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Operating Manual

Compression Testing Machine BD 3000-K for concrete samples



TESTING Touch V2 Quick Start Guide

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1. General Information:

TESTING Touch is designed to control the machine and processing data from the load cells, pressure transducers and positioning sensors installed on the compression machine frames and several high technology materials testing equipments.

1.1. System Overview:

TESTING Touch Control Unit is very stable and cost effective controller that can be adaptable to the wide variety of testing equipment. Through Universal Testing Software easy to use and user friendly.

- To easy read and control with 7" colored capacitive LCD touch screen
- Linux based stable and reliable Universal Testing Software
- 4 GB internal memory to save test results
- 32 GB SD card support
- 1000 Hz/s data acquisition speed (If needed can be increase to the 10000 Hz/s)
- Direct internet connection via LAN connector to send test report as e-mail
- 2 input channel with minimum 20 bit resolution
- USB input for easy updating
- Test results can be loaded to the external memory
- HP brand printers can directly connect to the TESTING Touch
- For secure test environment door and limitation sensors can be added
- Double loop PID controller for sensitive and precise controlling
- Automatic break detection
- Automatic Calibration
- TESTING V2 controller is connectable to the any personal computer via Universal Testing Software, thus you can realize your tests directly with your personal computer.
- Controller and Touch screen are can be used completely independent. In case of the having problem with touch screen you can continue with any computer.

1.2 Control Unit and Touch Screen Display

1.2.1 Touch Screen Display

Touch screen display is a Linux based computer. Every test stages and results can be observable from this screen and test parameters can be adjusted.

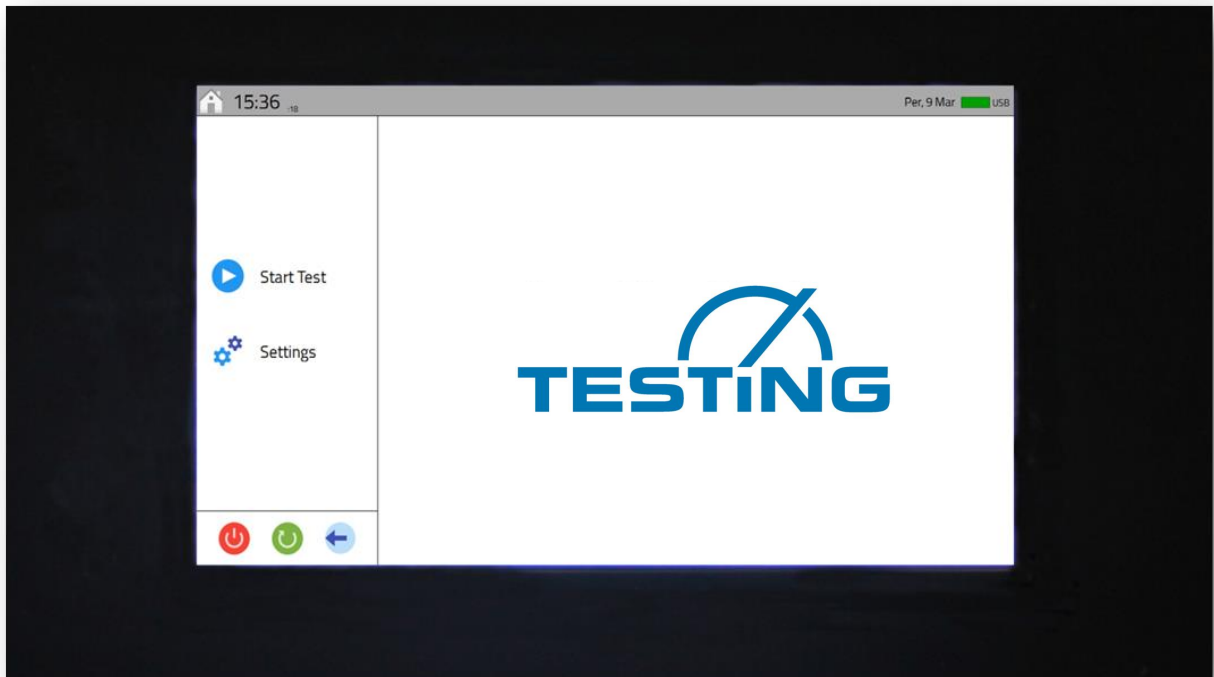


Figure 1: Front View of Touch Screen Controller

USB Connector



USB Connector: Makes possible to store test result in an external memory and can be use to upload software updates. Also a printer can be add to print test results directly from the control unit.

