uncertainty: 0.05%
- Dimensions: 100 mm diameter x 200 mm height
- Weight approx.: 17.5 kg

Ordering information

82-E0105/1

Strain gauged column/load cell, 3000 kN capacity



82-P0804/E with 82-E0105/1 Strain gauged column and 82-P0172/M 24 column printer. The strain gauged column is supplied complete with auxiliary platen and spacers for an easy and precise placing of the column either centrally or 6 mm displaced from the centre. It can also be used as a 3000 kN load cell for force verification.



82-E0105/1. Strain gauged column. Carrying case included.

Digital tester for Force Transfer verification

General description

This tester, when connected to the 82-E0105/1 column and to a PC and printer using the specific



Force Transfer verification certificate. The complete document includes another 3 certificates for upper plate self-alignment, alignment and restraint of movement.

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Centro di Taratura LAT N° 092
Calibration Centre
Laboratorio Accreditato di
Taratura

ACCREDIA
Membro degli Accordi di Mutual Recognition
EA, JAF & ILAC
Laboratory of EA, JAF and ILAC
Mutual Recognition Agreements

LAT N° 092
Pagina 3 di 6
Page 3 of 6

CERTIFICATO DI TARATURA N° :
Certificate of calibration No :

VERIFICA DELLA STABILITA' IN FASE DI CARICO
STABILITY TEST VERIFICATION

Verificata con - Verified with	Scale Ranges	Certificato n° Certificate no.	Validità Validity	Matricola Serial no.
Flessionmetro - Strain Gauge	0 + 2000 kN	N°1, 2012000245-1	2014/11/05	E1105/02

Verificata secondo - Conform to : PT 01 rev. 03
(ref. EN 12390 - 4 : 2002)

RISULTATI DI STABILITA' - STABILITY RESULT

	Fronte Front	Retro Back	Sinistra Left	Destra Right	Limiti Limit
Media rapporto di carico - Mean strain ratio	-0.02	0.00	-0.02	0.03	± 0.10
Max diff. rapporto di carico - Max change in ratio	0.01	0.02	0.08	0.07	0.10

	Fronte / Retro Front - Back	Sinistra / Destra Left / Right	Limiti Limit
Diff. rapp. di carico - Diff. strain ratio /mm 200kN	0.04	0.05	0.06
Diff. rapp. di carico - Diff. strain ratio /mm 2MN	0.05	0.04	0.04

software 82-P0804/E1 and 82-P0804/E2, provides completely automatic data acquisition, processing and printing of the verification test certificates concerning either the accuracy of force indication or the force transfer verifications. Whilst operating, acquired data are displayed on the graphic screen and then downloaded via the serial port to the PC and printer. The system can also connected a 24-column serial printer (e.g. our model 82-P0172/M) or download the test results for further processing using programs developed by the user.

Supplied complete with carrying case that can also contain the 82-P0172/M printer.

Specifications

- Four channels
- Effective resolution:
1/128,000 used with 82-E0105/1 strain gauged column
1/256,000 used with load cells
- Large permanent memory to store data and test results
- Graphic display 240x128 pixel
- Bridge impedance: 350 ohm
- Dimensions: 250x220x150 mm
- Weight approx.: 2 kg

Ordering information

82-P0804/E

Force transfer digital tester. 230 V, 50-60 Hz, 1 ph.

82-P0804/E2

Same as above but 110 V, 60 Hz, 1 ph.

Accessories

82-P0804/E1

Testing software for the automatic data acquisition and processing of the plate self-alignment and restraint of movement verification (stability) of compression testers.

82-P0804/E2

Testing software for the automatic data acquisition and processing of force measurements for calibration of compression testers.

82-P0172/M

24-column serial printer. 110-230 V, 50-60 Hz, 1 ph.

