



GENERAL CATALOGUE 2023

the suitable product

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MODEL ME-402

Universal testing machines for tensile/compression/flexure, 1 to 300 kN



ME-402 description

ME-402 machines cover all low-forces range for pseudo-static tests for all materials, as plastics, rubber, steel, aluminium, construction, soils, asphalt, etc.

Both force and displacement channels accuracy meet ISO 7500-1 Class 1.

They are built from 1 to 300 kN force capacities.

Both tabletop and floor-standing formats are available.

Its versatility allows it to be used in most of standard tests. It can perform tensile and compression tests in the same frame, with the suitable accessories.

It is composed by a bench, side columns, upper bridge, lower bridge, load cell, grips, compression platens, bending fixtures, etc.

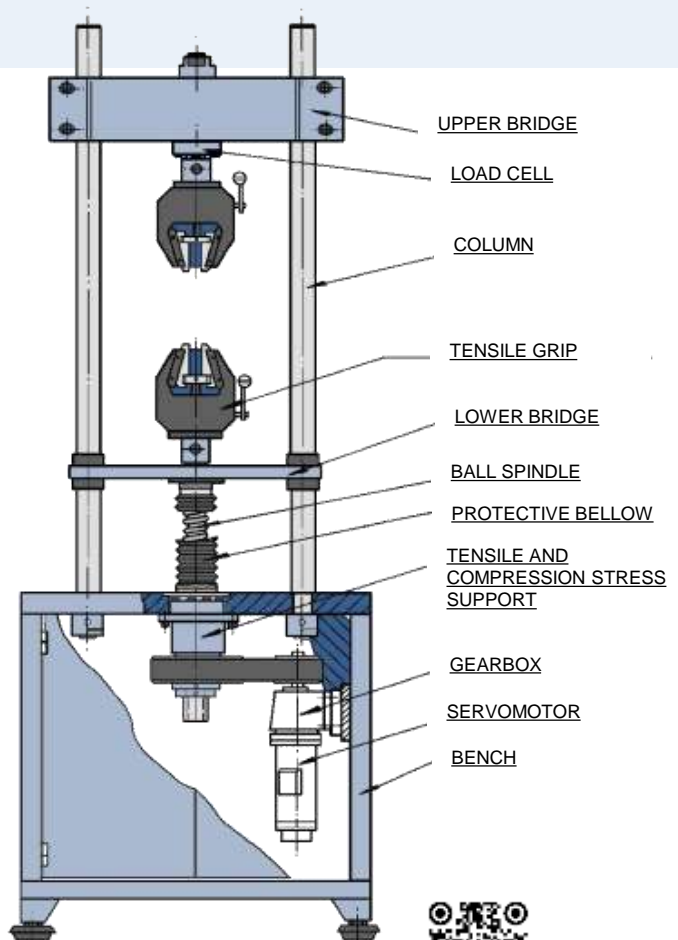
Computer controlled through PCD2K testing software.

Test speed may vary between 0,0001 mm/min and 200 mm/min.

It could get 500 mm/min upon request.



ME 402/5 kN with specific fixtures for shock absorber tubes tests.



ME 402/20

+ compression plates



ME 402/1 tabletop

+ 3 point bending fixture



ME-402 Features

	ME 402/0,1t	ME 402/1t	ME 402/2t	ME 402/5t	ME 402/10t	ME 402/20 t	ME 402/30 t
Load capacity (kN)	1	10	20	50	100	200	300
Maximum working speed (mm/min)	200. Optional up to 500 mm/min						
Accuracy	FORCE: $\pm 1\%$ DISPLACEMENT: $\pm 1\%$						
Max. axial free distance, without grips (mm)	1000						
Spindle stroke (mm)	400 in floor-standing models/ 300 in tabletop models						
Lateral free distance between columns (mm)	350	520	520	610	610	610	610
Lateral free distance tabletop model	350	350	350	350	350	n.a.	n.a.
Test frame dimensions. Width/depth/height (mm)	650 / 400 / 1800	800 / 500 / 1800	800 / 500 / 2000	900 / 500 / 2050	900 / 500 / 2100	900 / 500 / 2150	900 / 500 / 2200
Test frame dimensions tabletop model (mm)	500 / 400 / 1500	500 / 400 / 1500	500 / 400 / 1500	550 / 450 / 1650	600 / 500 / 1650	n.a.	n.a.
Test frame approximate weight (Kg)	180	310	410	610	710	790	980
Electrical requirements	220/380 VAC / 50/60Hz $\pm 10\%$						

We can built other capacities upon request.



MODEL ME-405

Universal testing machines for tensile/compression/flexure



ME-405 description

ME-405 machines cover all low-forces range for pseudo-static tests for all materials, as plastics, rubber, steel, aluminium, construction, soils, asphalt, etc.

Both force and displacement channels accuracy meet ISO 7500-1 Class 1

They are built from 5 to 500 kN force capacities.

Its versatility allows it to be used in most of standard tests. It can perform tensile and compression tests in the same frame, with the suitable accessories.

It is composed by a bench, side columns, upper bridge, lower bridge, load cell, grips, compression platens, flexure fixtures, etc, and control equipment.

Standard test speed:

- Smax = 200 mm/min.
- Smin = 0,0001 mm/min.
- Optional Smax. = 500 mm/min.



ME 405 + ACTUATOR MOD CH9



ME 405 WITH ENVIROMENTAL CHAMBER



ME 405 + SIDE ACTION GRIPS MODEL 4013 + 4 POINT FLEXURE FIXTURE



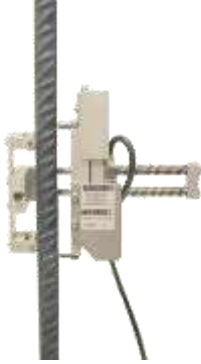
ME 405 + MANUAL WEDGE ACTION GRIPS MODEL 4012



ME-405 accessories: extensometers

Model CDD

Axial extensometer for tensile tests through specimen failure.



- Gauge length 100-200 mm (possibility to built other sizes).
- Maximum strain 50 -100 mm (possibility to built other sizes).
- Manual or automatic clamp.
- For round or flat specimen.
- Operating principle: digital encoder.

Model CDA

Axial extensometer for tensile tests through failure.

- Gauge length 100,-200 - 500 mm (possibility to built other sizes),
- Maximum strain 50 -100 mm (possibility to built other sizes).
- Automatic clamp from PC.
- For round or flat specimen.
- Operating principle: digital encoder.



Epsilon extensometers

For several purposes.

Model 3560.- Biaxial extensometer:

Provides simultaneous lateral (transverse) and axial strain measurement.



Model 3542.- Axial extensometer

Gauge length 10-80 mm.

Operating principle: wheatstone bridge.



Model CDR

Extensometer for yield strength and young modulus

- Gauge length 50-100 mm.
- Max. Strain 2,5 mm.
- Possibility of double mounting.
- Manual clamp.
- For round or flat specimen.
- Operating principle: wheatstone bridge



Model CDL

Diametral extensometer

- Manual clamp.
- Nominal stroke: 3 to 10 mm.
- Resolution: 0,001 mm.
- Linearity: 1 %,
- Specimen width: 10-25 mm. (it can be modified upon request)
- Operating principle: LVDT transducer.



ME-405 accessories: extensometers

Model CDO. Videoextensometers

Model CDO / 1 / 50

Optical extensometer for general purpose



- Non-contact measurement.
- Includes a high accurate camera.
- For all kind of materials.
- Accuracy: 0,01mm to 0,002 mm.
- Local strain measurements (fracture mechanics...)

Laser extensometer

Laser extensometer



- Non-contact measurement.
- Includes a high accurate camera.
- For all kind of materials.
- Accuracy: 0,01mm to 0,002 mm.
- Local strain measurements (fracture mechanics...)



ME-405 accessories:

FLEXURE TESTS FIXTURES

We manufacture all kind of flexure fixtures.

Some of them can be mounted on the bench, other on the load cell, or on other independent equipments.

They are custom machined, to allow the assembly of deflection transducers.

Specific fixtures for:

- Flexural strength of concrete.
- Flexural strength of insulators.
- Wood bending test.
- ...



COMPRESSION PLATENS

- Wide variety of diameters.
- With or without centerer.
- Hardened surfaces.
- Machined to assembly other fixtures as deflectometers...



ENVIROMENTAL TESTS

- Two-zone split furnace up to 1000°C.
- Cold/heat enviromental chamber.
- Heated compression platens...



STANDARD TESTS

- Asphalt compression.
- Concrete compression.
- Wood compression.
- Insulator compression.
- ...
- Designs in constant evolution, adapted to the current regulations.



Servosis designs and manufacture all type of accessories, both standard and custom made, to help you meet the needs of your application.

ME-405 accessories:

GRIPS

ME 405 serie may include different types of grips for tensile tests, both standard and custom designs.

MODEL	LOAD RANGE	ACTION	Clamping
4012 ACM	5-200 kN	Manual. Mechanic with spring	Wedge.
4011 ACN	5- 100 kN	Pneumatic. Air 8 Bar.	Wedge.
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge.
4013 ALH	100-2500 kN	Hydraulic. Oil 200 Bar.	Side.

Hydraulic action grips can be connected to the machine's hydraulic power supply (if available) or provided with its own hydraulic power supply.

All models have available easily changeable wedges to suit specimen varying by shape, size and surface textures.

Models 4011 and 4013 have a locking system to allow tensile-compression tests through zero load as an option.



4012 ACM



4011 ACN



4011 ACH



4013 ALH



ME-405 features

	ME 405/1t	ME 405/2t 405/5t	ME 405/10t	ME 405/20 t	ME 405/30t	ME 405/40 t	ME 405/50 t
Load capacity (kN)	10	20/50	100	200	300	400	500
Maximum working speed (mm/min)	200. Optional up to 500 mm/min						
Max. axial free distance, without grips (mm)	1350						
Min. axial free distance, without grips (mm)	0						
Lateral free distance between columns (mm)	350	520 Opt. 610	520 Opt. 610	610	610	610	610
Test frame dimensions. Width (mm)	650	800 Opt. 900	800 Opt. 900	900	900	900	900
Test frame dimensions. Depth (mm)	400	500	500	500	500	500	500
Test frame dimensions. Height (mm)	1900	2100	2100	2150	2200	2250	2400
Test frame approximate weight (Kg)	380	630	710	840	910	1010	1300
Electrical requirements	220/380 VAC / 50/60Hz ± 10%						

We can build other capacities upon request.



MODEL MUE-403

Testing machine for tensile, compression, flexure 50 to 1000 kN



MUE-403 Description

MUE-403 machines are well-suited for static and dynamic tests, from 50 to 1000 kN, up to 5 Hz.

Specially designed for metallic and rigid materials tests as steel sheets or round bars, both smooth and ribbed.

High stiffness (more than 2 Fn/mm), wide variety of tests, quick and easy placement of different samples, and a small maintenance are some of its main features.

All the system has an hydraulic servocontrol, including grips action, movements and blocking of the upper bridge.

Includes hydraulic power supply with pressure regulation, pressure line filter with electrical display, displays for low oil level and high temperature, and air-oil exchanger cooling system.

The hydraulic supply can be far from the testing machine.



MUE 403/20



MUE 403/60

Main components:

- Mobile upper bridge with hydraulic blocking system and automatic action.
- Upper grip and load cell to measure tensile or compression force.
- Lower grip and support for compression or flexure platen.
- Hydraulic actuator integrated in the bench:
 - Model CH4: Low friction actuator. Working frequency up to 5 Hz.
 - All actuators include control servovalve and displacement transducer in the rod.
- Control station (electronic amplifying unit, computer and software). It can be installed in the hydraulic supply rack, or on a side table.
- Control panel for gripping action and upper bridge displacement.

Wide range of grips and accessories available, according to specimen varying and test requirements.



MUE-403 Description

MAIN ACTUATOR

HYDRAULIC ACTUATOR MODEL CH4



They are designed to work in static and pseudo-static tests, and they can occasionally be used in cyclic tests up to 5 Hz.

Sealing system is based on low friction and high speed joints.

They have a drainage circuit to collect the small leaks that dynamic work normally cause.

Minimum available dimensions are: Stroke 50 mm; Load capacity 10 kN. We select the most suitable actuator for the client's purpose.

GRIPS



4011 ACH

MODEL	LOAD RANGE	ACTION	CLAMPING SYSTEM	LOAD CAPACITY THROUGH THE WEDGES
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge	100% Tensile 10 % Compression
4013 ALH	100-2500 kN	Hydraulic. Oil 200 Bar.	Side	100% Tensile 100% Compression
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge	100% Tensile 100% Compression



4013 ALH



MUE-403 Features

	MUE 403/5t	MUE 403/40t	MUE 403/60t	MUE 403/100t
Number of columns	2	2	2	2
Static/Dynamic capacity (kN)	50/40	400/300	600/500	1000/750
Accuracy	FORCE: $\pm 1\%$ between 1 and 100% Nominal. (optional $\pm 0,5\%$) DISPLACEMENT: $\pm 1\%$ between 1 and 100% Nominal (optional $\pm 0,5\%$)			
Actuator stroke (mm)	± 50 ; ± 75 ; ± 100 ; ± 125 ; ± 150			
Working frequency ranges (Hz)	ACTUATOR MODEL CH4: 0,01-5			
* Upper bridge displacement	Automatic with up/down buttons Stroke between 700 and 1000 mm (optional 1500 mm)			
Electrical analog output signal (V)	± 10 VDC for Force, Displacement and Strain measures			
Communication PC	Through interface AD/DA 16 bits			
Maximum working speed (mm/sec)	Depending on the hydraulic power supply selected. It will be set with the order.			
Columns diameter (mm)	60	90	110	120
* Axial free distance without grips (mm)	To be determined with the order. Between 1500 and 2500			
* Lateral distance between columns	2 versions: A= 600mm; B= 800mm			
Test frame dimensions (mm)	Width: Version A=1200; Version B= 1400 Depth: 800mm Height: between 2700 and 3700 (depending on the axial distance)			
Test frame approximate weight (Kg)	650	1900	2350	2900
Electrical power (kW)	Depending on the hydraulic power supply selected.			
Electrical requirements	220/380 VAC / 50/60Hz $\pm 10\%$			

* Options to be set in the order.



MODEL MUE-404

Testing machines for tensile/compression/flexure from 600 to 2000 kN



MUE-404 Description

MUE-404 machines allow static and low-frequency dynamic tests, tensile and compression in the same testing area, through a double acting actuator.

Recommended for metallic tests as steel sheets or round bars, both smooth and ribbed.

They are built from 600 to 2000 kN (up to 5000 kN upon request).

For a static purposes they use to include a hydraulic power supply between 13 and 38 l/min, to get displacement speed of approximately 3 mm/sec.

For dynamic purposes the flow rate must be studied depending on the test. Maximum frequency 10 Hz.

They normally incorporate standard hydraulic wedge action grips, being possible to use the lower one as a flexure bridge (optional).

They can also incorporate side action grips.



MUE 404/120t

Upper crosshead is hydraulically displaced and blocked. Standard stroke 700 mm.

They incorporate servoactuators model CH4, with sealing system based on low-friction and high speed joints, which includes a drainage circuit to collect the small leaks that dynamic work normally cause.

Force capacity and stroke of the actuators are selected depending on the customer requirements. They can be mounted on the bench.

Control station (electronic amplifying unit, computer and testing software) can be installed into a 19" industrial rack, or on a working table.