CAN-BUS Cable



CAN-BUS Cable: Touch screen control unit and control card is communicates via Can-Bus protocol for high speed data transfer.

LAN Port



LAN Port: TESTING Touch V2 can directly connect to the network to send test result as e-mail, online updates and remote access.

5V DC Supply



1.2.2 TESTING V2 Control Unit

TESTING V2 Control Unit is an advanced controller for wide variety of testing equipment. It provides high precision and accuracy.

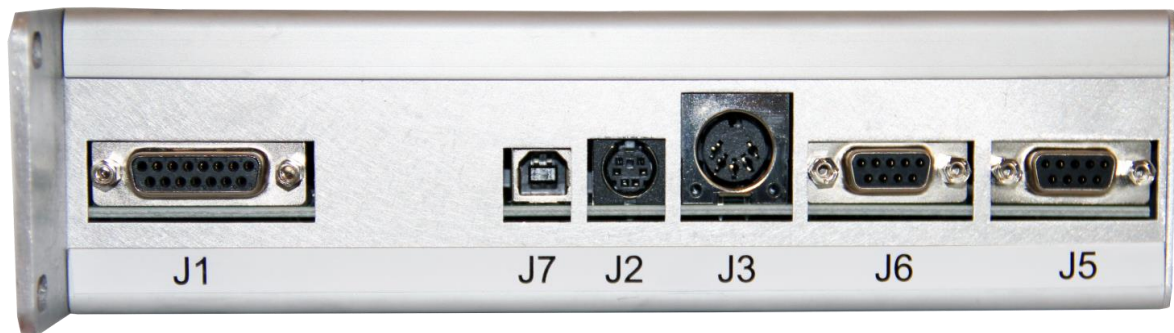


Figure 2: Side View of the TESTING V2 Controller

J1 - Driver Output Port: Digital input-output, analog output, $\pm 10V$ output

J2 - Potentiometer Slot: Allows manual controlling

J3 - Can-Bus Slot: Touch screen unit communicates via this port.

J5 - Analog Sensor Input: Load cell and pressure transducers can connect via this port. (Machine A)

J6 - Analog Sensor Input: Load cell and pressure transducers can connect via this port. (Machine B)

J7 - USB Type B Socket: TESTING V2 can directly connect to the computer via this USB socket

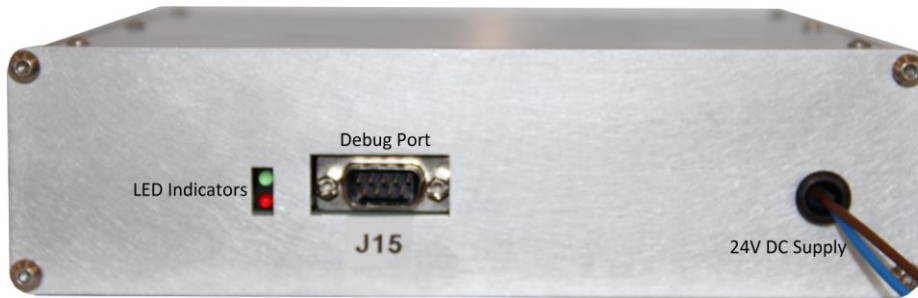


Figure 3: Back View of the TESTING V2 Controller

2. Software Overview

When the machine is started, Touch Screen controller also starts automatically and shows Main Menu.

2.1 Main Menu

This screen contains 2 buttons that allows access to the screens described below, these buttons are used for starting a test procedure and making machine's setting. Also users can place their own logo to the main screen.



