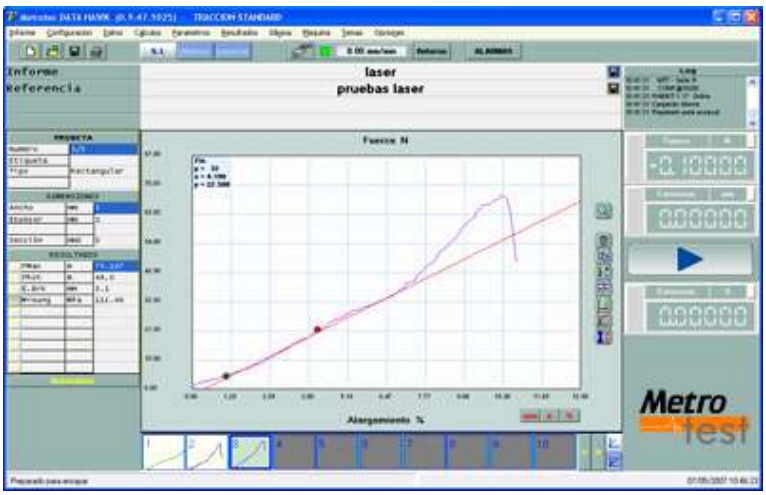
TECHLABSYSTEMS

SERVO-HYDRAULICS
HIGH CAPACITY MATERIALS TESTING MACHINES SHM/CS2 series

Testing Frame Higher
Double Effect Cylinder



With control system and data acquisition by All in One
Touch Screen PC and advanced testing software

METROTEST

Metro test

MADE IN EU

CE

- **Tensile – Compression – Bending – Shear... tests**
- **Servo-hydraulic Close Loop Control**
- **Force capacity : 400 to 2000 kN capacity models**
- **Load Measurement Accuracy : +/- 0,5 % (EN ISO 7500 :2004 Class 0.5 ASTM E4)**

The standard delivery includes :

- Equiped with 1 Load Cell Tension/Compression of (**400 – 600 – 1000 o 2000 kN** according model)
- Set of **HYDRAULIC** Tensile Grips, including:
- - Flat wedge jaws for testing flat specimens (see range in the table on page 3)
- - **V**-notch faces jaws for testing round specimens (see range in the table on page)
- Round Compression Plates (see dimension in the table on page 3)
- Each Machine is supplied with a **ENAC Calibration** Certificate (equivalent to NIST-UKS-DKD Certified)
- 1 All in One 22" PC Touch Screen and Printer
- 1 **METROTEST** Materials Testing Software – Multilingual (English, French, German and Spanish)
  1 Statistic software pack: Barr graphs, Gauss bell diagram and Comparative of References

OPTIONALS: Flexural Tools – Extensometers… *Consult METROTEC and / or our Local Agent*

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Servo-hydraulic M achines SHM / CS2 Series consist of a testing frame with tension and compression testing tools, (optional flexion) in specimens of metal, electro-hydraulic version with double effect hydraulic piston and special dimensions eaching capacity between grips to 950 mm.

This is because the testing frame is designed with a set of approximation between grips by two lateral spindles which can traverse in motorized both the upper crosshead and the hydraulic cylinder to achieve the initial separation suitable for a tensile test or bring down the compression zone and folded.

The models of the SHM / CS2 series are testing machine motor drive, therefore, have a hydraulic unit included in the control cabinet to get the strength and speed necessary for carrying out the tests

The electronic measurement is incorporated in a cabinet in which the computer are included, screen, plus electronics.

The cabinet of electronics, sensors connected to the machine and the electrical panel cabinet through various connectors.

The main electronic card allows condition the signals of the sensors of force and displacement, and to also control the speed of the tests. These machines are manufactured from 400 kN to 2000 kN.

Have several types of extensometers, for the precise determination of the elastic limits in metals.

Extensometer (Gauge of deformations) for the accurate measurement of elastic limits to international standards in metal tensile specimens as well as for measuring the elastic modulus E of metals.

Testing Machines SHM / CS2 Series are composed of:

- Very robust testing frame
- Hydraulic drive tensile jaws, with manual switches and separate pressure regulator
- air-cooled Hydraulic Group with Moog Servo-valve, electrical panel and pressure hoses and grips hydraulically actuated
- The MOOG servo valve is controlled from the PC Closed Loop to control loading rates (N/s, MPa /s) and advance in mm/ min
- Control and Data Processing Computer and software under Windows control testing machines. Includes program for testing metals **METROTEST**
- Compatible computer installed in the control cabinet and measurement.