82-P0172/1

Serial cable for connection of 82-P0172/M printer

82-Q0800/3

RS 232 serial cable and RS 232 to USB adapter

82-P0804/E3

Force transfer verification MS Excel spreadsheet

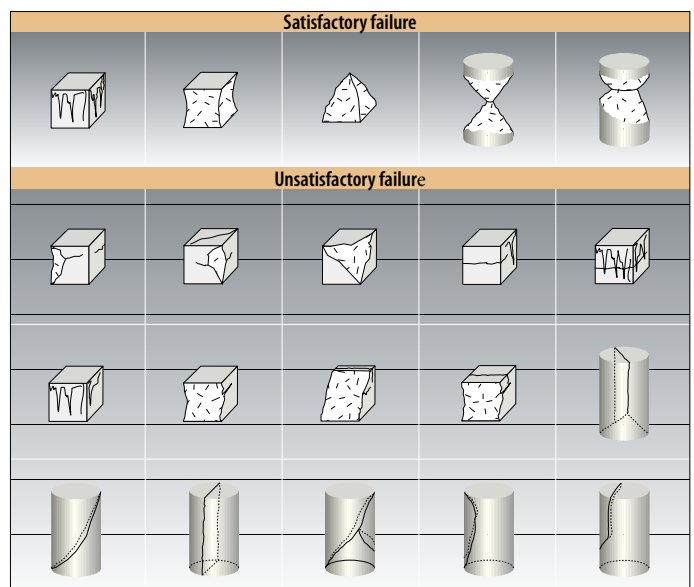
82-P0804/E4

Force calibration verification MS Excel spreadsheet

IMPORTANCE OF THE VERIFICATION OF FORCE TRANSFER

The result of a compression test on a cube or cylinder specimen is affected to a considerable extent by a non-uniform application of load on the surface of the sample – this results in an exceptional force being applied to the material causing premature failure. For this reason the calibration certificate for the force measurement instrument mounted on the machine does not guarantee the

accuracy of the strength result. Usually a non-uniform application of load leads to unsatisfactory failures, as shown below, which cannot be related to a known loss of strength. EN 12390-4 includes a testing procedure which verifies the self-alignment of machine components and the restraint on movement of the upper platen using a special strain gauged column (e.g. 82-E0105/1) connected to a suitable data acquisition and processing system (e.g. 82-P0804/E).



FORCE VERIFICATION AND CALIBRATION APPARATUS

◆ EN 12390-4, EN ISO 376, ASTM C39, ASTM E4

The procedures detailed in these Standards can be performed with the following equipment:

- > Load cell. To be selected according to the maximum capacity of the compression and/or flexural tester. See models 82-E0100/L5 to 82-E0100/500.
- > Digital tester for force verification. See model 82-P0801/E with optional accessories.

Load cells

General description

These high performance cells have been specially designed to meet the stringent requirements of EN, ISO and ASTM standards for calibration of compression testing machines. The cells must be connected to a suitable Digital tester such as the Digimax Plus (82-P0801/E).

Load cells connected to the Digi-

tal tester can be supplied complete with an official or traceable calibration certificate.

Specifications

- Accuracy: Class 1 EN ISO 376
- Linearity: $\leq \pm 0.05\%$ F.S.
- Hysteresis: $\leq \pm 0.05\%$ F.S.
- Repeatability: 0°, 120°, 240°: $\leq \pm 0.145\%$ F.S.
- Reversibility: $\leq \pm 0.240\%$ F.S.
- Zero: $\leq \pm 0.030\%$ F.S.
- Zero balance: $\leq \pm 1\%$ F.S.
- Supply voltage: 10 V
- Material: stainless steel
- Connector type: MIL-C-5015 7 poles male

Ordering information

82-E0100/L5

Load cell, 5 kN capacity, complete with carrying case.

82-E0100/L25

Load cell, 25 kN cap., complete with carrying case.

82-E0100/5

Load cell, 50 kN capacity, complete with carrying case.

82-E0100/10

Load cell, 100 kN capacity, complete with carrying case.

82-E0100/30

Load cell, 300 kN capacity, complete with carrying case.

82-E0100/60

Load cell, 600 kN capacity, complete with carrying case.

82-E0100/100

Load cell, 1000 kN capacity, complete with carrying case.

82-E0100/200

Load cell, 2000 kN capacity, complete with carrying case.

82-E0100/300

Load cell, 3000 kN capacity, complete with carrying case.

