



**LS AUTOMATIC
COMPRESSION TESTING
MACHINE**



CONCRETE

www.testmak.com

LS Automatic Compression Testing Machines

PRODUCT MODEL

C5200	600 kN Automatic Compression Testing Machine, ASTM Standard, 220-240 V 50-60 Hz
C5215	1500 kN Automatic Compression Testing Machine, ASTM Standard, 220-240 V 50-60 Hz

STANDARDS

ASTM C39 | EN 12390-3, 12390-4 | BS 1881 | ГОСТ 10180-2012



DESCRIPTION

The Testmak LS series Low Strength Automatic Compression Testing Machines have been manufactured for consistent testing of concrete cube and cylinder specimens. These machines are produced to capacity range of 600 kN and 1500 kN. Suitable for CE security norms and EN 12390-3, 12390-4, BS 1881, ASTM C39, AASHTO 22 to standards. These compression test machines are controlled by the "TCM 304" software with computer. Tests can be performed by either on TCM Unit or on a computer with using free software. Can be done tests on computer with using TCM 304 software and such as reporting, graphical output. Low Capacity Automatic Compression Testing Machines are supplied in Class 1 starting from 50 kN. Surface hardness 55HRC, flatness tolerance 0.02 mm. Traceable certificate of surface hardness available on request.

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Testable Specimens

- Concrete Cubes: 100 mm, 150 mm, 200 mm concrete cube sample or any other custom cube and prism size can be tested with this machine.
- Concrete Cylinder: 100x200 mm, 150x300 mm, 160x320 mm concrete cylinder samples or any other custom diameters cylinder can be tested with this machine.

Can be done the following tests with this machines;

- 1- Compression strength tests.
- 2- Flexural and splitting tests by using proper accessories.
- 3- Mortar (Cement) compression tests by using proper accessories.
- 4- Core testing.

LS Automatic Compression Testing Machines supplied complete with following accessories;

1- Spacer Discs;

- Diameter 165 mm x Height 90 mm spacer disc 1 piece
- Diameter 165 mm x Height 50 mm spacer disc 1 piece
- Diameter 165 mm x Height 30 mm spacer disc 2 piece

2- Upper Platen;

- Upper Platen Diameter 165 mm (with ball seating assembly)

3- Lower Platen;

- Lower Platen Diameter 165 mm

4- Piston;

- Piston Diameter 160 mm (For 600 kN Capacity Models)
- Piston Diameter 200 mm (For 1500 kN Capacity Models)

5- Automatic Hydraulic Power Pack ;

- Automatic Hydraulic Power Pack, 410 bar (For All Models)

Safety Features

- Maximum pressure valves to avoid machine overloading
- Piston travel limit switch
- Emergency stop button
- Front and rear transparent durable plexiglas guards
- Software controlled maximum load value

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LCD Data Acquisition Control System

The Data Acquisition Control provides real-time graphical indication. Automatically determines the load rate in accordance with the international standards upon sample type. With the STOP and START buttons, the test will automatically stop or start.

LCD Data Acquisition Control System has different units are available (kN / kgf / lbf). Can do Automatic Load Rate upon Sample Type. Total load and also per area are given. and has real time graph indication. Stops Automatically, when Test is completed. Test results can be send printer to with software or from the thermal printer. Can do calibration easily from 5 points. Manual Control is available. Computer and printer are not included in the price.

TECHNICAL SPECIFICATIONS

Product Code	C5200	C5215
Standards	ASTM	ASTM
Capacity	600 kN	1500 kN
Frame Type	Welded Frame	Welded Frame
Sample	4" , 6" dia. cylinders 100,150,200 mm cubes	4" , 6" dia. cylinders 100,150,200 mm cubes
Upper Platens Dim.	Ø 165 mm	Ø 165 mm
Lower Platens Dim.	Ø 165mm	Ø 165mm
Max. Vertical Clearance	370 mm	370 mm
Max. Horizontal Clearance	320 mm	320 mm
Piston Diameter	160 mm	200 mm
Max. Piston Movement	50 mm	50 mm
Max. Working Pressure	410 Bar	410 Bar
Oil Capacity	18 Liters	18 Liters
Power	1100 W	1100 W
Dimensions	650x500x1250 mm	750x540x1300 mm
Weight Power Pack	490 kg	680 kg