This test frame has the following advantages over the classical frame these capacities:

- Lower clamp fixed at low altitude
- System approach grips by two lateral screws.
- Does not require any hole under the machine
- The tensile test area may be between 900 and 1800 mm. ground level.
- The compression zone may be working at a height between 1600 and 2000 mm.

Standards: SHM/CS2 conform to the following international standards: ASTM A370, A615, E290, F606 - EN 10002-1, EN 10002-2, EN 10002-4 – EN ISO 6892-1, EN ISO 6892-2, EN ISO 7438, EN ISO 15630-1

* **Larger range of test speeds** - With a simple change to a higher capacity Hydraulics Group is possible to have a wider range of test speeds:

- Code. 3148 - Hydraulic Group 9 liters / minute to speeds range 0-180 mm / min at 50Hz
- Code. 3149 - Hydraulic Group 9 liters / minute to speeds range 0-220 mm / min at 60Hz
- Code. 3150 - Hydraulic Group of 16 liters / minute to speeds range 0-300 mm / min at 50Hz
- Code. 3151 - Hydraulic Group of 16 liters / minute to speeds range 0-360 mm / min at 60Hz
- Code. 3151 - Hydraulic Group of 16 liters / minute to speeds range 0-360 mm / min at 60Hz

Technical Data SHM/CS2 series				
Model	**SHM-400/CS2**	**SHM-600/CS2**	**SHM-1000/CS2**	**SHM-2000/CS2**
Capacity	400 kN	600 kN	1000kN	2000kN
Stroke of hydraulic piston	300 mm			
Range Test speed	0-150 mm/min			0-100 mm/min
Piston Return Speed	250 mm /min			
Driving	Electro-hydraulic			
Control	Automatic (PC)			
Approach				
Stroke	900 mm			1000 mm
Drive	Motor			
Speed	200 mm/min			100 mm /min
Tensile Zone				
Opening (between columns)	660 mm	830 mm		890 mm
Separation between grips	50-1150 mm	50-1250 mm		50-1350 mm
Hydraulic clamps with flat wedges included (90 mm height) for thickness:	**0 – 25 mm**	**0 - 25 mm**	**Range 0-40mm** 0 - 25 mm 15 – 40 mm	**Range 0-40mm** 0 - 25 mm 15 – 40 mm
V profile Jaws includes (90 mm height) for Ø	**Range 8-40mm Ø** 8 – 25 mm Ø 25 – 40 mm Ø	**Range 8-40mm Ø** 8 – 25 mm Ø 25 – 40 mm Ø	**Range 8-60mm Ø** 8 – 28 mm Ø 28 – 45 mm Ø 45 – 60 mm Ø	**Range 8-60mm Ø** 8 – 28 mm Ø 28 – 45 mm Ø 45 – 60 mm Ø
Compression Area				
Opening (between columns)	345 mm		442 mm	500 mm
Separation between plates	0-320 mm			
Compression plates	160 mm de Ø		200 mm de Ø	250 mm de Ø
Flexural/Bending Area	(Testing Tools not includes)			
Increased height machine	+ 200 mm (since the flexion testing tool is placed in the compression zone)			
Roller diameter	50 mm Ø			
Support height	125 mm			
Separation between supports	500 mm			
Testing Frame Dimensions				
Minimum height grips in touch	2.900 mm	2.900 mm	3,300 mm	3.400 mm
Maximum height (extracted piston)	4.000 mm	4.100 mm	4.500 mm	4.620 mm
Width base + Controls Grips	1.300 mm	1.300 mm	1.500 mm	1.500 mm
Depth	950 mm	950 mm	1.100 mm	1.100 mm
Control Cabinet	600 x 600 x 1900 mm (200 Kg)			
Hydraulic Power	800x800x1000mm (360 Kg)	800x800x1000mm (450 Kg)		
Electrical power supply	AC 380V ± 10%, Trifásica 50 ó 60 Hz			
Consumption	3,5 Kw	3, 8 Kw		
Net weight of the test frame	4.800 Kg	4.900 Kg	5.000 Kg	6.500 Kg

Features:

- **Full Control** (closed-loop) testing process
- **Automatic Hydraulic Grips** can be operated from separate control panel (in the control cabinet)
- **The Material Testing and Analysis Software** will provide more testing methods to meet ASTM, ISO and other test standards
- **The report**, test report will create its simple and intuitive way
- **METROTEST Materials Testing Software**, which allows working in CLOSED LOOP and edited in 4 Languages

  (English - German - Spanish and French), with basic statistics Bars Graphics, GAUSS bells and Comparison of References The latest software solution "the easiest way to test and analyze the quality and performance of your raw material, semi-finished and finished components"

  - **Plug and Play**
  - **Easy learning for operators**
  - **Fast and accurate**
  - **Reliable**
  - **Microsoft Windows compatible**
  - **Auto scaling**
  - **Ability to export data**
  - **Multiple user password protection**

**Windows is a registered trademark of Microsoft Corporation*

- Maximum capacity : 400 a 2000 **(KN)** (40 a 200 Tns.f) according model
- Load Reading resolution: 1/200.000 points: (100.000 in Tensile y 100.000 in Compression)
- Sampling Speed Force Data (internal): 30.000 S/second
- Measuring range: 2 % -100% del FS
- Load measurement accuracy: Class **0,5** (< 0,5 %)
- Range Uniform Load Control: 1 – 100 N/mm2/s
- Accuracy: ± 0,5%
- Speed Tension Tolerance: ≤ ± 0,5 %
- Control Loading Speed Uniform: 0,00025/s – 0,0025/s
- Loading Speed Tolerance: ≤ ± 0,5%
- Relative Error of the Displacement Speed: ≤ ± 0,5%
- Fixing of the Test samples: For Hydraulic Grips
- Work Environmental Conditions: 10 ºC ~ 35 ºC / Relative Humidity: 20% -80%

Fig. 2 – SHM-1000/CS2 TESTING MACHINES

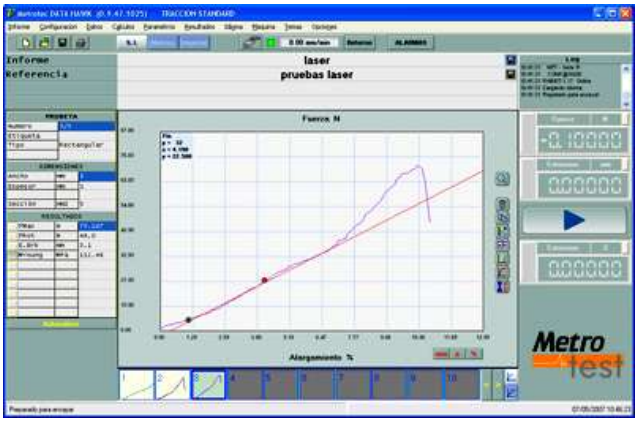
- SHM1000 Testing Frame
- Hydraulic Clamps
- Compression Plates installed
- Hydraulic Unit (behind the frame)

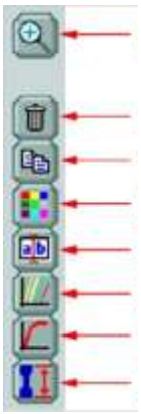
Fig. 3 – SHM-2000/CS2 TESTING MACHINES

- SHM / 600 Testing Frame (in position of minimum height)
- Hydraulic Clamps
- Tool Flexion / Bending installed
- Hydraulic Unit (behind the frame)

MATERIALS TESTING MACHINES METROTEST

The **METROTEST** testing and analysis software is very easy and quick to use in order to achieve different functions, adaptable to most operators habits. With all the information in functions such as test sample, choice of sample, setting the test conditions, data processing, analysis of test results ..., very easy to use.