A wide range of grips and accessories as extensometers are available, according to specimen varying and test requirements.



MUE 404/60t



MUE-404 Description

MAIN ACTUATOR

HYDRAULIC ACTUATOR MODEL CH4



They are designed to work in static and pseudo-static tests, and they can occasionally be used in cyclic tests up to 10 Hz.

Sealing system is based on low friction and high speed joints.

They have a drainage circuit to collect the small leaks that dynamic work normally cause.

Minimum available dimensions are: Stroke 50 mm; Load capacity 10 kN. We select in each case the most suitable actuator.

GRIPS



4011 ACH



4013 ALH

MODEL	LOAD RANGE	ACTION	CLAMPING SYSTEM	LOAD CAPACITY THROUGH THE WEDGES
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge	100% Tensile 10 % Compression
4013 ALH	100-2500 kN	Hydraulic. Oil 200 Bar.	Side	100% Tensile 100% Compression
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge	100% Tensile 100% Compression



MUE-404 Features

	MUE 404/60t	MUE 404/100t	MUE 404/150t	MUE 404/200t
Number of columns	4	4	4	4
Static/Dynamic capacity (kN)	600/500	1000/850	1500/1300	2000/1700
Accuracy	FORCE: $\pm 1\%$ between 1 and 100% Nominal. (optional $\pm 0,5\%$) DISPLACEMENT: $\pm 1\%$ between 1 and 100% Nominal (optional $\pm 0,5\%$)			
Actuator stroke (mm)	Standard ± 125 . Other optional			
Working frequency ranges (Hz)	0,01-10			
* Upper bridge displacement	Automatic with up/down buttons Stroke between 700 and 1000 mm (optional 1500 mm)			
Electrical analog output signal (V)	± 10 VDC for Force, Displacement and Strain measures			
Communication PC	Through interface AD/DA 16 bits			
Maximum working speed (mm/sg)	Depending on the hydraulic power supply selected. It will be set with the order.			
Columns diameter (mm)	90	100	110	120
* Axial free distance without grips (mm)	700			
* Lateral distance between columns	560			
Test frame dimensions (mm)	900/600/2750	1100/600/2900	1150/700/3100	1200/800/3250
Test frame approximate weight (Kg)	2400	3100	3900	5600
Electrical power (kW)	Depending on the hydraulic power supply selected.			
Electrical requirements	220/380 VAC / 50/60Hz +/- 10%			



* Options to be set in the order

MODEL MUF-401

Dynamic Testing Machines up to 100 Hz. 10 to 250 kN



MUF-401 Description

Designed to meet middle and high frequency tests requirements up to approximately 100 Hz. Load capacities between 10 and 250 kN.

The upper bridge slides along 2 columns, and it is hydraulically actuated and blocked. Above 200 kN, and depending on the use of the machine, it can have 4 columns instead of 2, to achieve a better rigidity.

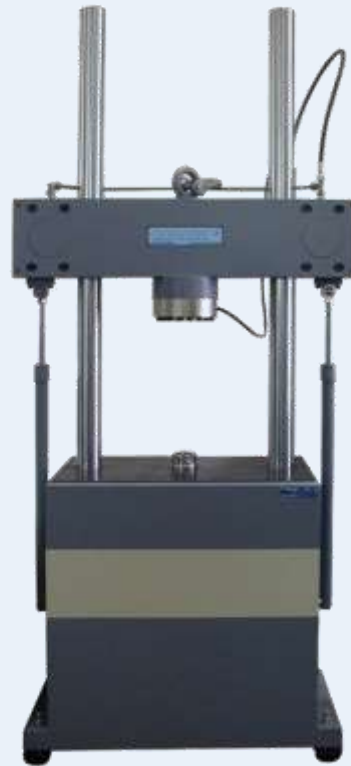
Hydraulic actuator is usually mounted in the mobile upper bridge, although it can be mounted in the lower bench upon request.

Model CH-9 hydrostatic actuator. With no seal rings, they include a suction pump for oil drainage. Maximum working frequency 100 Hz.

Upper bridge stroke is usually 800 mm, in order to adjust the distance to suit specimens varying by shape.

A wide variety of fixtures can be installed, as tensile grips, flexure fixtures, etc.

Free lateral distance between columns is 500 mm. We can suit it to 800 mm to install an environmental chamber, for example.



Hydraulic power supply

Hydraulic power supply in dynamic testing machines are standard, and the magnitude will depend on the flow rate required. This flow rate will be chosen depending on the cylinder section and the maximum test speed to perform. With a power supply as shown in the picture, we can make tests between 13 and 90 l/min.

We can optionally offer a low noise level hydraulic power supply, with the motor pump unit submerged in the oil tank. This type of supplies are delivered with a soundproofing fairing.

Working pressure is usually 210 Bar. The power unit can have fixed or variable flow rate.

For a 120 l/min flow rate, the motor pump unit is not placed on the tank, but on a side bench close to the tank. If more than 120 l/min are required, we install two or more pumps, and the flow rates are added.

The cooling system can be chosen in all models, between air-oil or water-oil exchangers.



MUF-401 Description

HYDRAULIC ACTUATOR MODEL CH9

Model CH9 Servosis hydraulic actuator is well-suited for high accuracy fatigue tests.

The seal rings are eliminated. A suction pump is incorporated to collect the drained oil.

We manufacture standard and custom models upon request, to meet any requirements you may have.

Available standard specifications: Stroke ± 5 mm to ± 300 mm; Load capacity: 5 to 250 kN.



The lower bench allows different configurations:

- T-grooved or non grooved table (series B.B.)
- Assembly on a raised bench (series B.A) to increase the working height, usually 500mm.



MUF 401 –C.S – B.B/ 10t.
Max force: 100 kN.
Lower grooved bench.
Upper actuator.
Side action grip, model 4013



MUF 401 – C.S – B.A /10t
Max force: 100 kN
Bench on fsupporting rame.
Upper actuator.
Side action grip, model 4013



MUF 401 - C.S – B.B /2,5 t
Max force: 25 kN
Lower grooved bench.
Upper actuator.
Wedge action grip, serie 4011



MUF 401 – C.I– B.A /10t
Max force: 100 kN
Bench on supporting frame.
Lower actuator.



MUF-401 ACCESSORIES:



COLD-HEAT ENVIROMENTAL CHAMBER

- ❑ Test under cold-heat temperature controlled changes.
- ❑ Tests with mechanic properties changes in specimen, due to temperature changes.
- ❑ Tests to emulate real temperature conditions.
- ❑ Standard temperature ranges from -10 to +150 °C.



GRIPS: MODELS 4013 ACL, 4011 ACH

Side action grip, suitable for round and flat specimens. For tensile-compression tests.

Hydraulic action, 200 Bar.

Easily changeable wedges, depending on the specimen.



They can be provided as an independent grip+hydraulic power supply set, or be incorporated in the testing machine's hydraulic supply.

Servosis designs and manufacture all type of accessories, both standard and custom made, to help you meet the needs of your application.



MODEL MUF-404

Dynamic Testing Machines for tensile-compression tests



MUF-404 Description



This model is well-suited for low and middle frequency cyclic tests.

The actuator is always in the upper bridge. All versions incorporate 4 columns.

One of the main purposes of these machines is tensile and cyclic tests of round metallic specimens.

They are built between 500 and 2500 kN forces. For fewer capacities, Servosis can offer model MUF-401, between 10 and 250 kN.

Upper bridge is hydraulically displaced and blocked. The axial distance can be adapted to the type of test, although in the standard version it is usually 700 mm.



They have hydraulic actuator Model CH4 (pseudo-static) for frequencies up to 10 Hz, and Model CH9 for higher frequencies. The stroke can vary depending on the use of the machine, standard is 200 mm.

Sealing system on CH4 is based on low friction and high speed joints, and they have a drainage circuit to collect the small leaks that dynamic work normally cause.

Sealing system on CH9 is based on pressure rings, and they require a direct drainage to the hydraulic power supply.

The force and the stroke is adapted to the machine's requirements.

Hydraulic power supply in dynamic testing machines are standard, and the magnitude will depend on the flow rate required. This flow rate will be chosen depending on the cylinder section and the maximum test speed to perform. With a power supply as shown in the picture, we can make tests between 28 and 90 l/min.

The working pressure is usually 210 Bar. The cooling system is based on an air-oil exchanger.

For higher flow rates than 90 l/min, the motor pump unit is not placed on the tank, but on a side bench close to the tank. If more than 90l/min are required, we install two or more pumps, and the flow rates are added. In this case, the cooling system is based on a water-oil exchanger.



MUF-404 Description

MAIN ACTUATOR



HYDRAULIC ACTUATOR MODEL CH9

Model CH9 Servosis hydraulic actuator is well-suited for high accuracy fatigue tests.

The seal rings are eliminated. A suction pump is incorporated to collect the drained oil.

We manufacture standard and custom models upon request, to meet any requirements you may have.

Available standard specifications: Stroke ± 5 mm to ± 300 mm; Load capacity: 5 to 250 kN.



HYDRAULIC ACTUATOR MODEL CH4

They are designed to work in static and pseudo-static tests, and they can occasionally be used in cyclic tests up to 10 Hz.

Sealing system is based on low friction and high speed joints.

They have a drainage circuit to collect the small leaks that dynamic work normally cause.

Minimum available specifications are: Stroke 50 mm; Load capacity 10 kN. We select the most suitable actuator for the client's purpose.

GRIPS



4011 ACH

4013 ALH

MODEL	LOAD RANGE	ACTION	CLAMPING SYSTEM	LOAD CAPACITY THROUGH THE WEDGES
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge	100% Tensile 10 % Compression
4013 ALH	100-2500 kN	Hydraulic. Oil 200 Bar.	Side	100% Tensile 100% Compression
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge	100% Tensile 100% Compression



MODEL MES

Compression Testing Machines up to 8 MN



Concrete specimens, rocks, cements and building materials tests between 1500 kN and 8000 kN.



Model MES. Description

The main purpose of this model is of concrete specimens, rocks, cements and building materials tests, between 1500 kN and 8000 kN.

They are built under Standard ISO-EN 12390-4 requirements, meeting ISO-EN 7500-1 Class 1 accuracy.

They have an excellent robustness, a high stiffness and an easy location.

Models MES serie AF have the distance between compression platens fixed (standard 330 mm). They can incorporate spacer plates to change the height.

Models MES serie AV have a variable distance between compression platens (standard from 0 to 400 mm). The upper platen is available on a spherical seat for improved alignment and ensuring even pressure across the entire surface of the specimen.

Side columns are grinded and hard-chrome covered to avoid oxidation.

It includes a safety enclosure to protect the user against flying particles, available with metallic or methacrylate panels, depending on the material to test.

It is possible to assembly flexure fixtures.

Computer controlled through PCD2K testing software. Control station can be installed into a 19" industrial rack, or on a working table.

Additionally it is possible to incorporate a manual control system, without using the PC.



MES machines can be equipped with a simple or a double acting actuator.

The simple acting actuator is controlled by a proportional valve, suitable for uniaxial compression tests in most cases.

The double acting actuator is controlled by a servovalve, and incorporates a displacement transducer and double pressure transducer. This system gives the machine a high precision control, which is essential for certain types of tests, such as module calculation.

It is also possible to close the loop by force or displacement, which makes MES machines with double action actuator an improved alternative to the classic compression testers.

All MES machines are prepared to connect a second extra testing frame for flexure tests of prismatic specimens. Both hydraulic and control system are ready to control the second testing frame.



Model MES. Rock mechanics

One of the specific purposes of MES machines is rocks tests, being necessary to acquire some specific fixtures:

Hoek cell: For **triaxial** tests under ISO-EN 22-950-92.

Measuring module with strain gauges: Analog electronic unit for a direct measure with strain gauges on specimen, for Poisson's ratio. The standard module is for 4 channels, expandable to 8 channels.

Measuring module with deflectometers for axial strain measurement and modulus calculation.

HOEK CELL



Triaxial test requires to apply lateral pressure on the specimen.

Our system allows to generate this pressure by means of water or oil.

It is a multi-actuator system, where the lateral pressure and the axial load are servocontrolled parameters.

Unlike other systems, the lateral pressure in this case is a servo controlled channel more in the software, treated in the same way as the axial force or the displacement, for example. This means that there is a Servocontrol and a PID adjustment on this measurement, and it is not about applying theoretical values by steps. The user can control, generate ramps at a required speed, cyclical functions, step type, etc.

The accuracy and exactitude in the control of this channel increases notably in comparison with open loop pressures application systems.

Lateral pressure is applied inside the Hoek cell., that is composed by:

- Cell body.
- 2 threaded caps.
- Axial loading body, with spherical seat.
- Rubber or latex membrane.



During the test, the lateral pressure application can be constant or increase as the axial force increases, depending on the test method chosen.

The user has complete control of the machine, being able to choose the most appropriate method in each moment.



Model MES. Rock mechanics

MEASURING ANALOG MODULE Measure with strain gauges

Strain gauges attached to the specimen are used to measure axial and diametral strains occurred during the triaxial test.

Usually the test is performed using 4 gauges, 2 for axial strain and 2 for diametral strain.

MES machines can incorporate measuring systems for these tests, and obtain Poisson's ratio.

The equipment includes signal conditioning electronics for wheatstone bridge.



MEASURING ANALOG MODULE Measure with deflectometers

When the test does not require the use of strain gauges, you can use a direct strain measure on the specimen, by using deflectometers.

The deflectometers can be mounted in a specific supporting fixture, or in contact with the compression platens. They offer a direct measure for modulus calculations, axial strains, etc.

MES machines can incorporate analog modules for deflectometers or any other type of extensometer signal reading.



Model MES. Description

	MES 150t	MES 200t	MES 250t	MES 300t	MES 500t	MES 800t
Number of columns	2	4	4	4	4	
Actuator stroke (mm)	100 (any other can be manufactured upon request)					
Compression platens diameter (mm)	305 or 300x300 square			400 or 400x400 square		
Maz axial distance between platens (mm)	330 (VERSION AF) // Adjustable from 0 to 400 (VERSION AV)					
Lateral distance between columns (mm)	330	370	370	410	450	500
Analog output (V)	± 10VDC in Force, Displacement and Strain.					
Control rack measures (mm)	700*900*1900 (width, depth, heigh)					

Options:

Simple / double acting actuator.

Safety enclosure with metallic / methacrylate panels.

Manual / authomatic switching.

Extra flexure testing frame.



MODEL MT

Torque testing machines



MT description

For torque test purposes of all type of materials and pieces, as wires, cables, bolts, steel bars....

The sample can be preloaded before test, in the axial load sense, by using a pneumatic cylinder..

Torque capacities from 100 to 5000 N.m. Other capacities can be manufactured upon request.

Te tests can be performed in different ways: by controlling the torque speed, the spinning speed, the angle to be reached... So that the end of the test can be determined upon reaching a certain strain, a known torque, or a sample failure.

The standard clamping system is conformed by 3-jaw chuck. Other designs available upon request.

The motion system is based on an AC geared motor with inverter drive.

The machine is PC controlled, through PCD2K testing software.

Numeric and graphic files are obtained from the torque/angle curves.



MT accessories

PNEUMATIC CYLINDER FOR SAMPLE PRELOAD



Available in different capacities and strokes .

The software can optionally control the the applied preload measure.