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UPPER & LOWER PLATENS

- C3070/A-01 | Upper Platen (with ball seating assembly) Ø 165 mm, Lower Platen Ø 165 mm
 C3070/A-02 | Upper Platen (with ball seating assembly) Ø 216 mm, Lower Platen Ø 216 mm
 C3070/E-03 | Upper Platen (with ball seating assembly) Ø 300 mm, Lower Platen Ø 300 mm
 C3070/A-04 | Upper Platen (with ball seating assembly) 310x410x90 mm, Lower Platen 310x410x90 mm
 C3070/E-04 | Upper Platen (with ball seating assembly) 310x500x38 mm, Lower Platen 310x500x38 mm

The platens enable the testing of a wide variety of cylinder, cube blocks or similar samples. Produced from high quality steel, which is then hardened. Surface hardness 55HRC, flatness tolerance 0.02 mm. Traceable certificate of surface hardness available on request. Have centering rings on the lower platens for proper centering of 100 mm and 150 mm cube, 100 mm and 150 mm cylinder samples.



Product Code	C3070/A-01	C3070/A-02	C3070/E-03	C3070/E-04
Description	Upper Platen (with ball seating assembly) Ø 165 mm, Lower Platen Ø 165 mm	Upper Platen (with ball seating assembly) Ø 216 mm, Lower Platen Ø 216 mm	Upper Platen (with ball seating assembly) Ø 300 mm, Lower Platen Ø 300 mm	Upper Platen (with ball seating assembly) 310x500x38 mm, Lower Platen 310x500x38 mm
Sample	4", 6" dia. cylinders 100 mm cubes	6" dia. cylinders 100, 150 mm cubes	Cylinders: 100x200 mm, 150x300 mm, 160x320 mm Cubes 100,150,200 mm	Blocks up to 310x500 mm
Used with Frames	TMC-3200, TMC-3201, TMC-3204, TMC-3206, TMC-3208, TMC-3209	TMC-3200, TMC-3201, TMC-3203, TMC-3204, TMC-3205, TMC-3206, TMC-3207, TMC-3208, TMC-3209	TMC-3203, TMC-3205, TMC-3207, TMC-3209	TMC-3202, TMC-3203, TMC-3204, TMC-3205, TMC-3206, TMC-3207, TMC-3208, TMC-3209
Standards	ASTM C39	ASTM C39 and EN 12390-4	EN 12390-4	EN 772-1
Hardness	≥ 55 HRC	≥ 55 HRC	≥ 53 HRC	≥ 600 HV
Dimensions	170x170x145 mm	220x220x145 mm	310x310x175 mm	320x510x175 mm
Weight	21 kg	38 kg	78 kg	135 kg

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DISTANCE PIECES

C3060/A-01 | Distance Pieces, Ø 165x15 mm

C3060/A-02 | Distance Pieces, Ø 165x30 mm

C3060/A-03 | Distance Pieces, Ø 165x40 mm

C3060/A-04 | Distance Pieces, Ø 165x90 mm

C3060/E-05 | Distance Pieces, Ø 205x30 mm

C3060/E-06 | Distance Pieces, Ø 205x50 mm

C3060/E-07 | Distance Pieces, Ø 205x90 mm



Distance pieces are used to reduce the amount of vertical clearance between the upper platen and the lower platen. 600 to 3000 kN machines are supplied with 205 mm and 165 mm dia distance piece.

Model	Dimensions	Weight (approx.)
C3060/A-01	165x165x15 mm	2,5 kg
C3060/A-02	165x165x30mm	5 kg
C3060/A-03	165x165x40 mm	7 kg
C3060/A-04	165x165x90 mm	14 kg
C3060/E-05	205x290x30 mm	8 kg
C3060/E-06	205x290x50 mm	13 kg
C3060/E-07	205x290x90 mm	22 kg

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LCD DATA ACQUISITION CONTROL SYSTEM