82-E0100/500

Load cell, 5000 kN capacity, complete with carrying case.

82-E0100/SIT1

Official ACCREDIA (ex SIT) calibration certificate for load cell 25 to 1000 kN capacity, connected to the relevant Digital tester.

82-E0100/SIT2

Official ACCREDIA (ex SIT) calibration certificate for load cell 2000 to 5000 kN capacity, connected to the relevant Digital tester.

82-E0100/SIT3

Official ACCREDIA (ex SIT) calibration certificate for load cell 5 kN capacity, connected to the relevant Digital tester.

82-E0100/TRC

Traceable calibration certificate for load cells 300 to 5000 kN capacity, connected to the relevant Digital tester.

Note: Load cells of other capacities are available on request.

Model	Capacity kN	Dimensions, mm (dia. x height)	Weight approx., kg
82-E0100/L5	5	57x80	1.5
82-E0100/L25	25	57x80	1.5
82-E0100/5	50	82x110	4.2
82-E0100/10	100	82x110	4.2
82-E0100/30	300	129x200	10
82-E0100/60	600	129x200	12
82-E0100/100	1000	129x200	14
82-E0100/200	2000	129x200	16
82-E0100/300	3000	129x200	18
82-E0100/500	5000	168x200	35

Digital tester for force verification

This system, when connected to any strain gauge load cell, provides data for the force verification of the testing machine. Data can be printed by a standard serial printer such as our model 82-P0172/M, using a serial cable (82-P0172/1, see accessories). Alternatively, data can be downloaded to the PC for processing and, using the relevant MS Excel template (82-P0804/E4, see accessories), for producing a test certificate conforming to the relevant Standard; for example the EN 12390-4 or ASTM C39 for concrete compression testers.

The tester, connected to one of our load cells 82-E0100/L5 to 82-E01000/500 (see Load cells), can be supplied complete with an official or traceable calibration certificate. See ordering information. Each cell must be calibrated separately and the certificate refers to one cell only.

Main features

- High effective resolution: 256,000 points (less than 0.05% of full scale)
- Large graphic display: 240x128 pixels
- Language selection
- Large permanent memory
- Two RS 232 serial ports for PC and printer
- Remote control
- MS EXCEL Template available for producing calibration certificates
- Clock/calendar chip
- Dimensions: 250x220x150 mm
- Weight approx.: 2 kg

Ordering information

82-P0801/E

Digimax Plus, calibration tester, for use with load cells or transducers, 236,000-point effective resolution. 230 V, 50-60 Hz. 1 ph.

82-P0801/EZ

Same as above, but 110 V, 60 Hz, 1 ph.

Accessories

82-P0172/M

24-column serial printer. 110-230 V, 50-60 Hz, 1 ph.

82-P0800/C

Carrying case for DIGIMAX Plus and printer

82-P0172/1

Serial cable for connection of 82-P0172/M printer

82-Q0800/3

RS 232 serial cable and RS 232 to USB adapter

82-P0804/E4

Force calibration verification MS Excel spreadsheet

Load cell (from 300 kN up to 5000 kN),
digital tester 82-P0801/E and printer
82-P0172/M



82-P0801/E with 82-P0172/M printer

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COMMERCE

Pagina 1 di 5
Page 1 of 5

CERTIFICATO DI TARATURA N° : 01 / 99999
Certificate of Calibration No :

MACCHINA A COMPRESSIONE - Taratura della forza
COMPRESSION TESTING MACHINE - Force calibration

Carico misurato con - Load measured by	Scala-Ranges	Resol.-Resol.	Carico min.-Lower limit	Mat.-Serial no.
Indicat. Manometrico - Manometer indicator	0 - 3000 kN	0.2 kN	600 kN	90069274
Display digitale - Digital display				
Altri - Others				

Verificato con - Verified with	Scala-Ranges	Certificato n°-Certificate no.	Valid.-Validity	Mat.-Serial no.
Dispositivo elettronico - Force transducer	0 - 3000 kN	IMGC 4392001	16/06/2003	A.40.34.006
Centralina digitale - Digital electronic tester	100000 div.	IMGC 4392001	16/06/2003	A.40.36.021
Manometri - Manometers				
Anelli di prova - Proving rings				