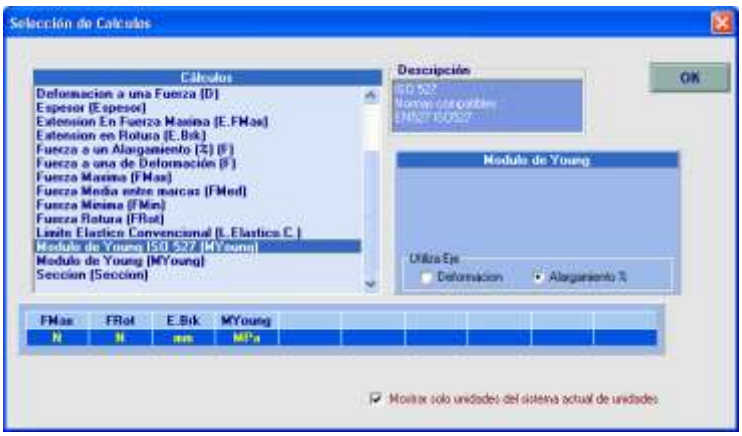




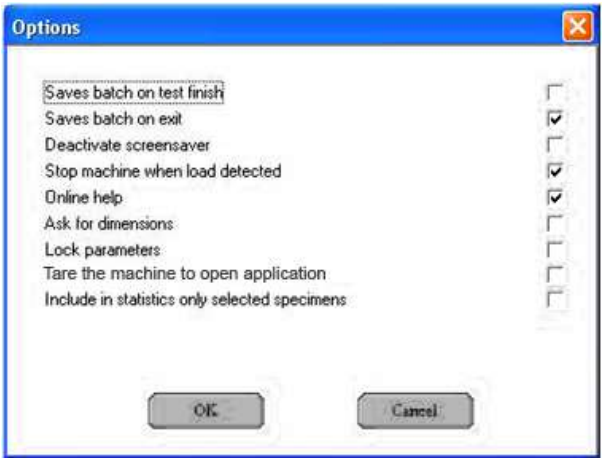
- Zoom
- Samples Delete
- Graphic Copy
- Change color of the graphic
- Assign label
- Show curves
- Assign standard curve
- Insert dimensions of the test samples

- ✓ Interface designed very clearly, intuitive attractive and with plenty of information on the screen
- ✓ Election of different units for each result
- ✓ Travel of all the points in the graphic, point by point
- ✓ Association of labels to each graphic
- ✓ Creation and management of patron curves
- ✓ Personalized reports
- ✓ Reports in PDF formats directly without any need of additional software
- ✓ Automatic Self scaling in the graphics
- ✓ Test limits independents to the limit graphics
- ✓ Self-save of the results, sample to sample
- ✓ Visualization of the curve individually or multiple
- ✓ Interface personalized
- ✓ Option of demanding for the dimensions of the sample in the beginnings of each test
- ✓ Information on the screen of all the actions that the software is making (log)
- ✓ Visual parameterization of results.