To turn off the device press this button



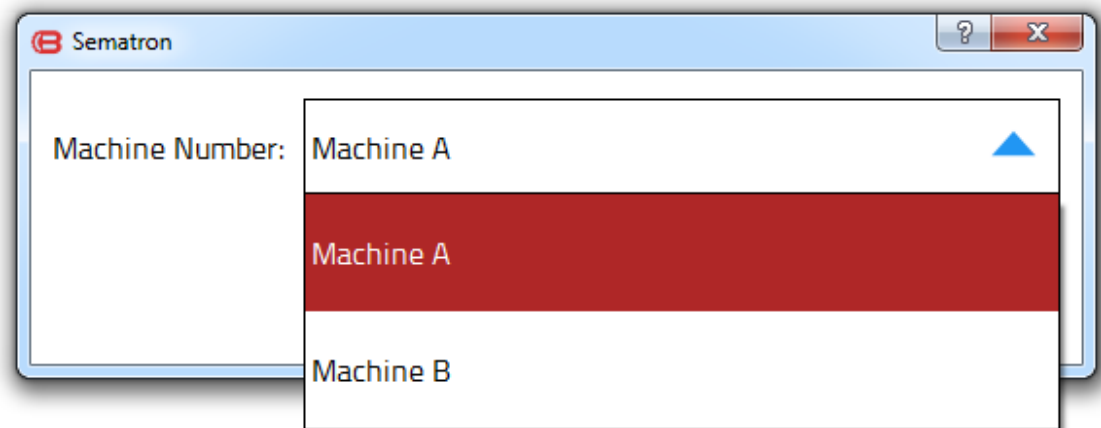
To restart the device press this button



To log out of the defined user account press this button

2.2 Start Test Menu

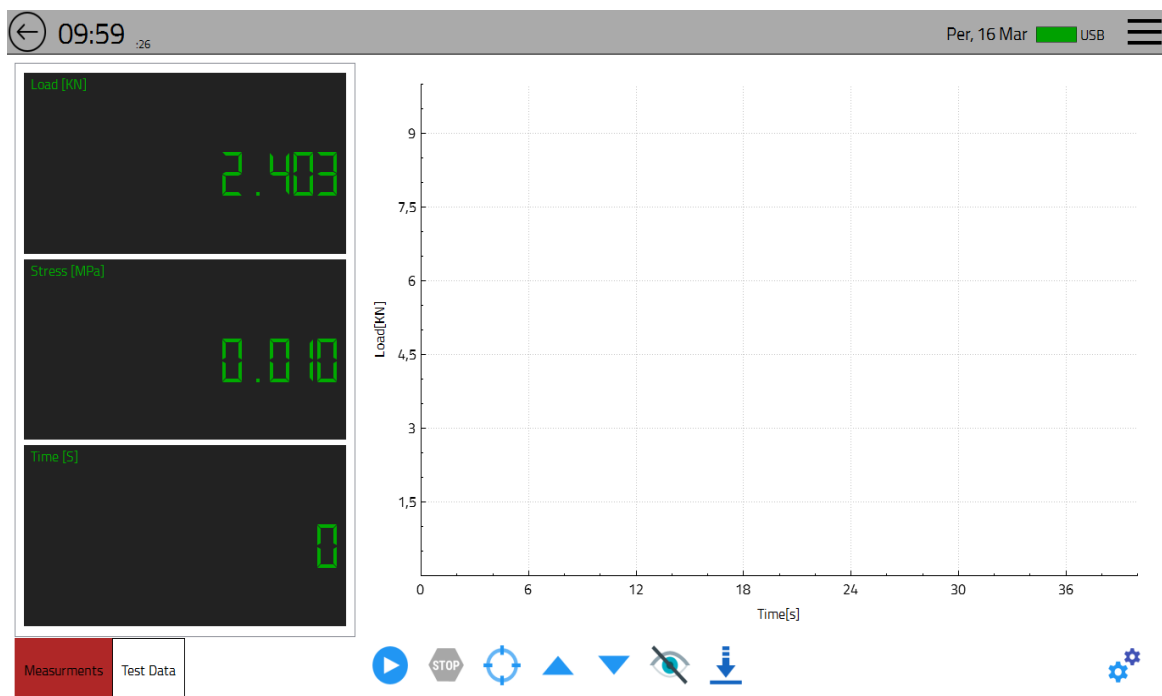
When starting a new test, you can use this button. When you touch "Start Test" button machine will be asking you to choose a machine number;



You can define and connect two separate test machine to TESTING Touch Controller, therefore before starting a test you should choose which machine you will work with. After this step you will see a test screen as below.

Back Button

Result Saving Function



Screen Selection Button

Function Buttons

Settings Button

2.2.1 Touch Buttons

2.2.1.1 Function Buttons



Start Button: To start a test you can touch this button



Stop Button: It stops the test, but controller automatically detect the breaking of sample and stops test.