TORQUE TRANSDUCERS, FAILURE DETECTORS



Failure detection by electrical continuity in low loads.
Different scale ranges for torque measurement.



ME 406

HIGH CAPACITY TESTING FRAMES



ME 406

Main features

Testing frames can be used in so many applications, as in tests of structures, pillars, beams, concrete tubes, public works, automotive pieces, etc.

Its design and manufacture will be adapted to the size and characteristics of the test to be performed

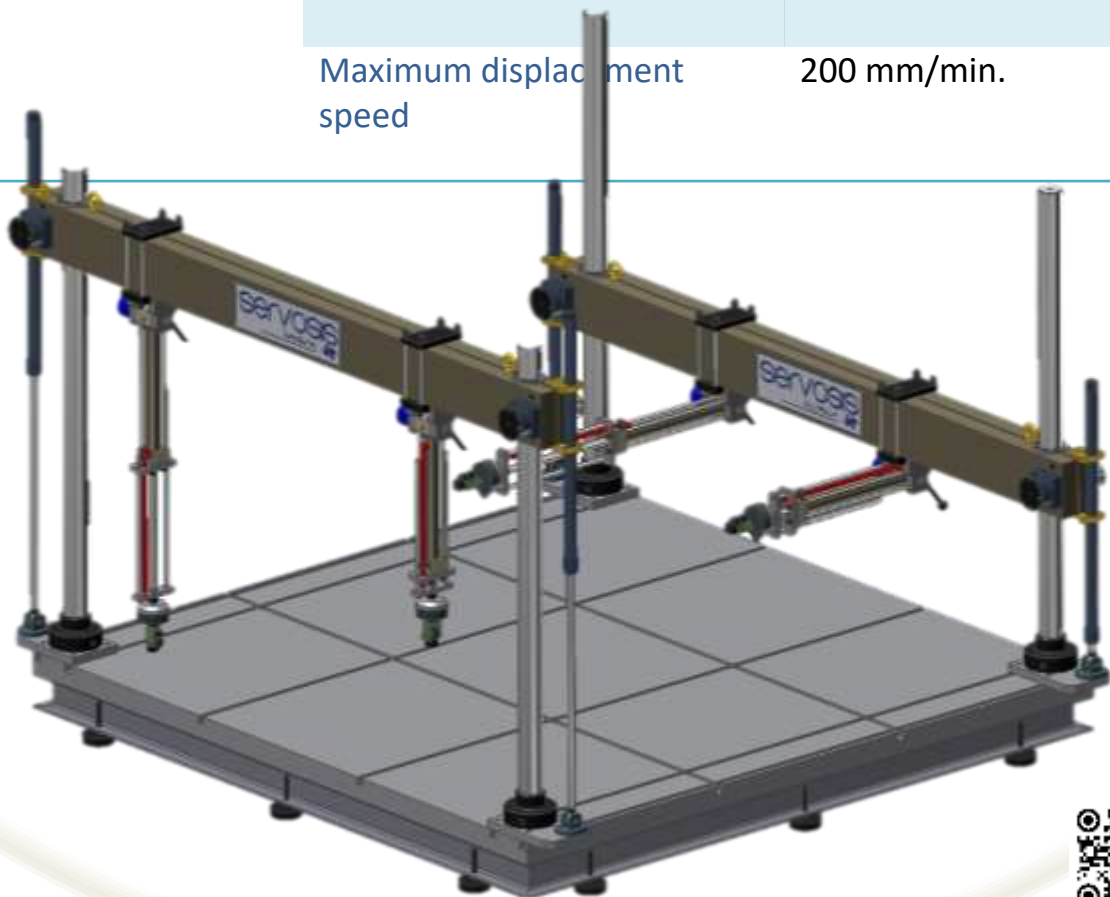
The stress is generated by hydraulic actuators, controlled by our standard software PCD2K, that can command up to 6 actuators simultaneously, with or without synchronism.

Load parameters

Maximum load capacity	Models available between 50 and 2500 kN.
Force transducer	Load cell, ISO 7500 class 1.

Displacement parameters

Displacement transducer	Integrated in the actuator body. Output digital SSI signal.
Maximum displacement speed	200 mm/min.



ME 406	
Load capacity (ton)	Maximum 2500 kN. (Others please consult)
Max. working speed (mm/min)	200
Max. Free axial space (mm)	Up to 3500 mm.. For longer specimens, please consult.
Max. Free lateral space (mm)	Up to 6000 mm.. For longer specimens, please consult.
Options.	Automatic upper crosshead displacement and locking system.



FEATURES:

- Servohydraulic actuator.
- Digital control.
- Closed servoloop 10 KHz.

• **ACCESORIES:**

- Grips.
 - Extensometers.
 - Video-extensometers.
 - Flexure fixtures.
 - Compression.
 - Climatic chambers.
 - Furnaces.
- **Customized devices**



MODEL Me 408
Elastomeric bearing tests



Experience

Servosis has a vast experience in testing world for pieces and materials. More than three decades working support us as a benchmark in the sector.

Our range of products include all fields: aeronautic, automotive, construction, lamber, composites, railway...

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products adapted to the most recent regulations.

Custom-made

Our competitive advantage is our ability to offer customized solutions, according to the specific needs for each of our customers.

All these characteristics has allowed us to develop a new product, based on our compression testing machine serie MES .

This is model ME-408, specifically designed to test elastomeric bearings.

It allows tests performance in both simple and shear compression, combining axial and lateral stresses on the specimen.

It meets ISO-EN 1337-3 requirements, annexes F,G,H.



Description.

Monoblock testing frame with hydraulic action, specifically designed to meet ISO-EN 1337-3 requirements:

- Annexe F: Shear modulus.
- Annexe G: Shear joints.
- Annexe H: Compression

The system is composed by:

- 2 linear double-acting hydraulic actuators, high capacity for axial load application, 6 MN.
- 1 linear double-acting hydraulic actuator 1,5 MN for lateral displacement application on the specimen.

All actuators have integrated Moog servovalve and linear displacement transducer.

Force measurement by load cell in lateral actuator, and by pressure transducer in the high capacity actuators.



Control system is developed by Servosis. It is a reliable and high performance equipment, with a great accuracy, resolution and a quick response.

It is composed by:

Interface hardware AD/DA integrated in control PC:

- 8 analog input channels ± 10 VDC.
- 4 analog output channels ± 10 VDC for actuators control.
- 16 digital input/output.
- **Control frequency 10 KHZ.**

Control and analysis software PCD2K:

- Multiactuator system, with synchronized control up to 6 actuators.
- **User-friendly window system, customized under Standard:**
 - References, test parameters and test results in a single window.
 - Real-time graphic display of measurement channels.
 - Reporting.
 - Data export to different file formats: data sheets, data bases.

All these features make ME-408 machine a powerfull testing solution for a high accuracy need, an innovave product in the market, capable to meet the most strict requirements.



SPECIFICATIONS	MODEL	ME 408/600/24	ME 408/600/42
Axial load capacity			2 x 6 MN
Lateral load capacity			1,5 MN
Accuracy force measure			Class 1 under ISO 17025
Axial maximum speed		120 mm/min	220 mm/min
Axial maximum speed		400 mm/min	800 mm/min
Hydraulic actuators displacement system		Linear transducer integrated. Resolution 0,005mm	
Hydraulic actuators control valve		Moog D633 servovalve	
Hydraulic power supply flow rate		24 l/min	48 l/min
Measurements (Height/width/depth)		3500x3200x3100 mm	
Approximated weight		22,000 Kg	

ACCESSORIES	MODEL	ME 408/600/24	ME 408/600/42
Flat surfaces compression platens		Included 800 x 800 mm	
Saw-tooth shear test platens		Included 1000 x 1000 mm	
Sample carriage		Included	
Safety enclosure		Optional	
Manual acting panel		Optional	
Low noise level faired hydraulic power supply		Optional	
Industrial rack 19" for control station		Optional	



servosis

Testing Machines



Hydraulic servoactuators CH4 SERIES



Servosis develops and manufactures CH4 servoactuators, specifically designed for static and pseudo-static tests up to 3 Hz.

Servosis, more than three decades of experience.



HYDRAULIC ACTUATORS

Servosis develops several types of hydraulic actuators

All of them can be provided with fixing pieces, assembled on standard or personalized bearing systems, with control system, etc.

CH-4 SERIE

The CH4 range is characterized by its versatility and reliability.

They are designed to work in static and pseudo-static tests, but they can also be used in cyclic tests up to 10 Hz.

Sealing system is based on low friction and high speed joints.

They have a drainage circuit to collect the small leaks that dynamic work normally cause.

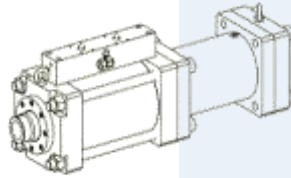
They can be mounted on a testing bench (forming a testing machine), or on any other testing structure, as a testing frame.

They can work individually or synchronously with other actuators, by using the control system PCD2K.

They can be manufactured with several forces and strokes, depending on the customer requirements.

Minimum stroke: 50 mm.

Minimum load capacity: 10 kN.



CH-4 1000 kN ACTUATOR
HORIZONTAL MOUNTING ON A
CONCRETE STRUCTURE, FOR
WALL TESTS..



MUF 404/60 MACHINE WITH CH-4
ACTUATOR, MOUNTED ON UPPER BRIDGE.



BALANCED ACTUATORS (THE SAME CAPACITY IN TENSILE AND COMPRESSION SENSE)

MODEL (kN tensile/comp)	Working pressure (bar)	Maximum working frequency (Hz)	Peak frequency (Hz)	External \varnothing	Rod \varnothing (mm)	Female thread in the rod end	max/min length (mm)
CH4 30/30	200	3	10	\square 88*88	36	M20 X 1,5	1030/830
CH4 100/100				\square 140*140	60	M30 X 2	1060/860
CH4 150/150				\square 158*158	60	M30 X 2	1110/910
CH4 200/200				\varnothing 250	60	M42 X 3	1110/910
CH4 250/250				\varnothing 270	80	M42 X 3	1110/910
CH4 300/300				\varnothing 270	80	M42 X 3	1110/910
CH4 500/500				\varnothing 310	90	M60 X 2	1170/970
CH4 1000/1000				\varnothing 400	160	M90 X 3	1340/1140

UNBALANCED ACTUATORS (DIFFERENT CAPACITY FOR TENSILE AND COMPRESSION SENSE)

MODEL (kN tensile/comp)	Working pressure (bar)	Maximum working frequency (Hz)	Peak frequency (Hz)	External \varnothing	Rod \varnothing (mm)	Female thread in the rod end	max/min length (mm)
CH4 5/10	200	3	10	\varnothing 48	25	M16	600/400
CH4 10/20				\square 78*78	30	M20 X 1,5	600/400
CH4 15/30				\square 78*78	36	M20 X 1,5	600/400
CH4 38/60				\square 88*88	36	M20 X 1,5	600/400
CH4 120/160				\varnothing 188	50	M24 X 2	840/640
CH4 170/220				\square 158*158	60	M30 X 2	840/640
CH4 200/300				\varnothing 228	80	M42 X 3	830/630
CH4 250/350				\varnothing 250	80	M42 X 3	830/630
CH4 300/400				\varnothing 260	80	M42 X 3	830/630
CH4 500/750				\varnothing 320	130	M80 X 3	940/740
CH4 680/1000				\varnothing 372	140	M 80 X 3	980/780

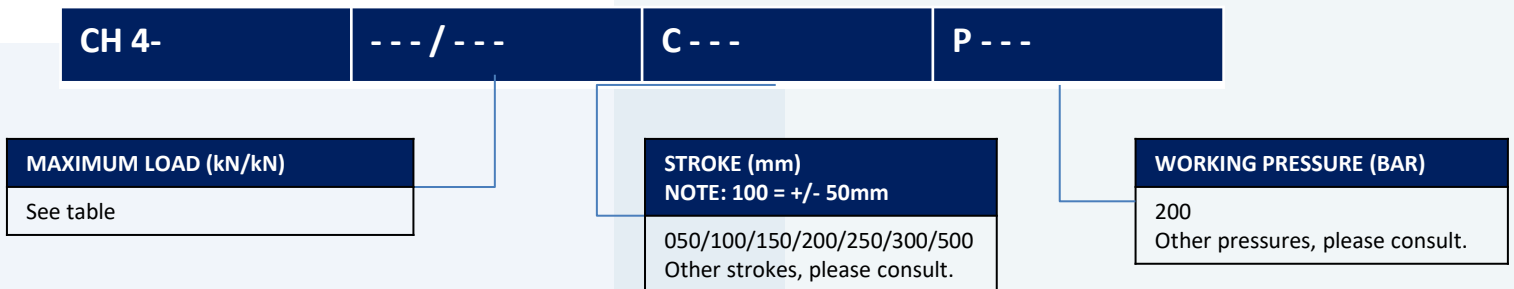


SPECIFICATIONS

ACCESORIES

DISPLACEMENT TRANSDUCER	LVDT	MAGNETOESTRICTIVE Digital output signal SSI	MAGNETOESTRICTIVE, Analog output signal +/-10 VDC
LOAD CELL	Standard commercial equipments, as HBM U10M or similar.	Servosis special designs.	
SERVOVALVE	MOOG. Drive signal in voltage or current. Optional: <ul style="list-style-type: none"> Block for two servovalves, to work in high/low flow. Sandwich valves for chambers locking, pressure and return lock. Hydraulic accumulators for pressure and return lines. 		
ASSEMBLY SYSTEMS	Designed for each project. Front or back flange, tilted systems, swivels.		

REFERENCE



servosis

Testing Machines



HYDRAULIC SERVOACTUATORS CH9

Hydraulic servoactuators
CH9 SERIES



Servosis develops and manufactures CH9 servoactuators, specifically designed for dynamic tests up to 100 Hz.

Servosis, more than three decades of experience.



www.servosis.com

MODEL CH-9

Hydraulic hydrostatic actuators.

Custom designs:

- Servosis personalize the actuators to meet customer requirements, choosing the suitable stroke, load capacity, bearing pieces, transducers, etc.
- They are full designed at Servosis, so that we can adapt them to customer requirements without depending on third parties involved.

Pressure sealing system:

- They have no joints neither in the rod nor in the rod covers.
- They have a pressure injector system that keep the rod floating in an oil film, with no friction.

Quick response:

- Linear speed up to 2 m/sec.
- Continuous working frequency up to 50 Hz.
- Maximum working frequency 100 Hz.