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Data Acquisition Control

Technical Specifications





- 3 universal analog input sockets (ADC)
- Each analog input with 18 bit precision (1/256000)
- 1 replacement analog input
- A total of 4 analog high-precision measuring capacities
- 2 analog output sockets (DAC)
- Analog outputs generate a 0-10V DC output signal
- Motor speed control devices, servo valves with this output signal, proportional valves, etc. reference signal is produced.
- PULSE / DIR outputs (PULSE / DIR / ENA) to control the servo and stepper motor drives
- 5 digital outputs for general purpose (can pull relays and control different electrical units)
- 5 digital inputs for general purpose (receives and evaluates input signals like limit contacts from the environment)
- Potentiometer input (reference signal input for calibration and remote control)
- 2 RS232 serial communication signal outputs (communicates with computers)
- It also connects to motor drives via serial communication via MODBUS connection
- USB communication signal output (communicates with computers)
- Connects to local networks and the Internet with Ethernet 10/100 network connection output (optional)
- Connects to portable devices via Bluetooth wireless connection (optional)
- 500 test results can be stored in internal memory
- Due to the SD (memory) card connection, a large number of test results can be stored in the device memory (40,000 test results).
- In addition, the results can be taken from the device memory and transferred to the computer as an Excel table. (Optional)
- Color TFT display supports 16 lar and 7 800 screen sizes, supports 16M colors and supports 800x480 pixel screen resolution

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- Resistive touch screen allows easy operation of device functions by touching the screen
- Access to frequently used functions with 6 membrane keypads
- The industrial standard operates with 24V DC supply voltage. Built-in voltage filter and regulator protects against input signal fluctuations
- Sensor modules are compatible with loadcell (load cell), pressure sensor (4-20 / 0-20 mA), potentiometric distance sensors, strain washers, thermocouples and all kinds of mV output sensors.
- Provides precise calibration with multi-point calibration (up to 10 points)
- Setting and calibration menus are password protected and prevent unauthorized use
- Allows testing with a computer or device
- There are many test sample information screens and test methods in the device memory and tests can be performed easily
- Different menu languages can be selected via the device via language support
- Speed control algorithm is closed loop PID control and all parameters can be adjusted on user side.
- The device can switch between one-touch load and deformation control modes Cihaz farklı makinelere kolayca adapte edilebilir ve en uygun kontrol sağlar
- The graphical field that visualizes the test results on the screen has the ability to change the scale automatically and automatically adjusts the optimal scale as the values change
- Firmware updates can be made via USB input. In addition, via the computer allows remote or internet update.

When energized to the device, on the digital indicator display will show the following information.

<u>Test standards</u>	
<p>ASTM C39, EN 12390-4, EN 196-1</p> <p>COMPRESSION TEST ON CUBE AND PRISM SAMPLES</p>	<p>TS EN 1390-5, ASTM C78, 293</p> <p>4 POINTS FLEXURAL TEST ON BEAM SAMPLES</p>
<p>ASTM C39, EN 12390-4</p> <p>COMPRESSION TEST ON CYLINDER SAMPLES</p>	<p>TS - EN - 12390 - 6</p> <p>SHARE STRENGTH TEST ON CONCRETE SAMPLES</p>
<p>TS EN 1390-5, ASTM C78, 293</p> <p>3 POINTS FLEXURAL TEST ON BEAM SAMPLES</p>	<p>TS 2428 EN 1338</p> <p>SHARE STRENGTH TEST ON PARQUET SAMPLES</p>

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Test standards and methods

There are already 18 commonly used test methods in the device memory. With updates, this number is increasing.

The input is displayed by touching the area of the test standard you want to test.

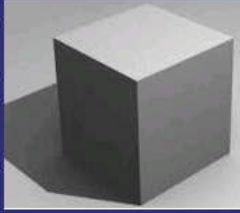
Toggle left / right arrow keys between test standard screens. In addition, the test standards screen is one of the most frequently used home screens, so you can switch from here to the computer connection screen and the settings menu

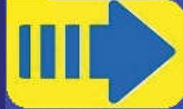



Compression Strength in Cube / Prism Samples

The compressive strength test in cube samples is a test method commonly used in the ASTM C39 | EN 12390-3, 12390-4 concrete tests standard. When this test method is selected, the sample size screen is displayed first.

Specimen dimensions

Cube / Prism sample dimen. :

Channel / Unit nr. :	0.00	
Width (mm) :	0.00	
Length (mm) :	0.00	
Height (mm) :	0.00	



After a short period of time numune Receiving sample information lanmış message is displayed, the predefined sample sizes of this test method are loaded from memory. Thus, the loss of time from entering the same information is prevented.