Manual elevation button (Up Button): If there is a gap between sample and upper compression platen you can eliminate this gap manually.



Manuel bypass button: If controller detect breaking of sample Automatic bypass will be activated.



Observing Button: When you touch this button you can just observe **Real Time Monitoring Screen**



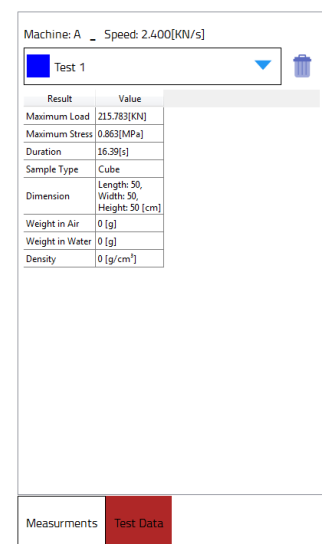
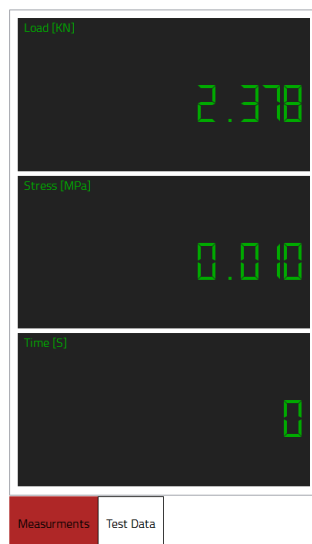
Offset Button: To rise the actuator controller has to apply an initial force to cylinder. Before starting test, you can offset to zero



Speed Test Button: It provides an automatic speed control for your setted up test speed value and gives you the speed of test.

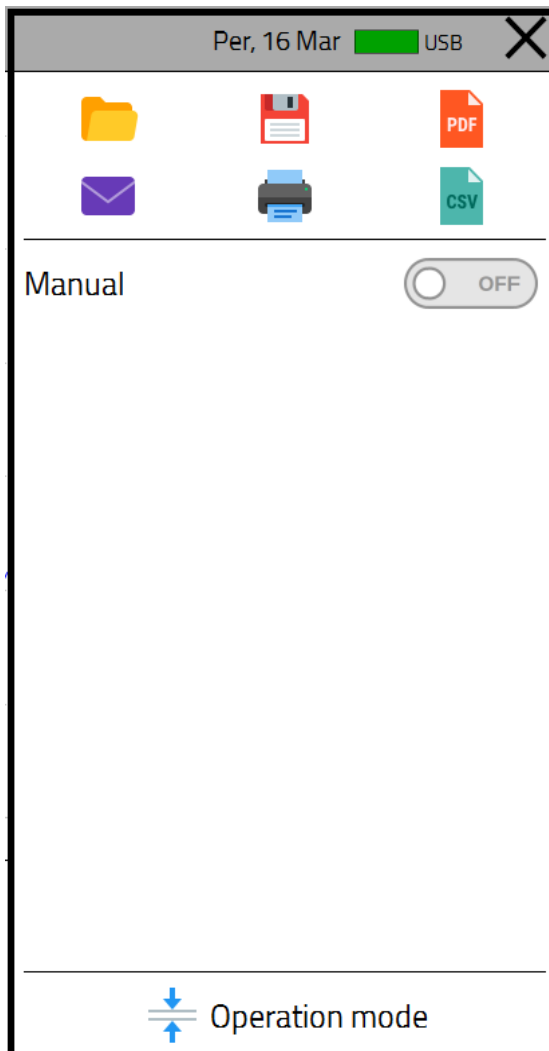
2.2.1.2 Screen Selection Button

With this button you can switch between Real Time Monitoring Screen and Test Result Screen.



2.2.1.3 Result Saving Functions Button

After completing your test, you can save or print your test with several options.