Robustness and accuracy:

- High quality transducers:
 - HBM
 - Temposonics
- Moog servovalves
- Ceramic coating rods, wich makes them practically immune to wear



MOD. CH9- 020 – C200-200.
 INSTALLED ON A SLIDING SUPPORT FOR GROOVED BENCH
 CENTRAL TILTING SYSTEM WITH FORCE APPLICATION ANGLE BLOCK

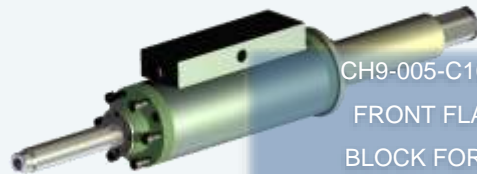


MOD. CH9- 020 – C100-200.
 IINSTALLATION ON A SUPPORTING SQUARE, WITH ADJUSTMENT OF:

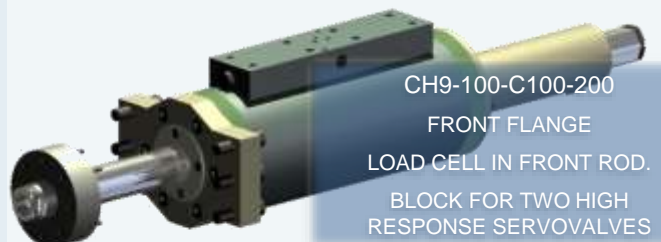
- HEIGHT
- SPIN
- LOAD APPLICATION ANGLE, THROUGH A CENTRAL BLOCKING TILTING SYSTEM



CH9-250-C100-200
 FRONT AND BACK FLANGES
 BLOCK FOR HIGH RESPONSE SERVOVALVE



CH9-005-C100-200
 FRONT FLANGE
 BLOCK FOR TWO SERVOVALVES



CH9-100-C100-200
 FRONT FLANGE
 LOAD CELL IN FRONT ROD.
 BLOCK FOR TWO HIGH RESPONSE SERVOVALVES



SPECIFICATIONS

	Working pressure (bar)	Maximum speed (m/sg)	Maximum working frequency (Hz)	Peak frequency (Hz)	External Ø (mm)	Rod Ø (mm)	Female thread in the rod end	Maximum length (mm)	Minimum length (mm)
CH9-5kN	200 bar	2 m/sg	50 Hz	100 Hz	118	36	M20 X 1,5	950	750
CH9-10kN					128	36	M20 X 1,5	950	750
CH9-20kN					128	36	M20 X 1,5	950	750
CH9-50kN					138	45	M24 X 2	950	750
CH9-100kN					170	50	M30 X 2	960	760
CH9-150kN					175	63	M33 X 2	960	760
CH9-200kN					220	80	M42X2	1050	850
CH9-250kN					220	80	M48 X 2	1050	850

These specifications correspond to 200 mm stroke actuators. Please consult for other models.
 These measures correspond to the actuators without accessories.
 We can build other sizes and capacities upon request.

ACCESORIES

DISPLACEMENT TRANSDUCER	LVDT	MAGNETOESTRICTIE Digital output signal SSI	MAGNETOESTRICTIVE Analog output signal +/-10VDC
LOAD CELL	Standard commercial equipments, as HBM U10M or similar.	Servosis special designs.	
SERVOVALVE	MOOG. Drive signal in voltage or current. Optional: <ul style="list-style-type: none"> • Block for two servovalves, to work in high/low flow. • Sandwich valves for chambers locking, pressure and return lock. • Hydraulic accumulators for pressure and return lines. 		
ASSEMBLY SYSTEMS	Designed for each project. Front or back flange, tilted systems, swivels.		

REFERENCE

CH 9- --- C --- P ---

MAXIMUM LOAD (kN)

005/010/020/050/100/150/200/250
 For other capacities, please consult.

STROKE (mm)

NOTE: 100 = +/- 50mm

050/100/150/200/250/300/
 For other strokes, please consult.

WORKING PRESSURE (BAR)

200
 For other pressures, please consult.



Load cells

servosis

Testing Machines



- Specific software.
- Products according Standard specifications.
- Custom made designs.





Experience

Servosis has vast experience in testing world for pieces and materials. More than three decades working support us as a benchmark in the sector.

Our range of products include all fields: aeronautic, automotive, construction, lumber, composites, railway...

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products, adapted to the most recent regulations.

Custom-made

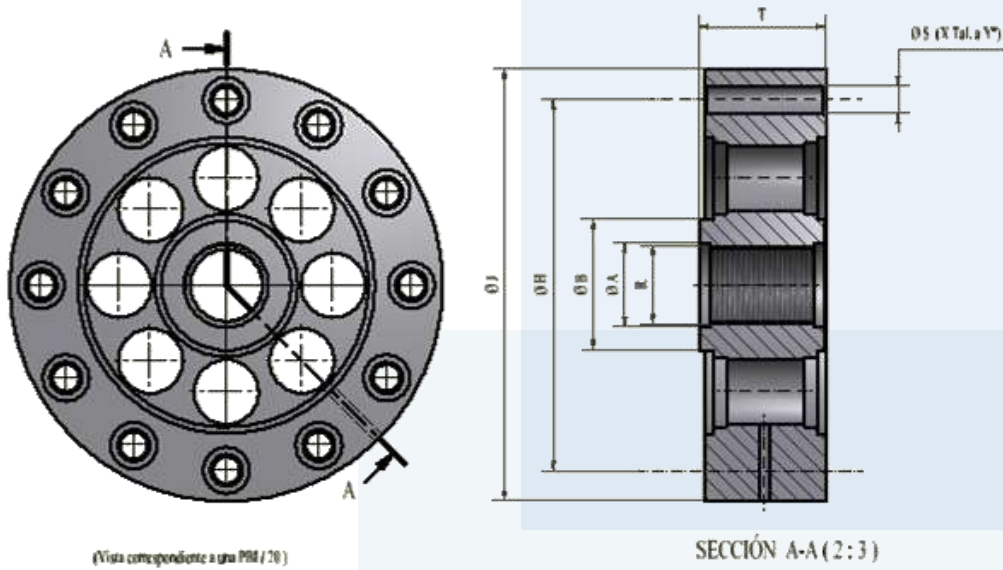
Our competitive advantage is our ability to offer custom solutions, according to the specific needs of each of our customers.



Servosis load cells (force transducers) deliver high stiffness and reliability to the test system. They can be certified to be used as force standards.

All values shown in this document are standard manufactures. You can consult for other sizes and possibilities.

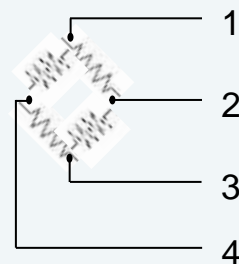
PBI Force transducer



(Vista correspondiente a una PBI / 20)

SECCIÓN A-A (2:3)

SPECIFICATIONS	
Input resistance	350 +/-3 Ohm
Output resistance	350 +/- 3 Ohm
Electrical output	2 mV/V +/- 0,5%



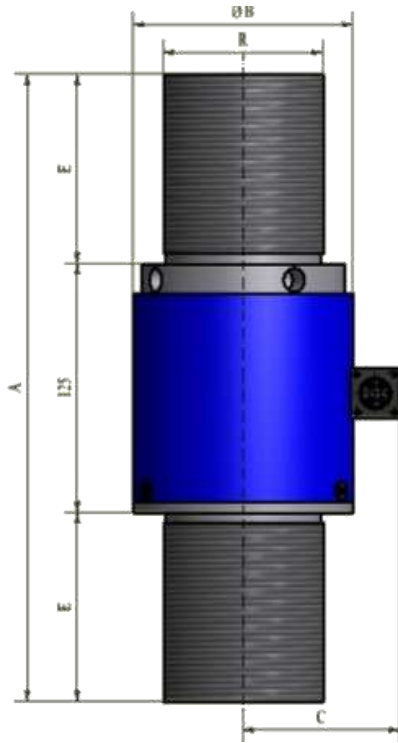
1	IN+
2	EX+
3	IN-
4	EX-

Model	Force capacity (kN)	ØA	ØB	ØH	ØJ	ØS	T	R
PBI/10t	100	32,5	50	142	166	Ø10,5	49	M30X2
PBI/20t	200	32,5	50	142	166	Ø10,5	49	M30X2
PBI/50t	500	50	68	166	198	Ø13	56,5	M48X2
PBI/100t	1000	66	118	228,6	280	Ø17	66	M64X4

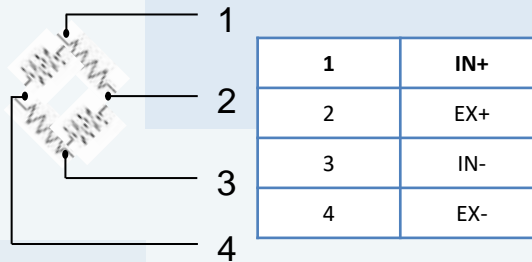
Measures in mm.



PCI Force transducer



SPECIFICATIONS	
Input resistance	350 +/- 3 Ohm
Output resistance	350 +/- 3 Ohm
Electrical output	2 mV/V +/- 0,5%

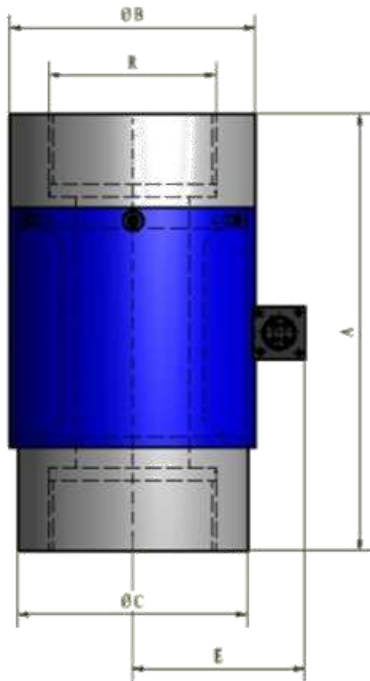


MEASUREMENTS						
MODEL	Force capacity (kN)	A	ØB	C	E	R
PCI/50t	500	275	90	70	75	M80X3 X70
PCI/60t	600	275	90	70	75	M80X3 X70
PCI/80t	800	275	90	70	75	M80X3 X70
PCI/100t	1000	275	90	70	75	M80X3 X70
PCI/120t	1200	315	110	78,5	95	M100X3 X95
PCI/150t	1500	315	110	78,5	95	M100X3 X95
PCI/200t	2000	335	136	91,5	105	M125X4 X105
PCI/260t	2500	335	135	91,5	105	M125X4 X105

Measures in mm.

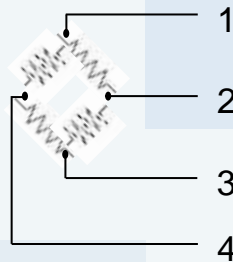


PCH Force transducer



SPECIFICATIONS

Input resistance	350 +/- 3 Ohm
Output resistance	350 +/- 3 Ohm
Electrical output	2 mV/V +/- 0,5%



1	IN+
2	EX+
3	IN-
4	EX-

MODEL	Force capacity (kN)	A	ØB	ØC	E	R
PCH/10t	100	150	68	59	57,5	M30x2 X40
PCH/20t	200	160	78	69	62,5	M36x2 x40
PCH/30t	300	175	90	81	68,5	M45x3 x40
PCH/40t	400	180	98	89	72,5	M60x3 x40
PCH/50t	500	210	118	109	82,5	M80x3 x40
PCH/60t	600	210	118	109	82,5	M80x3 x60
PCH/100t	1000	270	155	146	100	M100x3 x60
PCH/120t	1200	270	155	146	100	M100x3 x60
PCH/150t	1500	270	195	186	120	M125x3 x60
PCH/200t	2000	270	220	211	132,5	M140x3 x60

Measures in mm.





SPECIFICATIONS

SERVOSIS LOAD CELLS, MODELS PBI, PCH, PCI	
Nonlinearity	<0,05% of full scale
Hysteresis	<0,02% of full scale
Accuracy class	0,5 or 1 under ISO 7500-1
Rated output (Nominal)	2 mV/V
Bridge resistance	350 Ohm
Insulation resistance	>10 GOhm
Temperature	-20°C to 60°C
Max applied force	150% of full scale

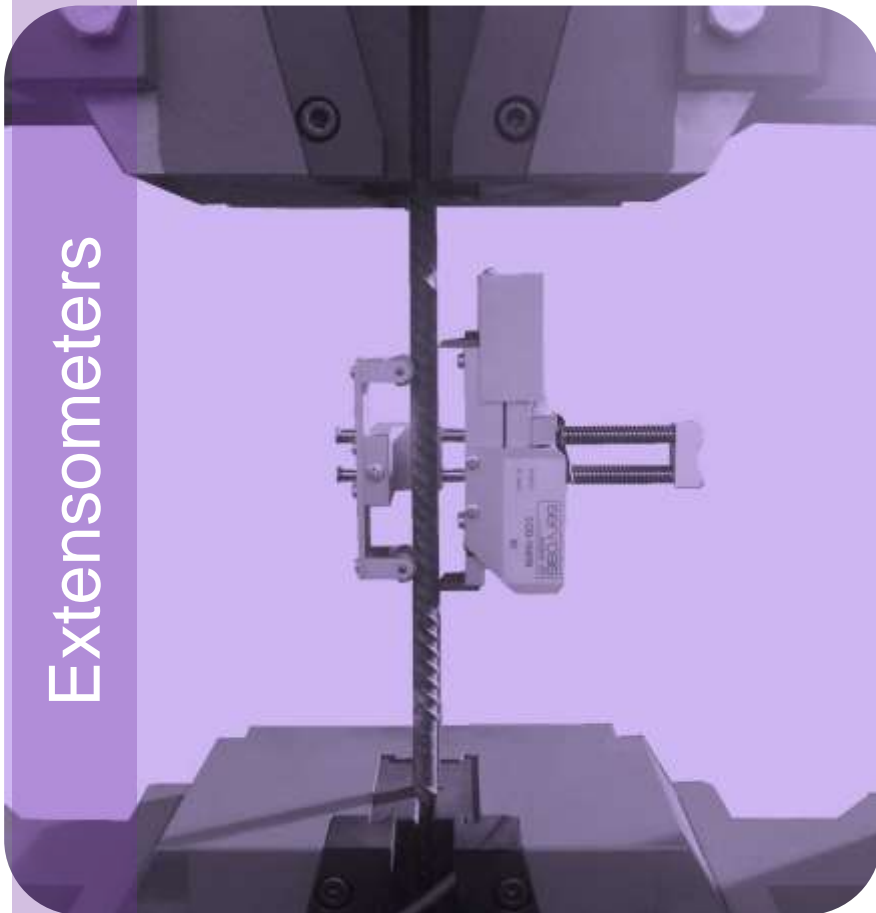


servosis

Testing Machines



Extensometers



- Specific software.
- Products according Standard specifications.
- Custom-made designs.



Experience

Servosis has a vast experience in testing workd for pieces and materials. More than three decades working support us as a benchmark in the sector.

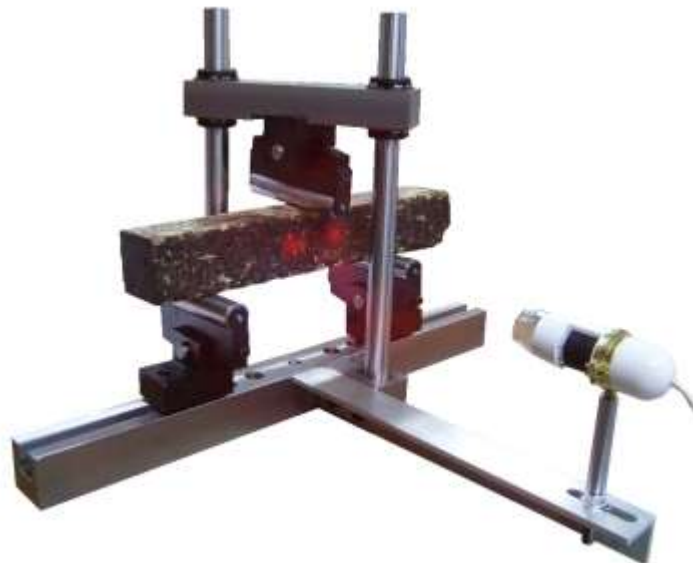
Our range of productos include all fields: aeronautic, automotive, construction, lumber, composites, railway...