It is important to note that with the sample information, the unit number to be tested and the sensor input channel to which the test unit is connected are entered into the device.





The selection of the sample dimensions and the selection of the test unit are performed in this screen. The device makes the necessary calculations according to the entered dimensions and determines the values of the cross-sectional area, etc. and makes the strength calculation accordingly.

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Specimen dimensions



Cube / Prism sample dimen. :





Channel / Unit nr. :	0.00		7 Home	8 ↑	9 PgUp	Del
Width (mm) :	0.00		4 ←	5	6 →	
Length (mm) :	0.00		1 End	2 ↓	3 PgDn	Enter
Height (mm) :	0.00		0 Ins		.	

Specimen dimensions

Cube / Prism sample dimen. :

Channel / Unit nr. :	<div style="border: 1px solid red; padding: 5px; display: inline-block;">  Sample dimensions loading.. </div>		
Width (mm) :	0.00		
Length (mm) :	0.00		
Height (mm) :	0.00		

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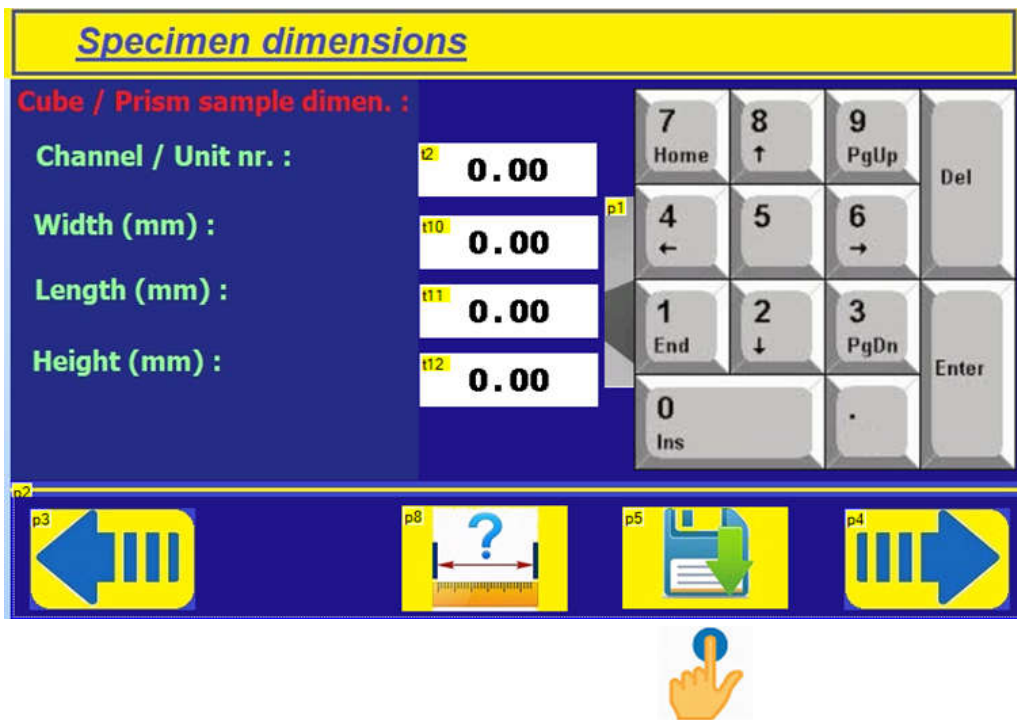
Thus, in which test method the device will receive the data from which sensor, the calibration values, the unit, the unit to be controlled and the required parameters will be automatically loaded.


To change any value displayed on the screen, touch the corresponding data field to open the on-screen keyboard.

Use the on-screen keyboard to enter the desired value and press ENTER.