To see saved old results



Saves test results to internal memory



Saves test result as PDF to USB disc



To send test result as e-mail



Prints test result directly from touch screen

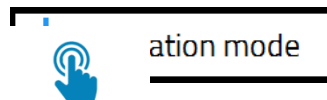


Saves test result as Excel to USB disc

2.2.1.4 Manual Operation Button

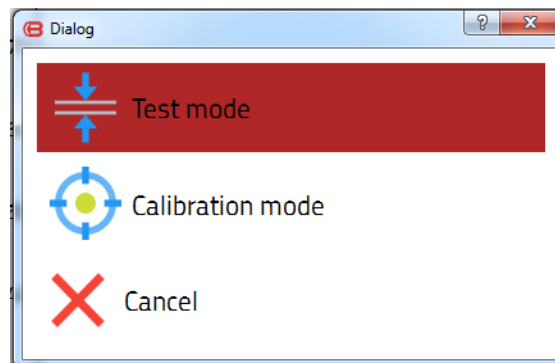


When you touch this button you can operate your test manually, to realize this option generally a potentiometer is placed into machine, by using this potentiometer you can operate the machine.



2.2.1.5 Operation Mode

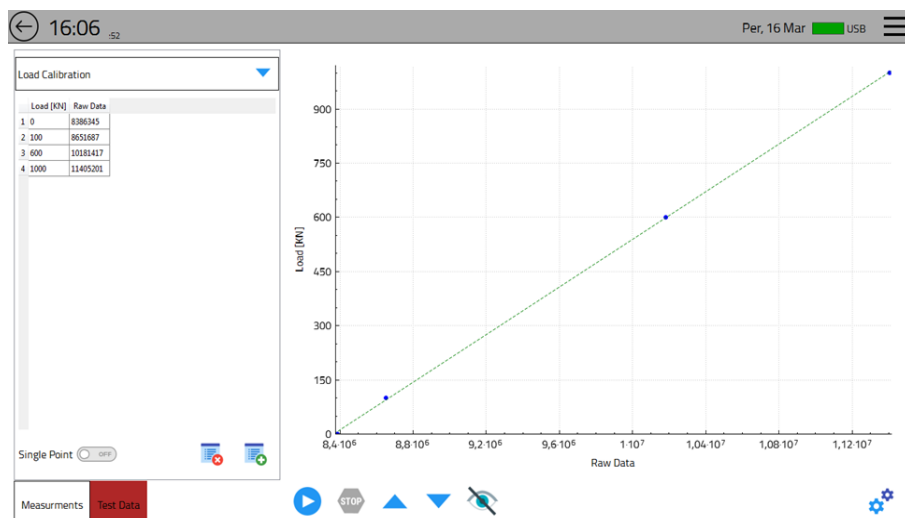
When you touch operation mode you will see a dialog window as below





Here you can switch between **Test Mode** and **Calibration Mode**


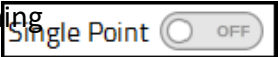
2.2.1.5.1 Calibration Mode

With this mode you can calibrate the machine easily. When you touch to the "Calibration Mode" you will see the screen as below.



- First of all you should choose calibration type between “Load Calibration” and “Pressure Calibration” mode. We will tell here “Load Calibration”
- Second step is speed adjustment (KN/s). By using up and down buttons you can adjust calibration speed.
- Now you should enter load values by using  button to create calibration points.

Also you can delete the calibration points via  button.

- First load value has to be entered as “0”, then you should enter second load value for second calibration point.
- **Second point is very important for healthy calibration, it should be very close to the zero point to equilibrate unstable region.**
- To healthier and linear calibration, you should add a few more point.
- After creation of all calibration points you should press  button to start **Automatic Calibration.**
- When automatic calibration starts, machine automatically comes the first calibration point and asks you to enter your real value, and this process is repeated one by one for every calibration point.
- For healthy calibrations points should be close to the calibration line (we prefer the points on the line)
- If any point is far from the calibration line you can activate the single point calibration by touching  .By this button you can calibrate single point.
- After completing calibration, you can leave this menu via “Result Saving Functions Button >> Operation Mode>>Test Mode

2.2.1.6 Settings Button



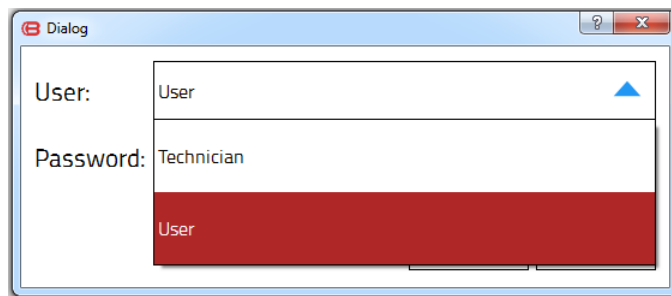
This section is explained in Main Menu>>Settings>>Test Settings in section **2.3.2 Test Settings**

2.3 Settings Menu



When you press this button device will ask you to choose a user and entering a password, when you first open the device you will have two options **Technician** and **User**. If needed you can define new user.