Verificato secondo - Confirms to : LQ.P3 Rev. 2
(ref. EN 12390 - 4 2000)

RISULTATI DI TARATURA - CALIBRATION RESULTS

LIMITI DI CLASSE - FORCE SCALE TOLERANCES				
	Accuratezza Accuracy	Repetibilità Repeat. Dev.	Ritorno a zero Zero error	Risoluzione Resolution
Classe-Class	%	%	% F.S.	%
1	± 1	1	± 0.2	0.5
2	± 2	2	± 0.4	1

RISULTATI DI TARATURA - CALIBRATION RESULTS

Campo di misura - Range	Da - From	a - to	Classe - Class
0.10	0.10	0.00	1

Campo di misura - Range Da - From a - to Classe - Class

Final Force calibration certificate.
The complete document includes
another two certificates for the data
recording and processing.

RELIABILITY OF STRENGTH TEST RESULTS

Full traceability of concrete, starting with a batch fresh from the ready-mix plant and ending with the hardened specimens tested in a compression machine, is a growing demand from contractors, consultants and inspectors. Their aim is to maintain continuous control of the whole process and gain evidence that the initial construction material designed with the ready-mix supplier is exactly the same as the one cast on-site.

Traceability of concrete, through production, transportation, sample picking, identification and testing, is a difficult task; a long process involving several participants working in different locations and at different times.

Control of the phases from the ready-mix plant through to the on-site sample picking is typically achieved using systems, software and technologies developed by specialized companies such as ELETTRONDATA SRL (www.elettrondata.it).

Traceability through the subsequent phases, from sample picking through to laboratory testing, requires full integration of the testing machines into the system; therefore CONTROLS is fully involved. In partnership with ELETTRONDATA S.R.L. we are developing an integrated system, based on ED-CUBE technologies, designed for this purpose.

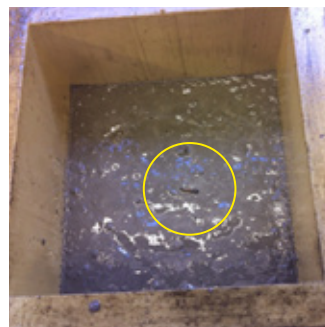


Layout of a complete system for concrete traceability

ED-CUBE system

(it is a CONSYSTECH patent, developed and distributed by ELETTRONDATA)

The system is based on a tiny micro-chip (LF technology) which is cast into the fresh concrete specimen during the preparation phase, which means that it can't be removed later when specimen is hardened.



Micro-chip (LF technology) cast into the fresh concrete



Micro-chip (LF technology) is permanently locked inside the hardened concrete specimen

This chip is detected from the outside with a special RfId antenna and provides unique identification numbers. ED-CUBE software manages all the phases of the process, such as the association of the specimen with corresponding ID numbers (in the picking phase) and, after the strength test is performed, it creates a permanent link between the specimen ID and the compressive strength result.

Compression machine software and firmware (embedded software) provide complimentary functions, communicating with the ED-CUBE software, giving notification when a new test is started, ensuring that the speci-

men can't be removed after a test has started, transmitting full test results with encrypted protocol, etc...

Contact us for detailed information about the ED-CUBE System and to evaluate compatibility of your CONTROLS compression machine with the ED-CUBE systems.

STANDARDS Index

AASHTO T22.....	33, 62, 64
AASHTO T97.....	46, 64
ASTM C39.....	33, 62, 64, 70, 72, 73
ASTM C78.....	36, 37, 46, 64, 68
ASTM C109.....	44, 46, 64
ASTM C293.....	36, 37, 46, 64, 68
ASTM C348.....	39, 46, 64
ASTM C469.....	56, 65
ASTM C496.....	46, 64
ASTM E4.....	70, 72
ASTM E74.....	38, 70
BS 1888:121.....	56, 65
C348.....	39, 44, 46, 64
DIN 1048.....	56, 65
EN 1338.....	46, 64
EN 1339.....	37, 64, 68
EN 1340.....	37, 64, 69
EN 196-1.....	38, 39, 41, 43, 44, 46
EN 772-1.....	6, 18, 20, 21, 29, 32, 33, 62
EN 933-5.....	44
EN 13412.....	56, 65
EN 12390-4.....	6, 20, 21, 26, 28, 29, 32, 38, 62, 64, 70, 71, 72, 73
EN 12390-5.....	36, 37, 46, 64, 68
EN 12390-6.....	46, 64
EN 12390-13.....	56, 65
EN 13286-41.....	44
EN 13286-43.....	56, 65
EN ISO 376.....	72
ISO 6784.....	56, 65
UNI 6556.....	56, 65