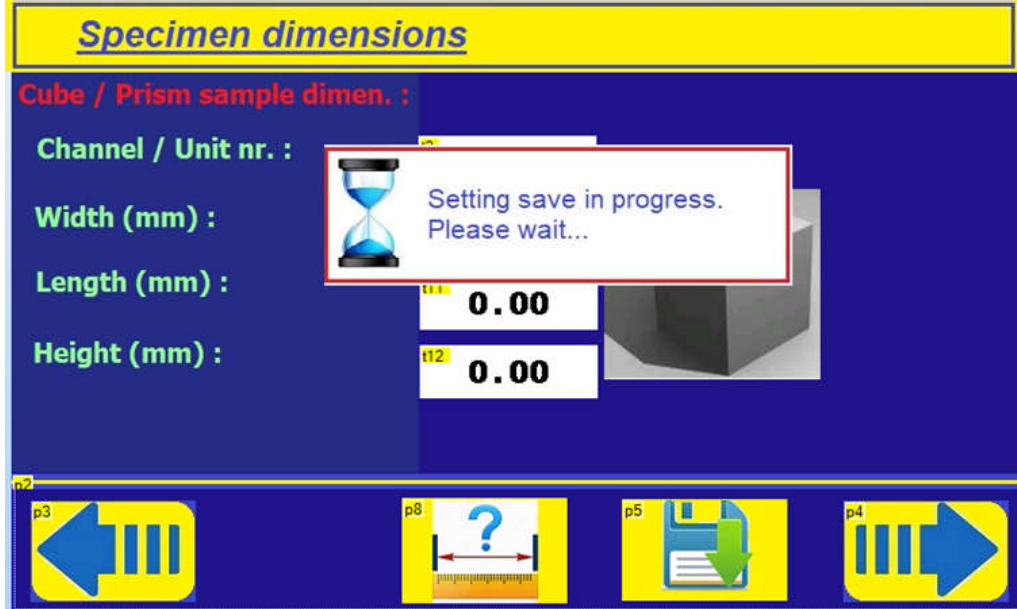
The DEL (Delete) key is used to delete the incorrect data.

The on-screen keyboard disappears when the enter key is pressed.



The  (SAVE) button is used to store data in the device memory.

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When saving data, the message "Saving settings" is displayed.

The method and screen layout described in this chapter are generally valid for all test methods and can be easily entered and saved by following the same process steps.

a: edge length (mm)

s: cross-sectional area (mm²)

$s = a^2$

F: Maximum applied load (kN)

MP: Compressive strength (MPa)

$$\sigma = F/s \text{ (Mpa)}$$


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Specimen dimensions

Cube / Prism sample dimen. :

Channel / Unit nr. :	t2	0.00
Width (mm) :	t10	0.00
Length (mm) :	t11	0.00
Height (mm) :	t12	0.00

p1





p2


p3

p4

p5

p8



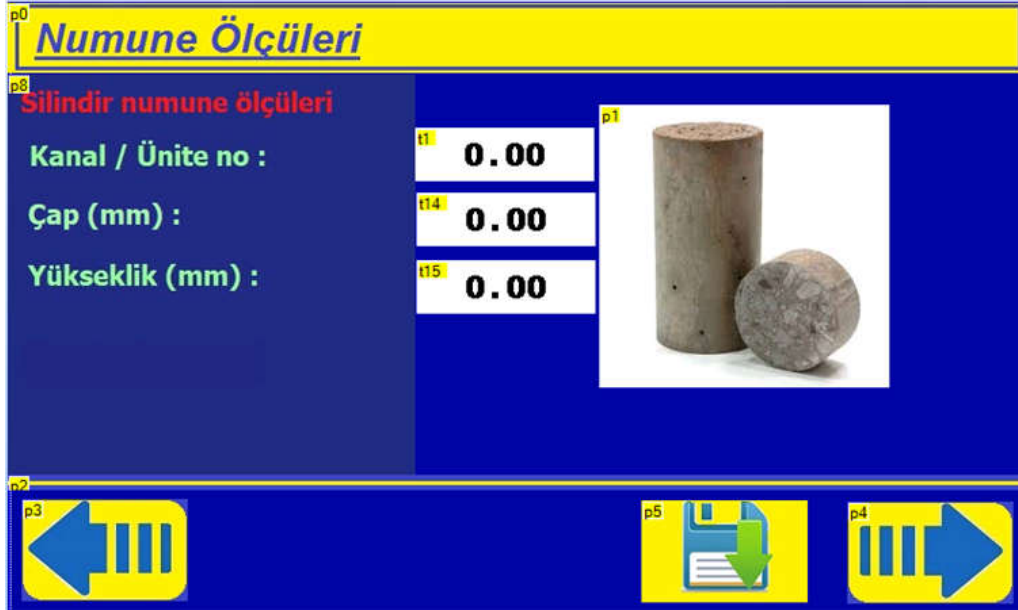
The  NEXT button is used to proceed to the next step.