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products, adapted to the most recent regulations of the sector.

Custom-made

Our competitive advantage is our ability to offer custom solutions, according to the specific needs of each of our customers.puntuales de cada uno de nuestros clientes de cada uno de nuestros



ACCESSORIES: EXTENSOMETERS & VIDEO EXTENSOMETERS



Servosis has a wide range of extensometers for a direct strain measurement in a stressed specimen under test.

We design and manufacture specific extensometers for tensile and compression tests, axial and diametral measurements...

We offer a wide range of models:

- Digital or analog reading.
- Manual or pneumatic auto-clamping system.
- Fracture characteristics.
- Laser extensometers.

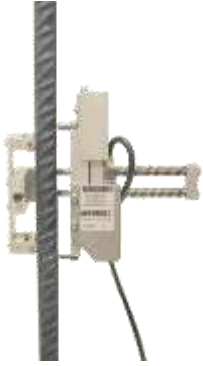
In addition to incorporating these equipment into our test machines, we can offer independent equipments with self-contained measurement analog signal outputs, to be used with any type of data acquisition system.



ACCESSORIES: EXTENSOMETERS

Model CDD

Axial extensometer for tensile tests through specimen failure.



- Gauge length 100-200 mm (possibility to built other sizes).
- Maximum strain 50 -100 mm (possibility to built other sizes).
- Manual or automatic clamp.
- For round or flat specimen.
- Operating principle: digital encoder.

Model CDA

Axial extensometer for tensile tests through failure.

- Gauge length 100,-200 -500 mm (possibility to built other sizes),
- Maximum strain 50 -100 mm (possibility to built other sizes).
- Automatic clamp from PC.
- For round or flat specimen.
- Operating principle: digital encoder.



Epsilon extensometers

For several purposes.

Model 3560.- Biaxial extensometer:

Provides simultaneous lateral (transverse) and axial strain measurement.



Model 3542.- Axial extensometer

Gauge length 10-80 mm.

Operating principle: wheatstone bridge.



Model 3541 – Fracture Mechanics



Model CDR

Extensometer for yield strength and young modulus

- Gauge length 50-100 mm.
- Max. Strain 2,5 mm.
- Possibility of double mounting.
- Manual clamp.
- For round or flat specimen.
- Operating principle: wheatstone bridge.



Model CDL

Diametral extensometer

- Manual clamp.
- Nominal stroke: 3 to 10 mm.
- Resolution: 0,001 mm.
- Linearity: 1 %,
- Specimen width: 10-25 mm. (it can be modified upon request)
- Operating principle: LVDT transducer.



Model CDP

Axial extensometer for rubber and plastic specimens (high elongations).

- Variable gauge length by the user.
- Max. Strain 600% of 100 mm gauge length.
- For round or flat specimen.
- Operating principle: digital encoder.



ACCESSORIES: EXTENSOMETERS

Serie CDO. Video extensometer



Model CDO / 1 / 50

Optical extensometer for general purpose

- Non-contact measurement.
- Includes a high accurate camera.
- For all kind of materials.
- Accuracy: 0,01mm to 0,002 mm.
- Local strain measurements (fracture mechanics...)

Laser extensometer



Laser extensometer

- Non-contact measurement.
- RS232 communication.
- Several models, please consult.



ACCESSORIES: EXTENSOMETERS

STRAIN GAGES

Measuring systems for the direct use of strain gages on specimens.



- Operating principle: wheatstone bridge unbalance.
- Different types of gauges.
- Amplifier with external adjustment of zero value and gain adjustment.
- Output analog signals ± 10 VCC through BNC plugs.
- Direct communication with PCD2K control system.
- Optional specific software for calculation with strain gages.
- It can be mounted as autonomous fixture.

Strain measurement on concrete specimens.



Modulus calculation on concrete specimens under Standard.

- Axial and diametral strain measurement under load.
- 4 LVDT transducers.
- Output analog signals ± 10 VCC through BNC plugs.
- Specific software.
- Direct communication with PCD2K control system.

Extensometers for rubber, elastomers, composites, frames... Servosis designs and manufacture custom-made extensometer equipments for any need.



servosis

Testing Machines



Grips



- Specific software.
- Products according standard.
- Custom designs.



www.servosis.com

Experience

Servosis has a vast experience in testing world for pieces and materials. More than three decades working support us as a benchmark in the sector.

Our range of products include all fields: aeronautic, automotive, construction, lamber, composites, railway ...

We also develop a wide range of grips, fixtures and accessories.

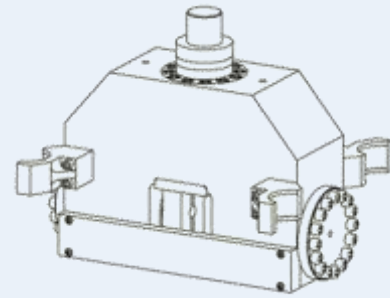
Innovation

We are in contact with the main manufactures and research institutes of the sector, in order to be able to offer updated products adapted to the most recent regulations.

Custom-made

Our competitive advantage is our ability to offer custom solutions, according to the specific need of each of our customers.





GRIPS FOR TENSILE TESTS

Hydraulic grips can be connected to the machine's hydraulic power supply, or they can also be delivered as an independent element, with its own hydraulic power supply.

All models have changeable jaw faces to suit specimen varying by diameter or size.

Models 4011 and 4013 have a blocking system as an option, to allow tensile/compression tests through zero load.



4011 ACH



4011 ACN



4012 ACM



4013 ALH

MODEL	LOAD RANGE	ACTION	CLAMPING
4012 ACM	5-200 kN	Manual. Mechanic with spring.	Wedge.
4011 ACN	5- 100 kN	Pneumatic. Air 8 Bar.	Wedge.
4011 ACH	50- 1000 kN	Hydraulic. Oil 200 Bar	Wedge.
4013 ALH	50-5000 kN	Hydraulic. Oil 200 Bar.	Side



GRIPS FOR TORQUE TESTS

MODEL	LOAD RANGE	ACTION	CLAMPING
4014	10-2000 N/m	Manual.	3-Jaw plate



GRIPS FOR INSULATOR TESTS



UNE 1607 Tensile strength perpendicular to faces.

UNE 826 Compression behaviour.



UNE 1608 Tensile strength parallel to faces.



UNE 12430 Behaviour under load point.



UNE 12089 Bending strength.

GRIPS FOR WOOD TESTS



UNE-314-1 Bonding strenght.



UNE-56539 Strength against cleft.



UNE 319 Tensile strength perpendicular to faces.



UNE 56538 Tensile strength perpendicular to fibers.



SPECIAL GRIPS. CUSTOM DESIGN

Servosis designs and manufactures all type or grips for any test. Do not hesitate in consult us.

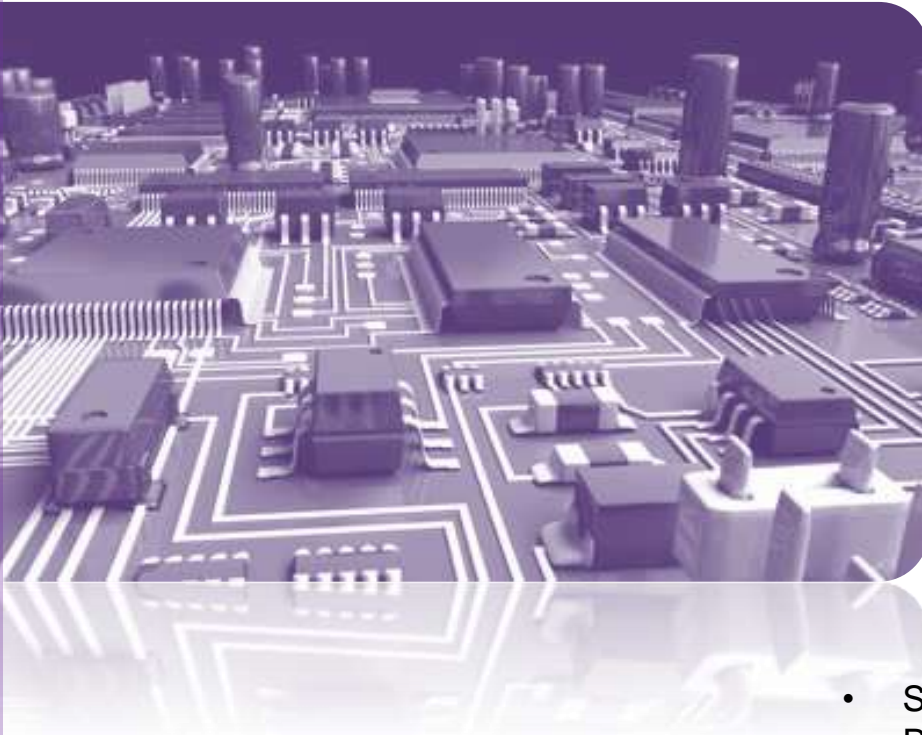


servosis

Testing Machines



Signal conditioning electronics



- Specific software.
- Products according Standard.
- Custom designs.



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Experience

Servosis has a vast experience in testing world for pieces and materials. More than three decades working support us as a benchmark in the sector.

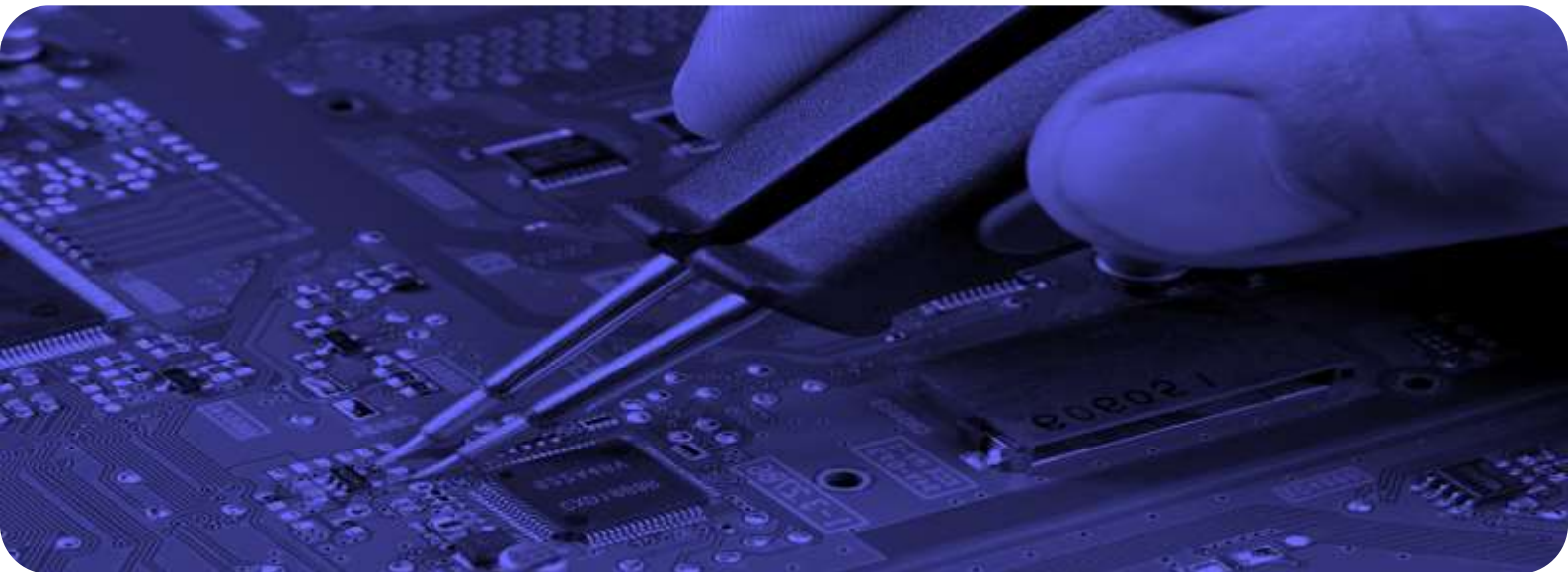
Our range of products include all fields: aeronautic, automotive, construction, lamber, composites, railway...

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products adapted to the most recent regulations.

Custom-made

Our competitive advantage is our ability to offer custom solutions, according to the specific needs for each of our customers.





SV 106

Designed for sensors or transducers measure, based on resistive strain gages on Wheatstone bridge.

Input circuit based on an Instrumentation Amplifier (INA) with:

- Low noise (1nV/ÖHz) .
- Low THD+N: 0.0009% a 1kHz, G = 100 (Total harmonic distortion plus noise).
- High GBW: 100MHz at G = 1000 (Gain Bandwidth product).
- High CMRR: >100dB (Common-Mode Rejection Ratio).



Gain selection for input Instrumentation Amplifier (INA) through micro switches, in steps of:

G= 100, G=200, G=300, G=400 o G=configurable through high stability resistance.

Offset adjustment.

Voltage input for external zero adjustment.

The conditioner has 2 scales, x1 and x10. Each one has independent gain adjustment and zero adjustment. The selection of the scale is made by an external voltage that switches a relay with double contacts, so that maximum galvanic isolation and independence between two gain amplifiers are ensured.

The conditioner output is standard voltage ± 10 V.

It has a force alarm circuit. This alarm compares the sensor output signal with an internally adjustable value or an external voltage value.

The alarm working causes a relay activation. It has NC contacts (Normally closed) and NO contacts (Normally open)

The relay remains locked, even if the alarm cause disappears. The alarm can be reset by pushing a button.

The conditioner just need 24 VDC supply voltage.

Manufactured with most of components in SMD assembly, with a great reliability, thermal stability and security, and a large number of elements and functions, such as filters and operational circuits

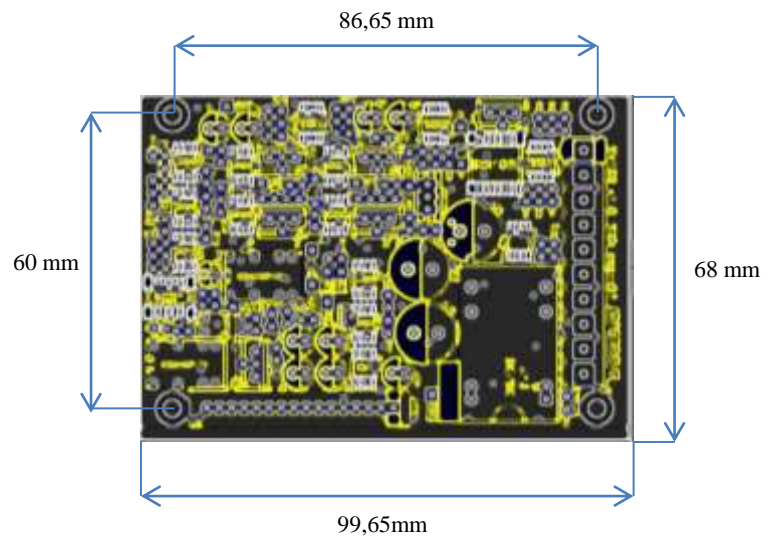
It has many Test Points (TPs) to make easier adaptation and adjustments with the load cell.