CODE Index

50-C0050/CAL.....	20, 22, 24, 28, 30, 37, 38, 39, 41, 43, 45	50-C12C02.....	22, 23
50-C0050/CAL2.....	22, 24	50-C12C04.....	23
50-C0050/CAL5.....	37, 38, 39, 41, 43, 45	50-C13C02.....	25
50-C0050/HRD2.....	22, 30, 44	50-C1400/3.....	37
50-C0050/HRD3.....	24	50-C1400/7.....	37
50-C0050/HRD4.....	20, 24, 28	50-C1400/8.....	36, 37
50-C0050/HRD5.....	38, 39, 41, 43	50-C1400/FR.....	36, 37
50-C0050/HRD6.....	20, 28	50-C1401/FR.....	36, 37
50-C0050/HRD7.....	20, 24, 28	50-C1601/1B.....	67, 68
50-C0910/FR.....	36, 37	50-C1601/2.....	68, 69
50-C10A/PR.....	39	50-C1601/3.....	69
50-C10B/PR.....	13, 19, 20, 22, 24, 27, 28, 30, 31, 41, 52	50-C1601/4.....	68
50-C10C/2F.....	8, 13, 19, 20, 22, 24, 40, 44	50-C1601/6.....	67
50-C10C04.....	8	50-C1601/7.....	67
50-C10D/3F.....	9, 13, 27, 28, 29, 30, 31, 42, 52, 53, 56	50-C1601/8.....	67
50-C10D02.....	9, 52, 53	50-C1601/9.....	67
50-C10D04.....	9, 52	50-C1601/FR.....	66, 67, 68, 69
50-C10D52.....	50, 51, 53	50-C1601/KIT.....	67, 68, 69
50-C10D52/EM.....	51, 53	50-C20E/4F.....	53, 56
50-C10D54.....	53	50-C20E82.....	53, 54, 55, 56, 57
50-C10D54/EM.....	53	50-C20E84.....	55
50-C1200/3.....	37	50-C20Z00.....	53
50-C1200/4.....	37	50-C22C02.....	23
50-C1200/5.....	67	50-C22C04.....	23
50-C1200/6.....	67	50-C23C02.....	25
50-C1200/7.....	37	50-C29C02.....	24, 25
50-C1200/8.....	36, 37	50-C32C02.....	23
50-C1200/8B.....	67	50-C32C04.....	23
50-C1200/BFR.....	36, 37	50-C34C02.....	25
50-C1201/BFR.....	36, 37, 52, 57, 66, 67	50-C39C02.....	25
		50-C42C02.....	22, 23
		50-C42C04.....	23
		50-C42D02.....	30, 31
		50-C42D04.....	31
		50-C43C02.....	23, 25
		50-C46C02.....	20, 21, 29
		50-C46C04.....	21
		50-C46D02.....	28, 29