The next step will be to determine the test parameters related to the selected test method.

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Compression Strength in Cylinder Samples

When this test method is selected, the sample size screen is displayed first.



d: diameter (mm)

s: cross-sectional area (mm²)

$$s = 3.14 \cdot (d/2)^2$$

F: Maximum applied load (kN)

MP: Compressive strength (MPa)

$$\sigma = F/s \text{ (Mpa)}$$

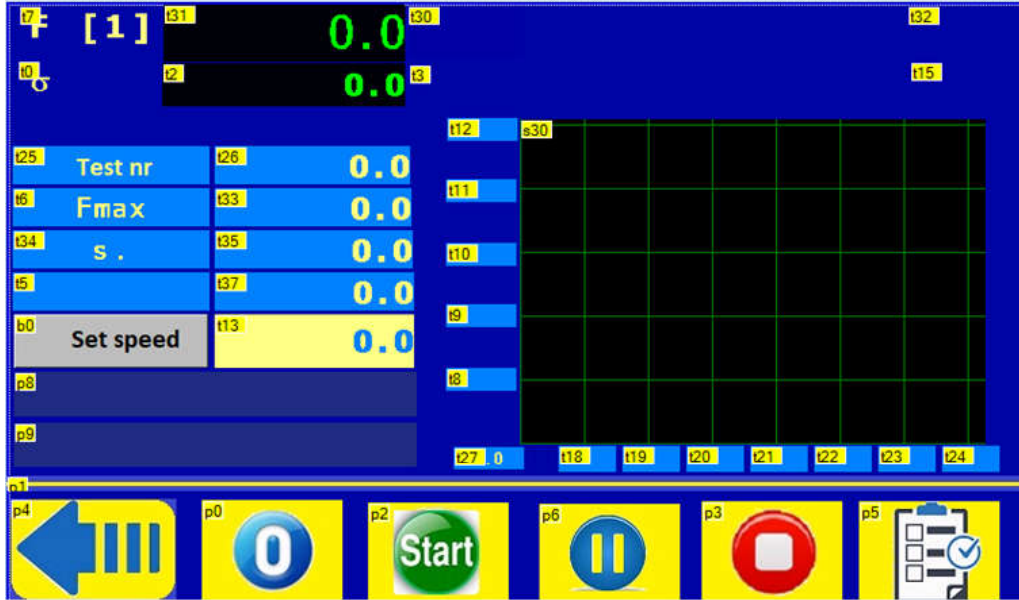
Test Screen

The screen test screen where the tests are performed in accordance with the test method.

At the top of the test screen, the channel, unit and the active value are displayed. In some tests, more than one active measuring channel is shown on the display.

In addition, the test number, the highest measured load value (Fmax), the time elapsed during the test, in seconds, and the set test speed are displayed.

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Start the Test Pause on Load End of test

Start the Test

Press (START) to start the test. First, the device performs a bit of fast loading up to the boot value. When the boot value is reached, the speed is automatically set to the test speed level and kept constant at this level until the end of the test.


Pause on Load

If you want to stabilize the load at any load level during the test (PAUSE), press the hold button. In this case, the load is fixed at the load value level when the hold button is pressed and the device starts to wait. If this button is pressed again, the load will resume.

Pause on Load

The device automatically terminates the test when the condition specified for the end of the test occurs.