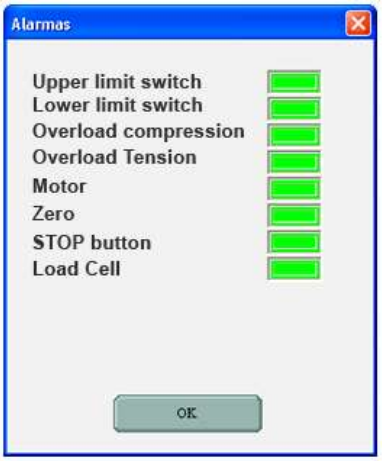
TEST PARAMETERS menu



CALCULATION SELECTION menu

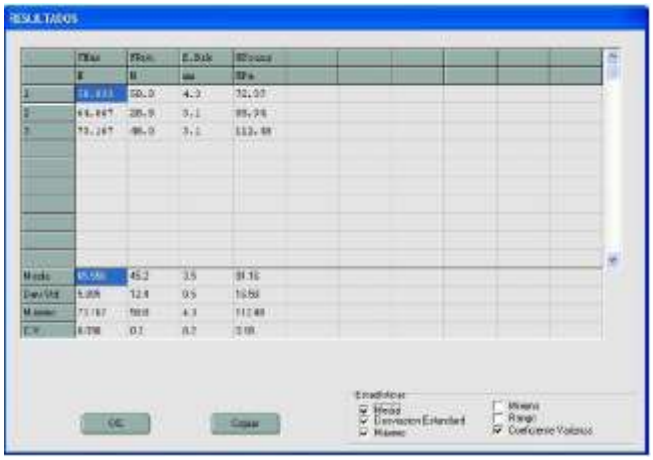


OPTIONS menu

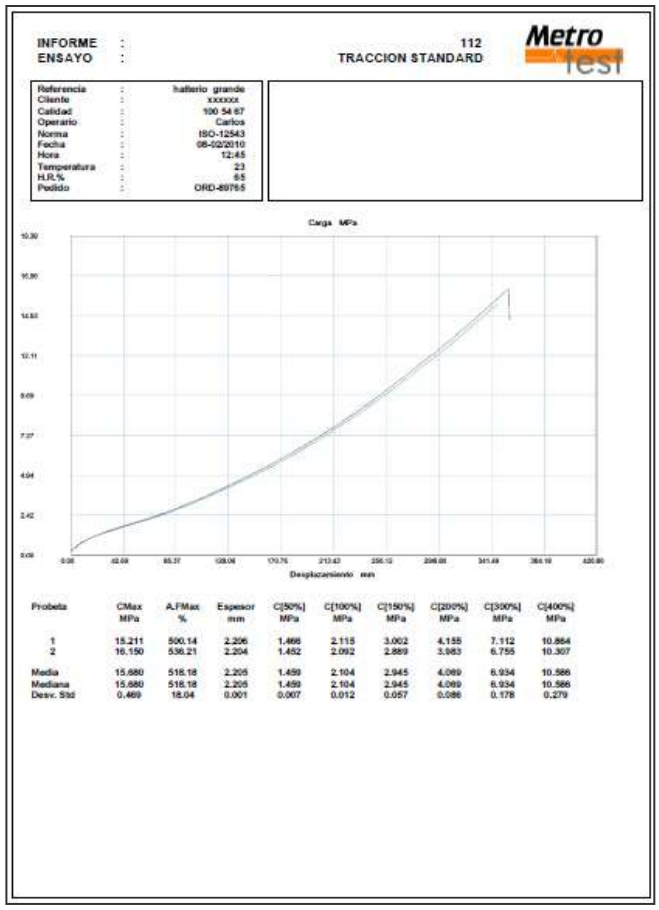


ALARMS menu

DATA menu



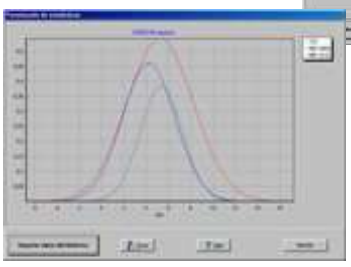
RESULTS menu



REPORT OF TESTS

Bar Graphs

Comparative Tolerances



Gaussen Bells

CONTROL SOFTWARE

Specific Testing Software with control module (operation):

- Control in **closed loop** of force, displacement, deformation, or time
- Selection and **automatic change of work scales**
- **Detection of the rupture** of probe with automatic stop, adjustable by user.

You can create as many control tokens as you want. These tokens can be assigned to a "test tube" so that when testing a test piece is performed using its assigned control card. Possibility of independent zeroing in F and L, after one step.

- ✓ **Setpoint Type**: It is the action that will perform the control of the machine.
- ✓ **F** Force (N / s).
- ✓ **R** Resistance (N / mm2 / s).
- ✓ **V** Speed (mm / min). In open loop (without control of the PC).
- ✓ **L** Displacement (mm / min). In closed loop (PC will regulate speed).

SOFTWARE MEASUREMENT included

Specially prepared for static testing of metals, which allows the Data acquisition from a machine with MBC3200 measurement electronics, using the PC communications port (RS232) or through a USB (using commercial adapters RS232C -> USB).

Features:

- Selection tab control (speed, etc.)
- Specimen Selection tab to:
  - ***Reference or name of the specimen***
  - ***Type*** *Rectangle / Circle / Tubular / Displays*
  - ***Lo*** *What long. initial specimen*
  - ***a, b / D / So*** *sectional dimensions*
  - ***n%*** *% to calculate the Rpn*
  - *Any desired value (0.01% -0.2% -1%)*
- Scale test graphics automatically or manually
- Real-time representation units' force-deformation "
- User selectable units
- Simultaneous digital display with graphic
- Ability to zoom into any area, from the mouse.
- Ability to manually choose the scales and units.
- Automatic File XY graph values in file security for retrieval.
- Possibility to compare graphics on screen.
- Ease of calculation and presentation of limits:
  - **ReH, ReL** (apparent in mild steels)
  - **Rpn** (n = 0.2% or any value entered)
  - **E** modulus of the material
  - **Rm** Maximum resistance.
  - **A** elongation and other test parameters (**Ag, E, N, R**, ...)
  - **Z** restriction coefficient
- Database (result tabs) (MS-Access compatible)