CODE Index

50-C46D04.....29	50-C8423/MP.....59	65-L18Z10.....38, 39	82-P0390.....65
50-C49C02.....20, 21	50-C8424/CP.....59	65-L2701/P.....40, 43	82-P0391.....65
50-C49C04.....21	50-C8424/MP.....59	65-L27C12.....40, 41	82-P0392.....65
50-C49D02.....28, 29	50-C9000/A.....46	65-L27C14.....41	82-P0393.....65
50-C49D04.....29	50-C9000/B.....46	65-L27D12.....42, 43	82-P0398.....65
50-C49/B.....21, 23	50-C9001/A.....46	65-L27D14.....43	82-P0399/1.....65
50-C50/L.....20, 22, 24, 28, 30	50-C9002.....46	65-L2800/P.....39, 41, 43	82-P0399/B.....65
50-C50/L1.....28, 30	50-C9002/A.....46	65-L28C12.....40, 41	82-P0801/E.....15, 55, 70, 72, 73
50-C50/P.....20, 22, 28, 30	50-C9010/B.....43, 46	65-L28C14.....41	82-P0801/EZ.....73
50-C50/P1.....28, 30	50-C9030/H.....46, 64	65-L28D12.....42, 43	82-P0804/E.....15, 55, 70, 71, 73
50-C52C02.....23	50-C9032/H.....46, 64	65-L28D14.....43	82-P0804/E1.....71
50-C52C04.....23	50-C9060/A.....20, 24, 28	65-L28Z10.....38, 39	82-P0804/E2.....71
50-C52D02.....30, 31	50-C9070/B.....46	65-L38D12.....43	82-P0804/E3.....71, 73
50-C52D04.....31	50-C9214.....45	65-L38D14.....43	82-P0804/E4.....71, 73
50-C54C02.....23, 24, 25	50-C92C02.....44, 45	65-L38Z10.....39	82-P0804/EZ.....71
50-C56C02.....20, 21	50-C92C04.....45	65-L58Z10.....38, 39	82-Q0800/3.....71, 73
50-C56C04.....21	50-C92C12.....45	82-D1260.....67	86-D2999.....61
50-C56D02.....28, 29	50-C92C22.....44, 45	82-E0100/10.....72	
50-C56D04.....29	50-C92C24.....45	82-E0100/100.....72	
50-C59C02.....20, 21	50-C92Z00.....45	82-E0100/200.....72	
50-C59C04.....21	50-C92Z10.....45	82-E0100/30.....72	
50-C59D02.....28, 29	50-C92Z20.....45	82-E0100/300.....72	
50-C59D04.....29	50-C99/B.....44	82-E0100/5.....70, 72	
50-C59/B.....21, 23	50-L0050/HRD.....39, 41, 43	82-E0100/500.....70, 72	
50-C69C02.....20, 21	50-L0050/P.....43	82-E0100/60.....72	
50-C69C04.....21	55-C0222/F.....65	82-E0100/L25.....72	
50-C69D02.....28, 29	65-L0019/B.....46, 64	82-E0100/L5.....70, 72, 73	
50-C69D04.....29	65-L0019/B1.....46	82-E0100/SIT1.....72	
50-C68C02.....20, 21	65-L0019/C.....46, 64	82-E0100/SIT2.....72	
50-C68C04.....21	65-L0050/P.....39, 41	82-E0100/SIT3.....72	
50-C68D02.....28, 29	65-L1400/X5.....21, 29, 38, 39, 45	82-E0100/TRC.....72	
50-C68D04.....29	65-L17Z10.....38, 39, 57	82-E0105/1.....70, 71	
50-C7022/UP1.....61	65-L1800/P.....39, 40, 43	82-P0172/1.....71, 73	
50-C7022/UP2.....59, 61	65-L18C02.....40, 41	82-P0172/M.....70, 71, 73	
50-C8422/CM.....61	65-L18C04.....41	82-P0331/2.....67	
50-C8422/CP.....58, 59	65-L18C12.....40, 41	82-P0331/C.....67	
50-C8422/MP.....58, 59	65-L18D12.....43	82-P0331/D1.....67	
50-C8423/CP.....59	65-L18D14.....43	82-P0331/E.....67	

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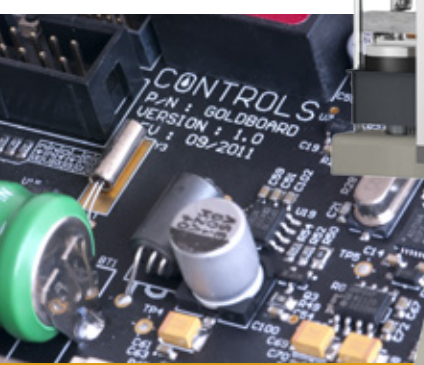
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