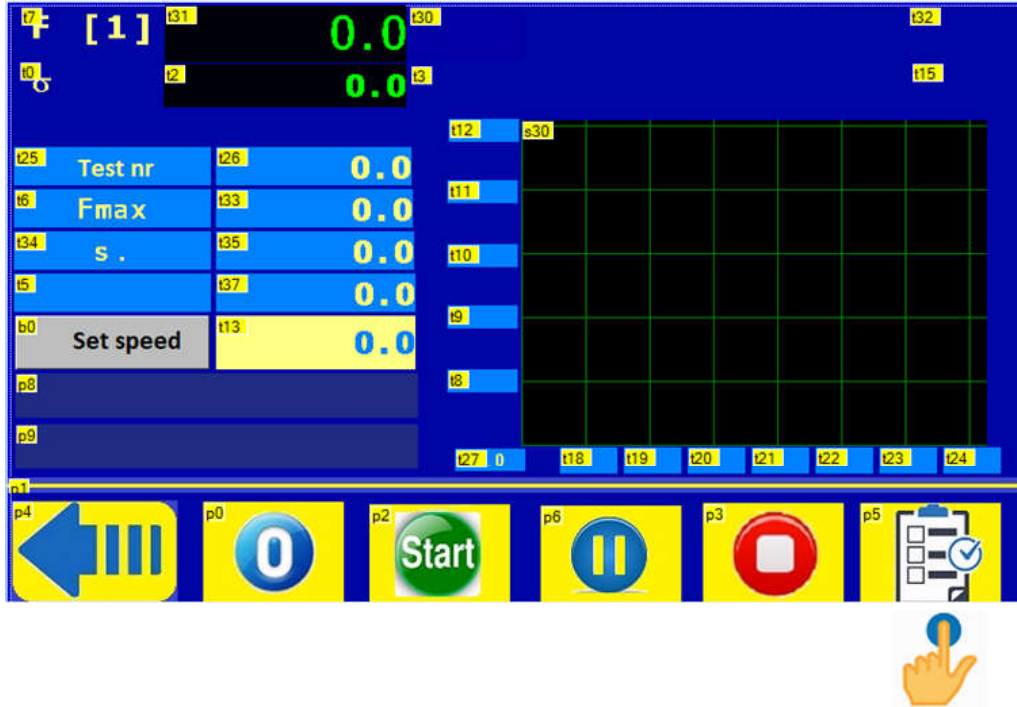
This condition is usually a decrease in the load as a result of the breakage of the test specimen, but sometimes the test can be completed when a certain load or deformation value is reached.

The user can also end the test at any time by pressing the STOP key at any time  (STOP). The unit automatically terminates the test to protect the machine and the sensors when the device detects that the specified loading capacity has been reached.

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Test Results

The test results are saved as a table in the device memory. To access this table, press the test button on the test screen. In this case, the test results are displayed.