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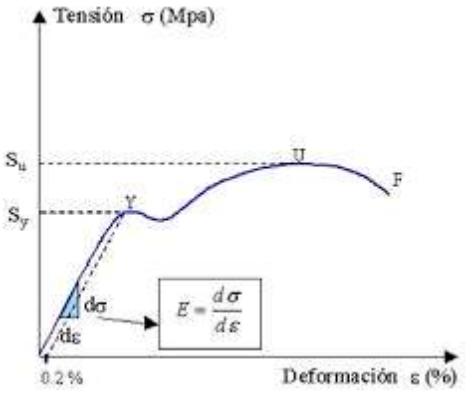
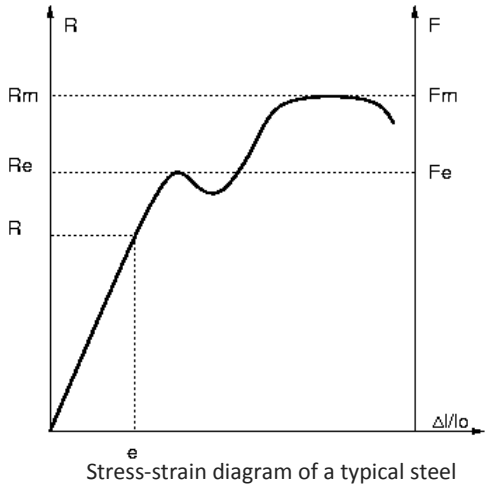
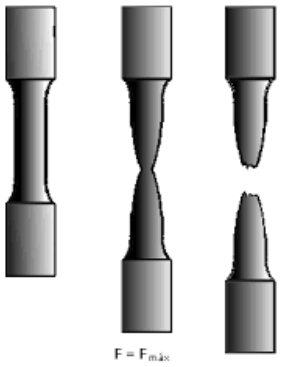




Stress-strain diagram of a typical steel of low yield strength



Detail of hydraulic Grips 1000 kN capacity

SHM-1000 / CS2 Universal Testing Machine 1000 kN capacity
Equipped with Integral Security Protection in polycarbonate

Supply for SHM-400/CS2 Y SHM-600/CS2 models **Packing Material :** In 3 Boxes of fumigated wood **Wooden Packing 01** Content: Testing Frame + Grips - Jaws... Net weight: 4.800 kg y el modelo de SHM-600 kN = 4.950 Kg Gross weight : 5.500 kg and SHM-600 model = 5.650 Kg Dimensions: 3250 x 1550 x 1200 mm (Length x Width x Height) Volume: 5,95 m^3 **Wooden Packing 02** Content: Hydraulic Power Net weight: 450 kg Gross weight : 600 kg Dimensions: 980 X 980 x 1200 mm (Length x Width x Height) Volume: 1.20 m^3 **Wooden Packing 03** Content: Control Cabinet + PC Net weight: 200 kg Gross weight: 350 kg Dimensions: 800 X 800 x 2070 mm (Length x Width x Height) Volume: 1.73 m^3	**Total supply:** Quantity: 3 Wooden Boxes SHM-400 model: **Total Gross Weight: 5.900 kg** SHM-400 model: **Total Gross Weight: 6.600 kg** SHM-400 and SHM-600 models: **Total Volume 8,88 m^3** • Weights and dimensions are approximate reference.
Supply for SHM-1000/CS2 Y SHM-2000/CS2 models **Packing Material :** In 3 Boxes of fumigated wood **Wooden Packing 01** Content: Testing Frame + Grips - Jaws... Net weight: 5.000 kg and the SHM-2000 model = 6.500 Kg Gross weight : 5.700 kg and the SHM-2000 model = 7.200 Kg Dimensions: 3150 x 1550 x 1200 mm (Length x Width x Height) Volume: 5,86 m^3 **Wooden Packing 02** Content: Hydraulic Power Net weight: 450 kg Gross weight: 600 kg Dimensions: 980 X 980 X 1250 mm (Length x Width x Height) Volumen: 1.20 m^3 **Wooden Packing 03** Content Armario de Control + PC Net weight: 200 kg Gross weight: 350 kg Dimensions: 800 X 800 X 2070 mm (Length x Width x Height) Volume: 1.73 m^3	**Total supply:** Quantity: 3 Wooden Boxes SHM-1000 model: **Total Net Weight: 6.600 kg** SHM-2000 model: **Total Gross Weight: 6.600 kg** SHM-400 and SHM-600 models: **Total Volume 8,88 m^3** • Weights and dimensions are approximate reference.