	SV 106	SV 111
Supply voltage	24 VDC +/- 15 VDC (optional)	
Output analog signal	+/- 10 VDC	
Double measure scale	YES 2 nd adjustable scale 1/5,1/10	N.A.
Maximum load alarm signal:	YES. External adjustment optional	N.A.,.
External zero value adjustment	Optional	
Dimensions	99,65 x 68 mm	
Assembly system	4 screws + turret M3 Plastic support for DIN rail mounting (optional)	

CON 1

1	INPUT +
2	INPUT -
3	EXC +
4	EXC -
5	Ref.
6	+ Vout
7	- Vout
8	0V IN
9	24VDC IN
10	



SV 107

SIGNAL CONDITIONERS FOR LVDT AND DISPLACEMENT TRANSDUCERS

Features:

- Selection from LVDTs, Half-bridge and Full-Bridge.
- Selection of exciting voltage between 2,5 and 5,0 V.
- Selection of exciting frequency between 3,7 kHz and 5,1 kHz.
- Selection of filter from 10 kHz, 1kHz and 100Hz.
- Possibility of variation of input circuit gain through high stability resistance.
- Gain stage with independent gain and zero settings.
- External voltage input for zero adjustment.
- Voltage output signal according to the industrial standard of ± 10 V.
- Supply: 24 VDC
- Dimensions: 68 x 100 mm, being possible to mount it on a DIN rail or to fix it using M3 screw.



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Testing Machines



ENVIROMENTAL TESTS



Experience

Servosis has vast experience and extensive testing knowledge in manufacturing test equipments. More tan three decades working to comply with you requirements.

We develope solutions for testing equipments at controlled temperature.





Two-zone Split furnaces.

- Autonomous equipments.
- Aluminium finish.
- Temperature measure via thermopair.
- Possibility to mount several thermopairs in both zones.
- Temperature controller, accuracy $\pm 1^{\circ}\text{C}$.
- Control via PC optional.

Maximum temperature	Free \varnothing in working area (mm)	Height in working area (mm)
1100 $^{\circ}\text{C}$	89	152
	127	304
	165	456
	203	
	254	

All diameters can be combined with all heights.
Height can be as shown or its multiples.





Climatic chambers.

- Temperature control from machine control computer.
- Synchronized with mechanic actuator.
- Finished with front glazed window.
- Ready to connect transducers.
- Temperature controller, accuracy $\pm 1^{\circ}\text{C}$.

Maximum temperature	Free working area dimensions (mm)
600°C	400*400*500
Free working distances can be customized. The entry cable points are considered for each case.	

Climatic heat/cold chamber in universal testing machine model MUF 401

Heated compression platens.

- Temperature control from machine control computer.
- Synchronized with mechanic actuator.
- Temperature control via thermopair.
- Evaluated for each Project.



servosis

Testing Machines



Solutions for automotive



Specific software.
Products according Standard.
Custom-made designs.



**Experience**

Servosis has a vast experience in testing world for pieces and materials. More than three decades working support us as a benchmark in the sector.

Our range of products include all fields: aeronautic, railway, construction, lamber, composites, and also automotive sector.

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products adapted to the most recent regulations.

Custom-made

Our competitive advantage is our ability to offer custom solutions, according to the specific need of each of our customers.



Tensile-compression test of stabilizer bar, with two synchronized actuators.

Equipment:

- ❑ 2 actuators model CH9, 50 kN, stroke 150mm.
- ❑ The hydraulic power supply is designed according to the test characteristics.
- ❑ Custom made bench and holders, with manual displacement.
- ❑ Control software PCD2K.
- ❑ Measure electronics for 16 analog channels.



Guiding test for perpendicular forces in shock absorbers.

Equipment:

- ❑ ME 402/50 kN with custom design fixtures.
- ❑ Control software PCD2K.
- ❑ Measure electronics for 8 analog channels.



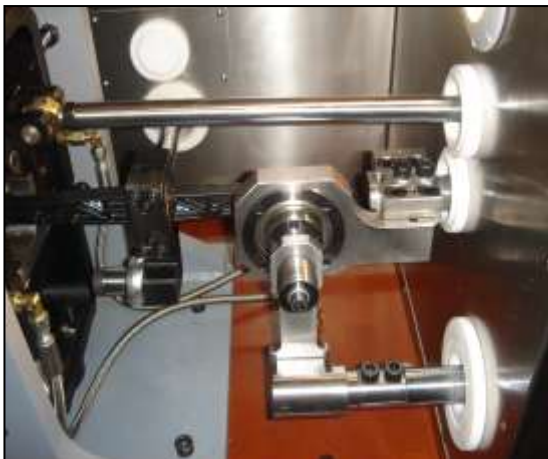
Rotating bending test for shock absorbers.

Equipment:

- ❑ Custom made bench with two synchronized movements for shock absorber tubes: rotation and perpendicular force.
- ❑ Optional 5 l/min – 200 bar hydraulic power supply.
- ❑ Pneumatic pressure measure in the tube, applied force, number of spins...
- ❑ Control software PCD2K.
- ❑ Electronic measure for 8 analog channels.



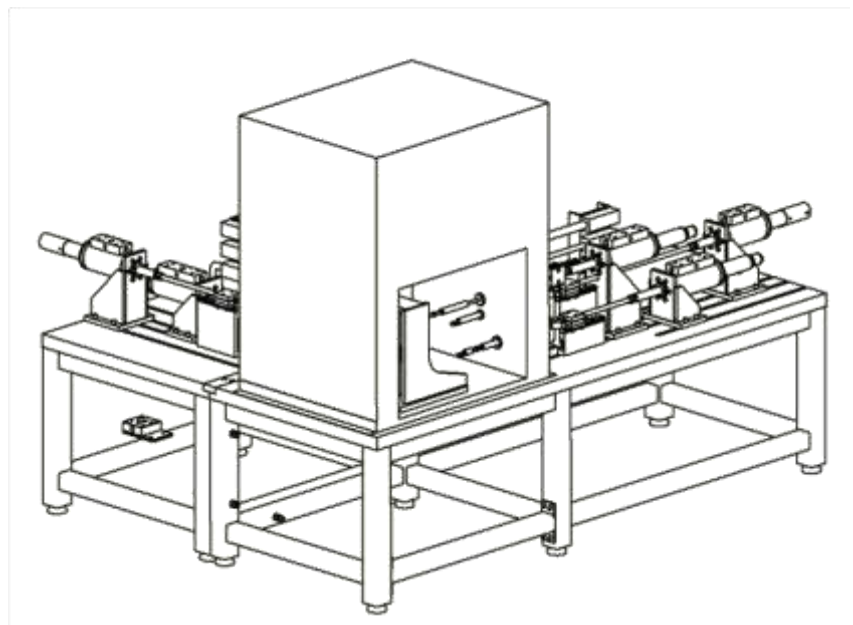
Wear test of swivels:



Equipment:

- 5 synchronized hydraulic actuators.
- Enviromental chamber controled from testing software.
- Control softwre PCD2K.
- Measure electronics for 16 analog channels.

The values of the test to be performed have been taken through a data acquisition in a real vehicle, later Servosis system has import them to emulate reality.



Dynamic actuator + mounting bracket for many purposes.

Equipment:

- Actuator model CH9, different capacities and strokes.
- Mounting bracket that allow vertical and rotating movements..
- Hosing for hydraulic connection.

This equipment can be provided with the hydraulic power supply, control software and measure electronics.

Pulsating pressure generator for filters, filter burst, torque tests, crank shafts crack tests, multiactuator tests with free configuration...



ROTATING BENDING TESTS

Fatigue testing machine – Rotating bending machine



Description

This machine has been designed to test bars of any material, under simultaneous rotating and bending stresses.

Its analog control allows the user to regulate the rotating speed and to program the number of cycles to perform.

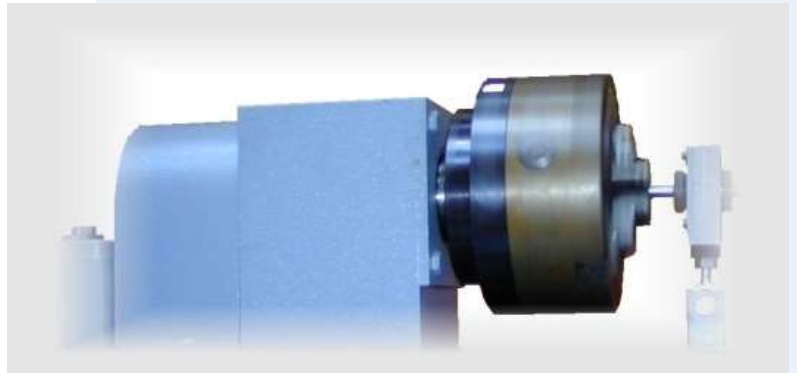
The test ends when the number of cycles programmed is reached, or when specimen failure occurs.

Applied flexure force is displayed.

An hydraulic actuator provides the system with the required flexure force, supplied with an hydraulic power unit. Force regulation is via pressure relief valve, that allows to regulate forces between 10 and 500 N.

Features:

- Adjustable flexure forces between 10 and 500 N.
- Flexure arm adjustable between 100 and 200 mm distances.
- Rotating speed programmable between 100 and 1000 r.p.m.



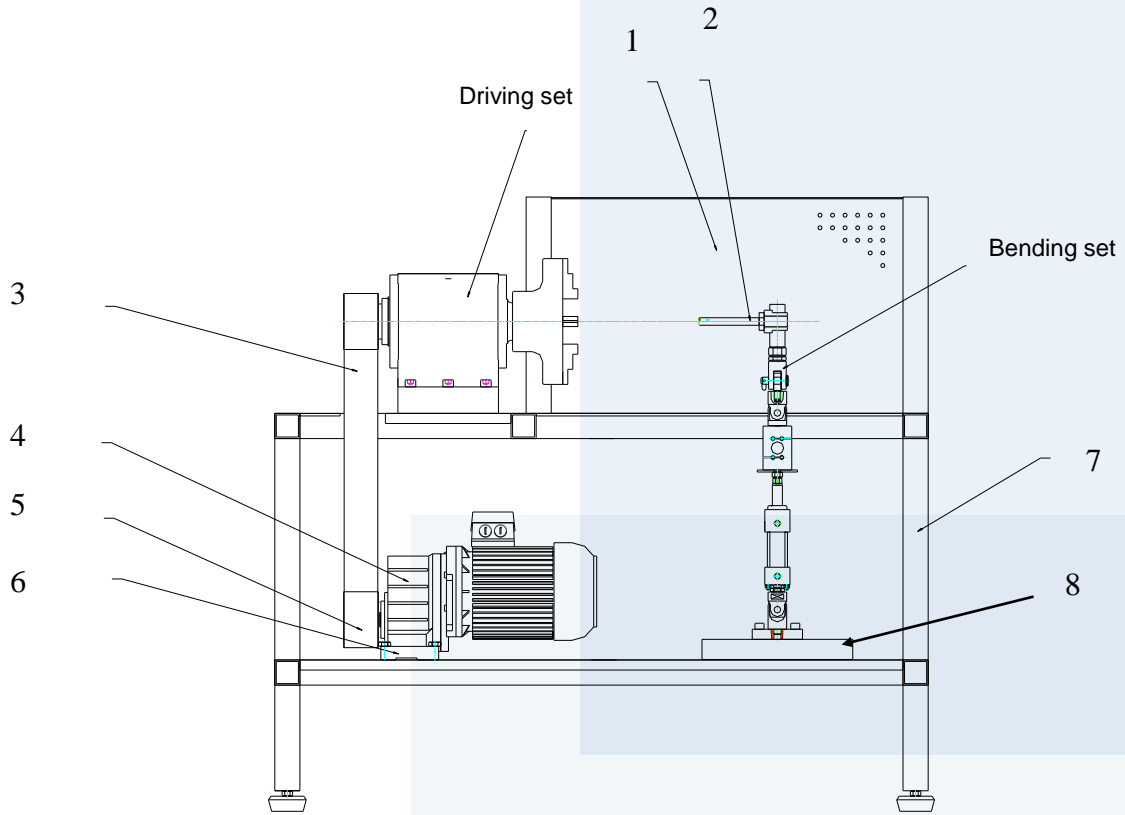
INCLUDED ELEMENTS:

Clamp for $\varnothing 10$ mm specimens in the load application end. For other diameters the clamp must be changed.

3-jaw chuck in the rotating end, where any specimen can be moored up to $\varnothing 50$ mm.



Description



1	Protective case
2	Specimen
3	Toothed belt
4	Geared motor
5	Toothed pulley
6	Fixing plate
7	Bench
8	Bending distance regulation base.



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Testing Machines



Bituminous mixtures test solutions



- Specific software.
- Products according Standard.
- Custom made designs.





Experience

Servosis has vast experience in testing world for pieces and materials. More than three decades working support us as a benchmark in the sector.

Our range of products include all fields: aeronautic, automotive, construction, lumber, composites, railway, asphalts...

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products, adapted to the most recent regulations.

Custom made

Our competitive advantage is our ability to offer custom solutions, according to the specific needs of each of our customers.



Servosis offers solutions constantly evolved in the field of bituminous mixtures tests. We are in contact with the main laboratories to ensure the most recent regulations compliance.

Model MUF-401 is recommended for this purpose. It has been designed to allocate the necessary fixtures to test into a climatic chamber in the load frame.



MUF 401

Frequency up to 100 Hz.

Load capacity between 20 and 500 kN.

Semi-hydrostatic actuator.

Hydraulic power supply, flow rate between 28 and 90 l / min.



UGR FACT TESTING DEVICE



Fatigue cracking in bituminous mixes is one of the most common pathologies that affect roads all over the world. The improvement of the laboratory test methods used in their design is crucial to prolong the service life of pavements.. The UGR-FACT Test, based on a device that produces controlled fatigue cracking process, makes possible to analyze the cracking propagation in the different phases (initiation, progression, and failure). The study of the material is performed in a representative volume, controlling horizontal and vertical deformations produced in the immediate proximity of the crack, after the application of each loading cycle.

- ▶ UGR-FACT is a new test to analyze fatigue cracking in bituminous mixes.
- ▶ The dispositive has been designed specifically as well as a test procedure.
- ▶ The test simulates the loads sustained by a real pavement.
- ▶ It induces a fatigue cracking process (crack initiation, propagation, and failure).
- ▶ The test device is easy to reproduce at a low economic cost.

TESTING MACHINE FOR DUCTILITY TESTS IN COMPLIANCE WITH EN-13589

Testing cart displacement: 1000 mm.

Number of testing posts: 2.

Load capacity: 150 Kgf.

External measurements: 1400 x 400 mm.

Approximate weight: 150 Kgf.

Supply voltage: 220 V single-phase, 50/60 Hz, 350 W.

Cooling coil input/output for an external cold circuit connection with refrigerated circulators, to maintain a controlled temperature.

Water recirculation pump into the bucket, wich allows to homogenize the temperature.

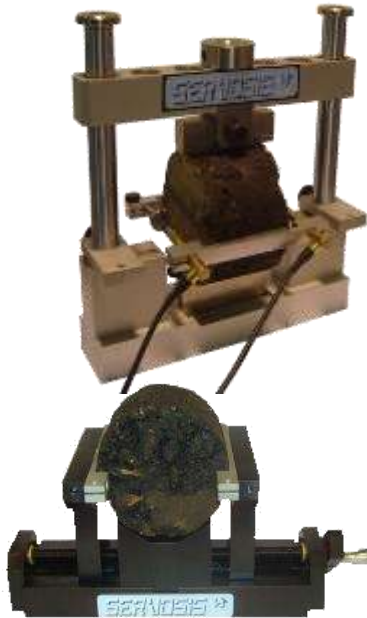
2 load cells and 2 symmetric moulds included.