Test Results

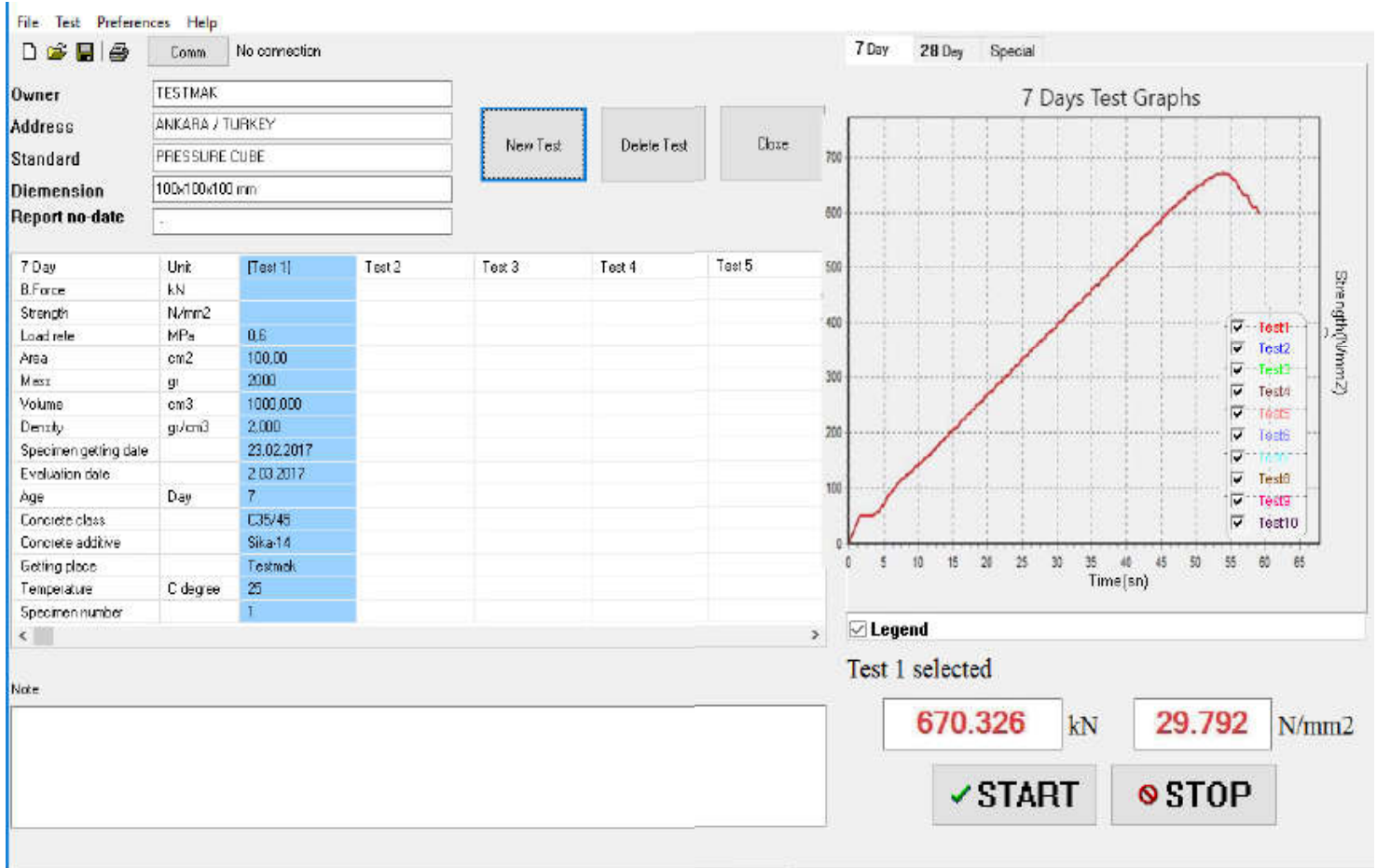
When the test results are displayed in a table, the test result is displayed on each page. Use the up / down arrow keys to scroll through the pages. This allows switching between 500 test results in the device memory.

Test Sonuçları				1		Ara	
No	Numune	Fmax	t1	σ (Mpa)	t2	σ (s.)	t3
150	151	152	153	154	155	156	157
155	156	157	158	159	160	161	162
160	161	162	163	164	165	166	167
165	166	167	168	169	170	171	172
170	171	172	173	174	175	176	177
175	176	177	178	179	180	181	182
180	181	182	183	184	185	186	187
185	186	187	188	189	190	191	192
190	191	192	193	194	195	196	197
195	196	197	198	199	200	201	202

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SOFTWARE

The tests and calibration can be done and monitored with a computer by connecting it to the machine. LCD Control unit can connecting with RS232 or USB port to the machine. Using the state-of-the-art software provided by TESTMAK with the machine will help performing and managing the tests in a very easy and fast way. By performing the tests via computer, the results can be saved and recalled when required. Reports can be generated automatically by the software and sent to printer.



The screenshot displays the TESTMAK software interface. On the left, there are input fields for Owner (TESTMAK), Address (ANKARA / TURKEY), Standard (PRESSURE CUBE), Dimension (100x100x100 mm), and Report no-date. Below these is a table for test parameters:

7 Day	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
B.Force	kN					
Strength	N/mm ²					
Load rate	MPa	0.6				
Area	cm ²	100.00				
Mass	gr	2000				
Volume	cm ³	1000.000				
Density	gr/cm ³	2.000				
Specimen getting date		23.02.2017				
Evolution date		2.03.2017				
Age	Day	7				
Concrete class		C35/45				
Concrete additive		Sika-14				
Getting place		Testmak				
Temperature	C degree	25				
Specimen number		1				

On the right, the '7 Days Test Graphs' plot shows Strength (N/mm²) on the y-axis (0 to 700) and Time (sn) on the x-axis (0 to 65). A red curve shows the test results for Test 1, peaking at approximately 670 N/mm² at 55 seconds. A legend on the right lists Test1 through Test10, with Test1 selected. Below the graph, the results for Test 1 are displayed: 670.326 kN and 29.792 N/mm². There are 'START' and 'STOP' buttons at the bottom right.



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MATERIAL TEST EQUIPMENTS

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