Computer controlled, with automatic calculation of energy absorbed at different strain modulus. User friendly Windows testing control software.

Programmable testing speed.



Servosis has developed several testing fixtures to comply with EN 12697 requirements, in cooperation with main laboratories in Spain:



EN-12697-24. ANNEX E
FATIGUE STRENGTH

INDIRECT TENSILE STRENGTH OF
CYLINDRICAL SPECIMEN. Fig E.1



NLT 350

FATIGUE TEST IN DYNAMIC BENDING TENSILE
TESTS



CYCLIC COMPRESSION TEST

EN-12697-25 Annex A and B

MARSHALL, CBR...



UNE-EN-12697-26, ANNEX C.

INDIRECT TENSILE STRENGTH OF CYLINDRICAL
SPECIMEN. Fig E.1 (IT-CY). Fig.C.1



EN-12697-24, ANNEX D

4 POINTS FLEXURE TEST OF SQUARE
SPECIMENS. Fig. D.1



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Testing Machines



Railway solutions





Experience

Servosis has a vast experience in testing world for pieces and materials. More than three decades working support us a benchmark in the sector.

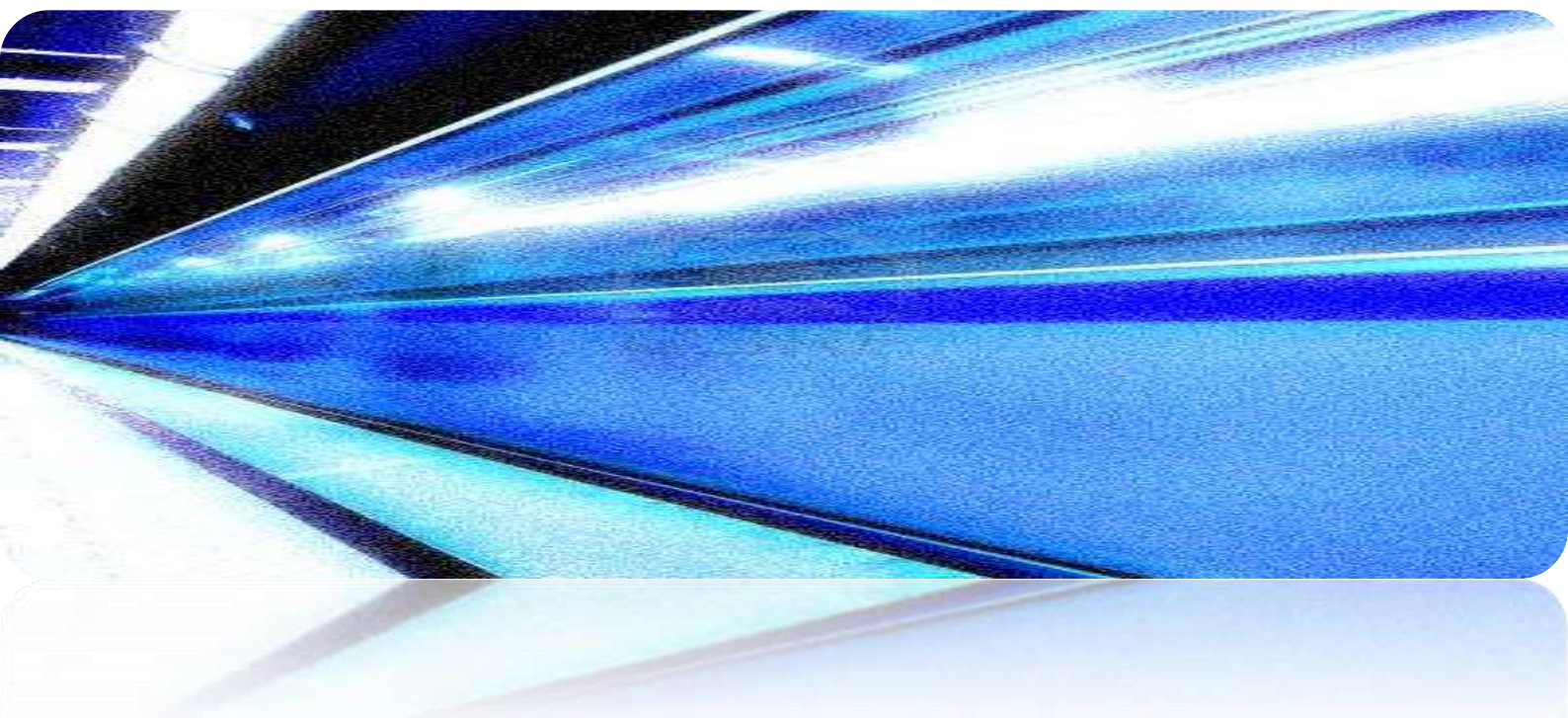
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Innovation

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Custom made

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SHOCK ABSORBERS MAINTENANCE



MODEL: ME 402/2,5

Load capacity: 25 kN

Maximum displacement speed: 500 mm/s.

It is equipped with a turning mechanism that allows both vertical and horizontal tests, depending on its position in the vehicle.

- **Dynamic test:** A known number of displacement applications are made on the shock absorber, and the force exerted is recorded.
- **Acceleration test:** A ramp is applied on the shock absorber at a constantly accelerated speed, and the force obtained is recorded at maximum speed.
- **Friction test:** The friction coefficient on the shock absorber is calculated
- **Note:** This machine can be built complying any other specification of maximum force or speed, depending on the customer requirements.



LIFE TESTS OF PIECES



MODEL: These tests are performed using dynamic actuators, capable of work at frequencies up to 100 Hz.

Maximum load capacity and working frequency are specifically defined depending on the test to perform.

Calculation of:
Dynamic rigidity constant, fatigue strength, dynamic modulus...



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Testing Machines



Metallic samples preparation





Experience

Servosis has a vast experience in testing wold for pieces and materials. More than three decades working support us as a benchmark in the sector.

Our range of products include all fields: aeronautic, automotive, construction, lamber, composites, railway, and also a wide range of fixtures developement.

Innovation

We are in contact with the main manufacturers and research institutes of the sector, in order to be able to offer updated products adapted to the most recent regulations.

Custom made

Our competitive advantage is our ability to offer custom solutions, according to the specific need of each of our customers.



ACCESSORIES: METALLIC SAMPLE PREPARATION FOR TENSILE TESTS.

Our accessories variety has been developed in close collaboration with the main domestic steel bars manufacturers.

All the process since the design phase has been overseen by our clients, achieving a product that unifies the process of sample preparation according to agreed and standardized criteria.

Following this method we have developed a range of effective, robust and easy to use products, so that sample preparation for testing purposes becomes in a controlled process, achieving to comply with the most challenging standards.



STRAIGHTENING



Straightening process of steel bars, both smooth and corrugated, becomes simple with this machine, where the user just selects the diameter of the bar.

Controlled by PC, EBA machines automate the straightening process, by applying 4 load points while a roller system drags the bar along the bench

2 models available:

EBA 14: for Ø 8-10-12-14 steel bars.

EBA 25: for Ø 16-20-25 steel bars.



THERMAL CONDITIONING

Climatic chambers for sample ageing.

Dimensions: 400 x 400 x 1100,1600, 2100 mm

Temperature control up to 200°C



AUTOMATIC MARKING SYSTEM

This machine is equipped with an electric servoactuator to displace a pneumatic cylinder, that makes the marks on the specimen.

The advantages over the manual version are the immediate change of dividing scales by pressing a button on the control touchscreen, the dividing distance versatility...

Easy to use:

- Touchscreen management.
- The process is automatic, being no necessary the presence of the user.
- The distance between marks is selected on the screen, and can be user-defined or selected from a standard list.

Robustness and reliability.

- Digital displacement measurement.
- PLC control.
- Double mechanic reinforcement of guiding system.
- Easy fungibles replacement.



MANUAL MARKING SYSTEM



Specific developement for fixed distances.

Marking divisions: 5-10-15 mm.

Easily exangeable marking pins.



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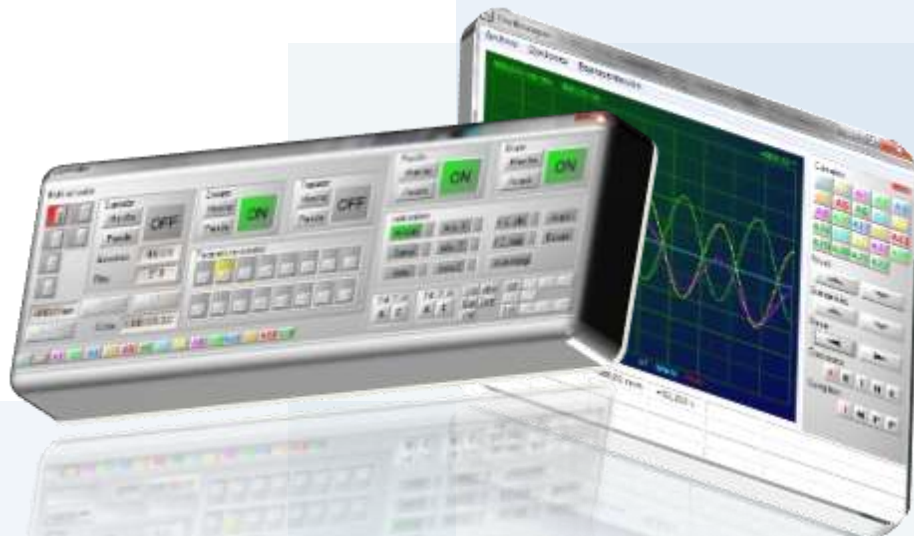
Testing Machines



PCD2K

Control and analysis software for testing machines

PCD2K is an universal control software for dynamic and static tests in all our range of products.



Power

Versatility

- Digital closed servoloop **40 kHz** with any measured or calculated channel.
- **Multiactuator**. Control up to 6 simultaneous actuators, with or without synchronism.
- Management up to **32** physical analog **channels**.
- Management of all type of **digital transducers**.
- Communication protocols with other brand equipments.
- **Equation** manager, calculated measurement channels.
- **Customized testing windows**.
- etc.



PCD2K

Control and analysis software for testing machines

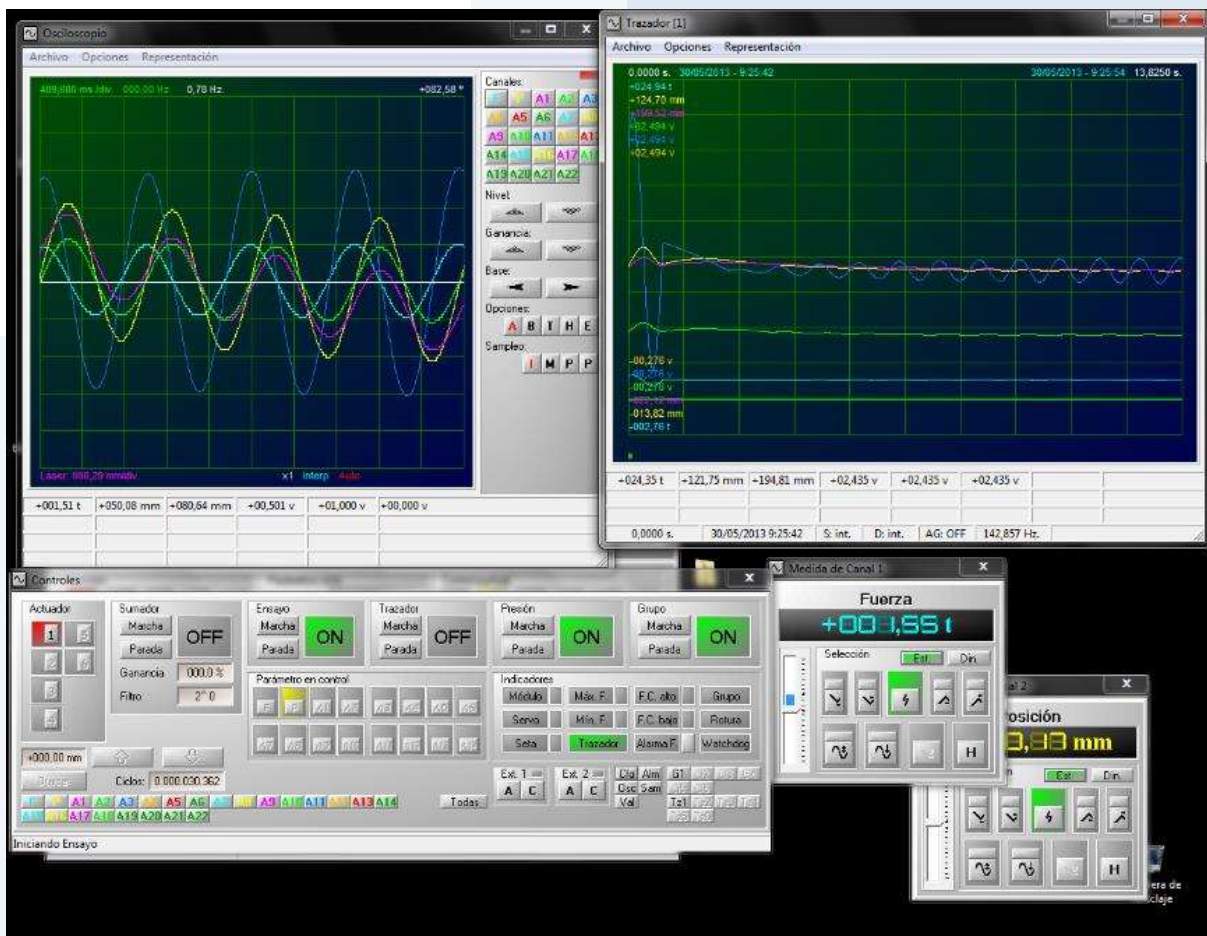
WHAT IS PCD2K?

PCD2K is a software entirely developed by Servosis for of testing machines control.

Combined with our hardware for control and data acquisition form a robust and effective solution for test performance.

Provides the user with the maximum possibilities in calculations and custom test that may need, becoming a very versatile product, capable of manage any tipe of testing machine.

It also has custom modules, test windows, designed to make easier repetitive tasks, reducing user intervention.



PCD2K

Control and analysis software for testing machines

CONTROL POWER

adaptative control

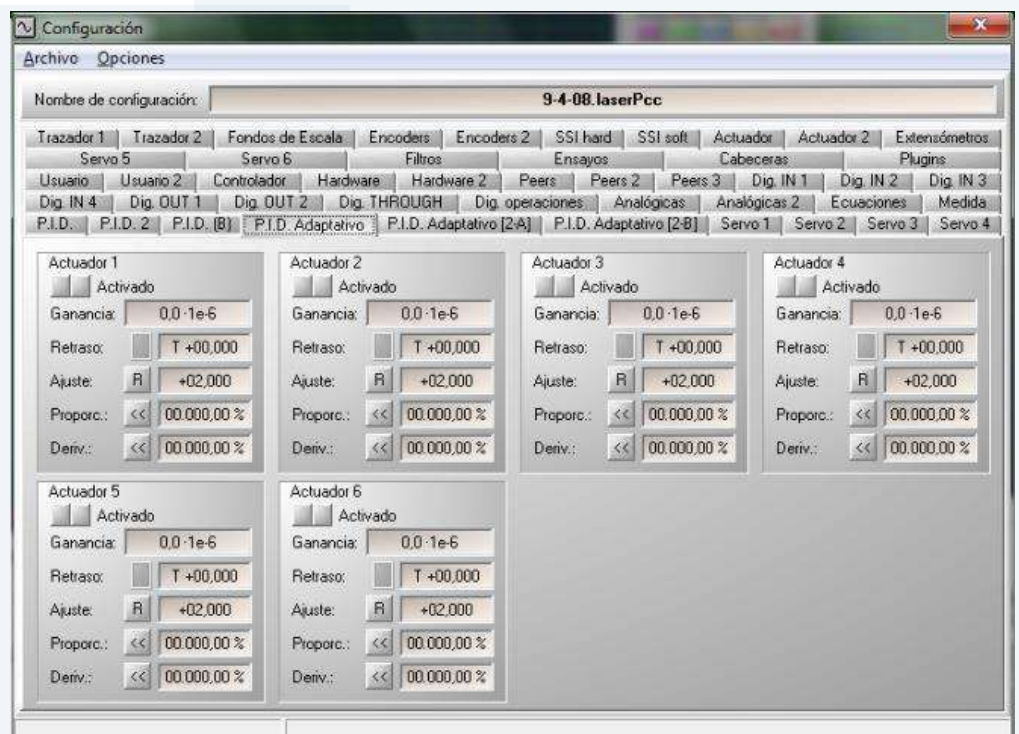
One of the main features of PCD2K is its capacity to automatically adjust the control parameters depending on the specimen behavior, so that the best compliance with the set testing conditions is guaranteed. This feature is known as **adaptative PID**.

Control frequency **up to 40 kHz**.

Closed control loop with any real analog channel measurement (load, displacement, extensometer).

Closed control loop with any virtual calculated channel (averages, speeds, accelerations...)

The system starts a test and adapts in real time the control conditions (proportional, integral, derivative) to specimen behavior. It is a totally transparent process for the user. This feature guarantees that the required test is exactly like the obtained, with no deviations as oscillations, etc.



PCD2K

Control and analysis software for testing machines

FUNCTION GENERATOR TOOL

Several types of programable functions:

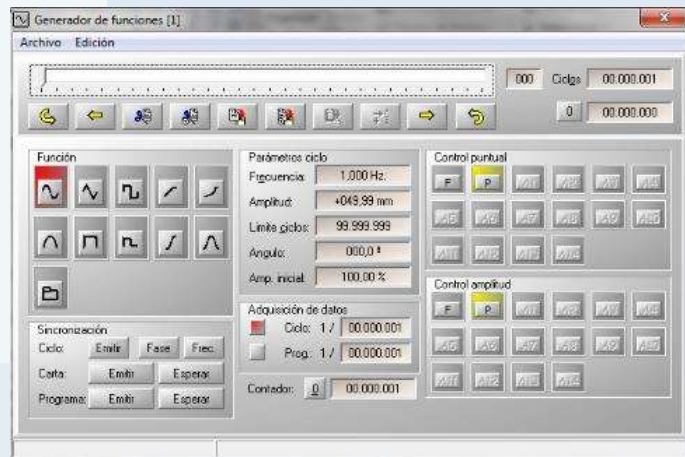
- Cyclic functions.
- Linear functions.
- Exponential functions.
- Functions **coming from real data acquisition files**.

Synchronization tools for several actuators.

Function links.

The user can **create his own testing files**, choosing the type of function to perform and defining its parameters.

The testing files are saved in the PC, and can be used as many times as wanted.

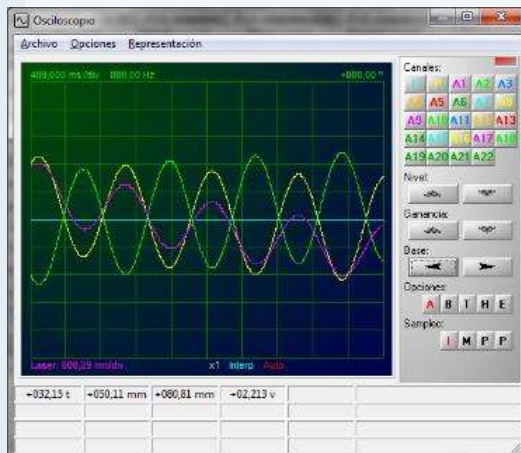


DISPLAY

Real time data display with the tool **“oscilloscope”**

Fully configurable and customizable:

- Automatic/manual zoom.
- Trigger.
- «Hold» function.
- Displayed channels selection.
- Graphic display versus time.
- Representation X-Y.
- Frequency spectrum analysis.
- etc



PCD2K

Control and analysis software for testing machines

DATA ACQUISITION

Data files creator with the tool "Data acquisition".

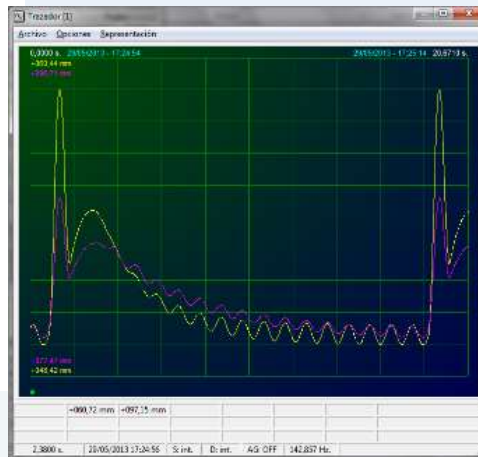
The user can define acquisition time and frequency.

Files supported by data processing platforms (Excel, lotus, matlab...)

Custom test reports.

Data autosaving in configurable intervals.

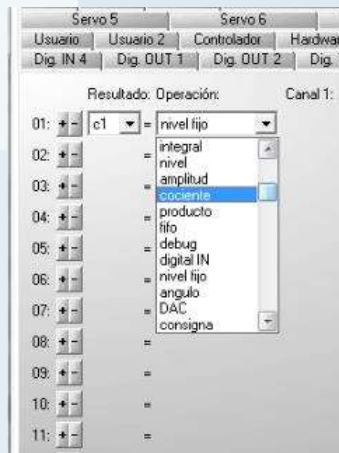
etc



ALGORITHMS

Calculated channels:

- additions
- maximums
- substractions
- gains
- derivatives
- areas
- integrals
- angles
- spikes
- etc
- zener



EXTERNAL ELEMNTS CONTROL

Digital inputs and outputs for status indication, start and stop of auxiliary elements.

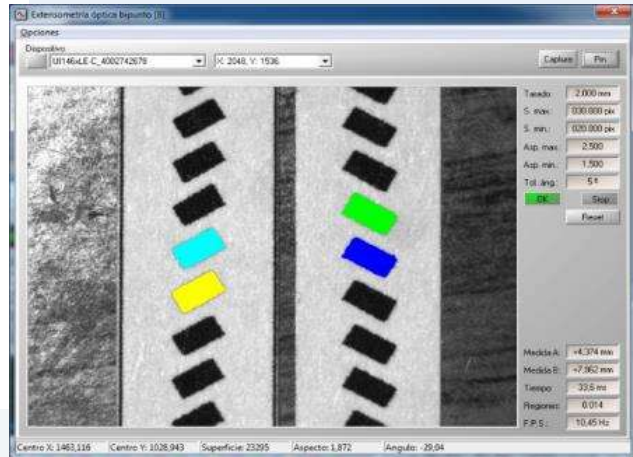


PCD2K

Control and analysis software for testing machines

OPTICAL EXTENSOMETER

Measure module for artificial vision use in strain measurement.



SAFETY:

LIMITS DEFINITION

- Limit values for analog channels.
- **Limit values for cyclic tests.**
- Digital signals for alarm input.

DETECTION SYSTEMS

- Watchdog between control driver and software.
- Resources consumption measurement.
- etc



PCD2K

Control and analysis software for testing machines

TEST WINDOWS

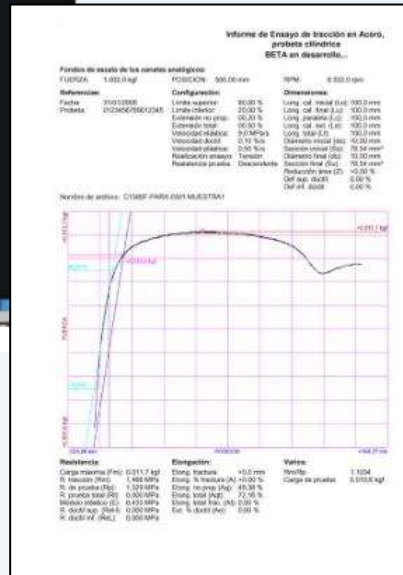
PCD2K includes custom test windows according to a required Standard, in which all the power of the software is combined in a very easy and intuitive tool for the user, that only parametrizes the specimen and obtains the results required by the specification.

- Custom windows, even if they are based on a Standard, the customer can define its own features.
- Testing windows, designed according any Standard or technical specification or procedure.
- Several tools for a test performance and data acquisition are brought together in a single window.
- User friendly. They are developed for the user to intervene as little as possible.
- Test report with your logo and all the results required by the Standard, or custom made.
- Statistics, results export...



PCD2K

Control and analysis software for testing machines



Developed tests for:

Steel

- Tensile, round specimen
- Tensile, square specimen
- Cyclic
- ISO 6892
- ASTM E-8...

Concrete

- Compression
- 3 and 4 points flexure...

Asphalt

- Diametral compression
- Fatigue
- Marshall
- EN 12697-24...

Rocks

- Triaxial compression
- Diametral compression...

Plastics

- Ring stiffness
- Ring flexibility
- Adherence...

Shock absorbers

- Dynamic tests...

Elastomers

- Frequency sweep
- Modules...

Insulator

- Point load
- Parallel tensile strength...

Elastomeric bearings

- Lumber
- Biomaterials...

Impact tests

- Free fall tests
- Dynamic tests
- etc

We develop any type of **custom test** according to your needs.





PCD2K

Control and analysis software for testing machines

Available languages:

Spanish

English

French

Portuguese

(Other languages please consult).

Easily integrable into other brand testing machines.

Demo mode operation **on any PC** for data processing, test analysis, test files...



servosis

Testing Machines



Revamping and updating



Specific software.
Products according Standard.
Custom-made designs.



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1

Experience.

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Innovation

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2

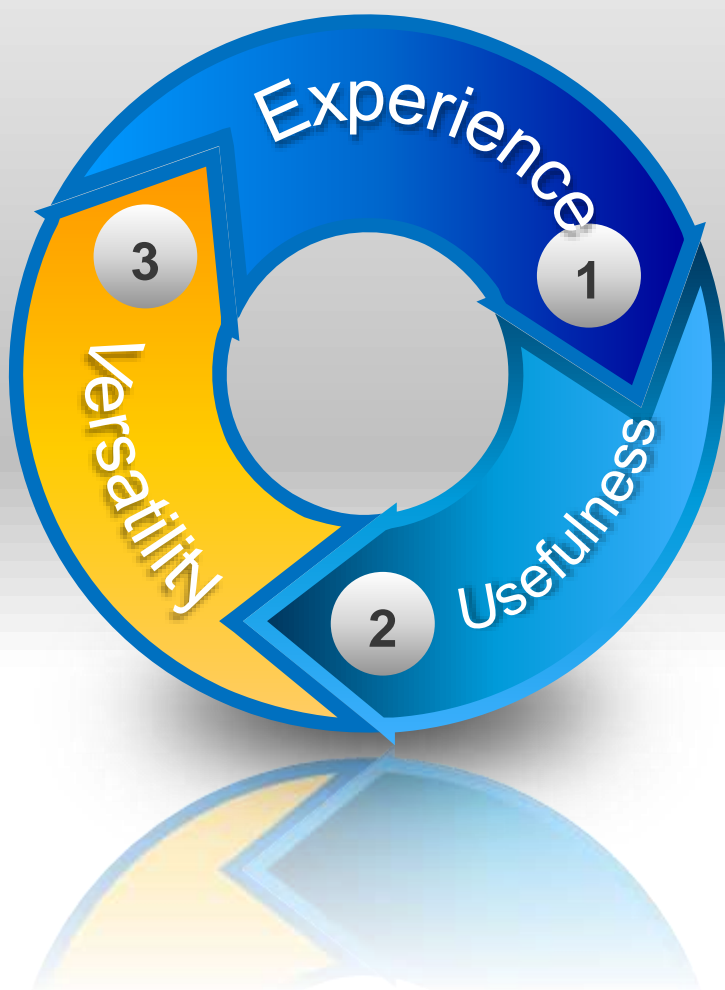
Usefulness

- Installation of new accesories.
- User-friendly enviroment, easy to use
- We deliver all documentation, with customized user manuals.

3

Versatility

- Custom-made testing windows, developed to comply with any Standard or customer requirements.
- Data and results can be exported to different formats, as ASCII, Excel...
- Reporting tool.





We use the old mechanics, incorporating a new measure and control system, providing the machine with a higher performance.

- We install a modern new measuring electronics.
- We replace the necessary sensors.
- We install our control system based on software PCD2K.
- We make the tuning and performance tests.

The customer gets a modern and up to date machine, with a moderate cost.





Universal testing machine, 600 kN load capacity:

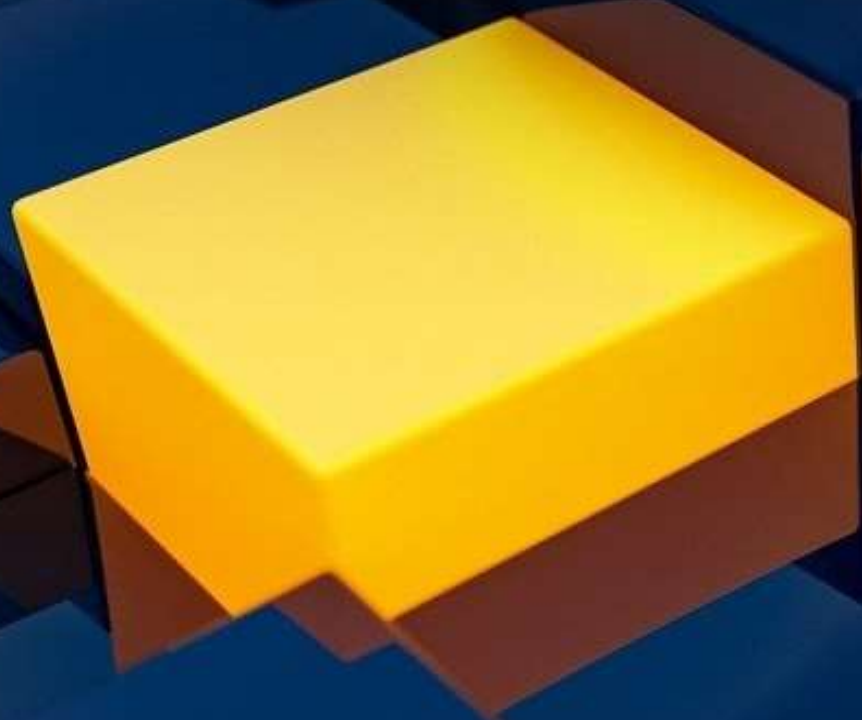
- We install the new control system based on PC, replacing the original.
- We provide new jaw faces for the tensile grips.



Universal testing machine, 600 kN load capacity:

- We install the new control system based on PC, replacing the original.
- We provide new jaw faces for the tensile grips.





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