User: When you choose this option, you can access only **Device Settings** and **Test settings**. In this option you **cannot reach** the **Machine Setting** and **Electrical Test** options.



Technician: When you choose this option, you can access all the menus in the device but this option must be used **only authorized persons**. Unauthorized intervention can cause serious faults. In this guide **Technician** option will be shown.

When you enter as technician you will see the window as below.



2.3.1 Device Settings

When you enter Device settings you will see the options as below.

LCD : Adjust the display brightness

Security : You can change the passwords

Date & Time : Adjust the date and time

Language : You can change the language

Contact : You can define an e-mail adress to send test results as e-mail.

Update : You can update soft- and firmware with online checking or USB option.

Connectivity : You can choose the connection protocol (Defined as CAN BUS)

Theme : Adjust the background, buttons, font, status bar and numbers colors.

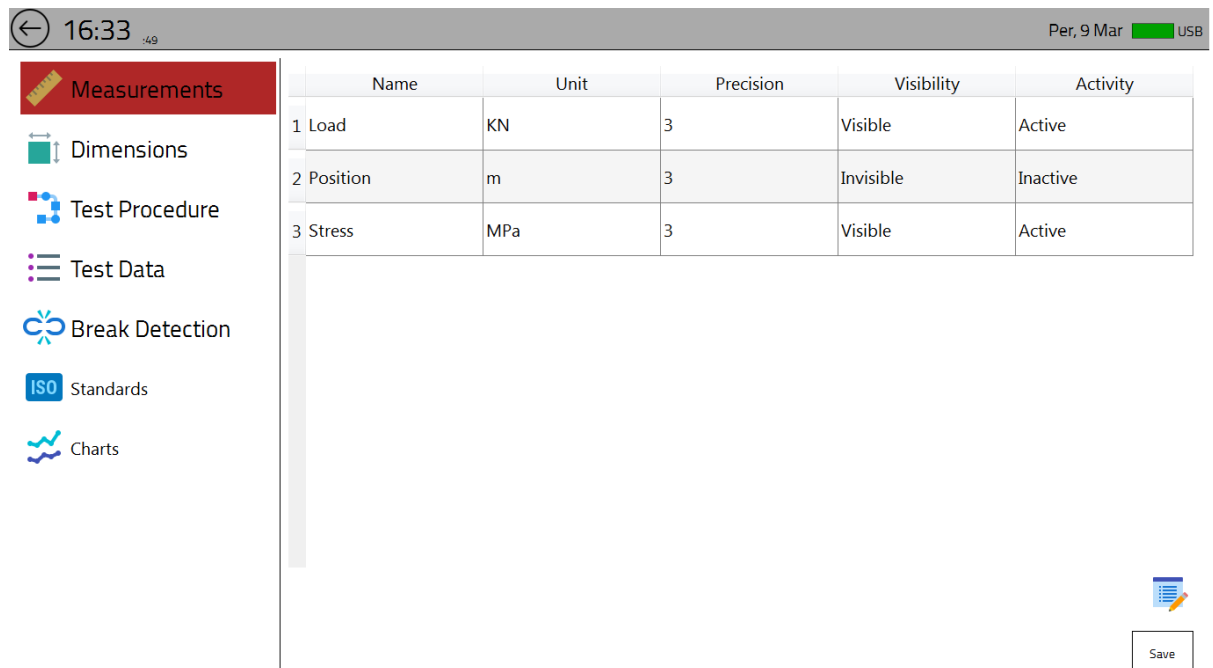


2.3.2 Test Settings

After complete the device settings press the **Test Setting** button for set up needed features to the test. When you press this button device will ask you to choose a machine (Machine A or Machine B). When you select the Machine A all the settings will be saved for this machine and connected transducer. (Machine A – J5 Port – Channel 0 / Machine B – J6 Port – Channel 1). Thus you can control two machine with the same controller separately. Also you can save the different settings for each device.

2.3.2.1 Measurement

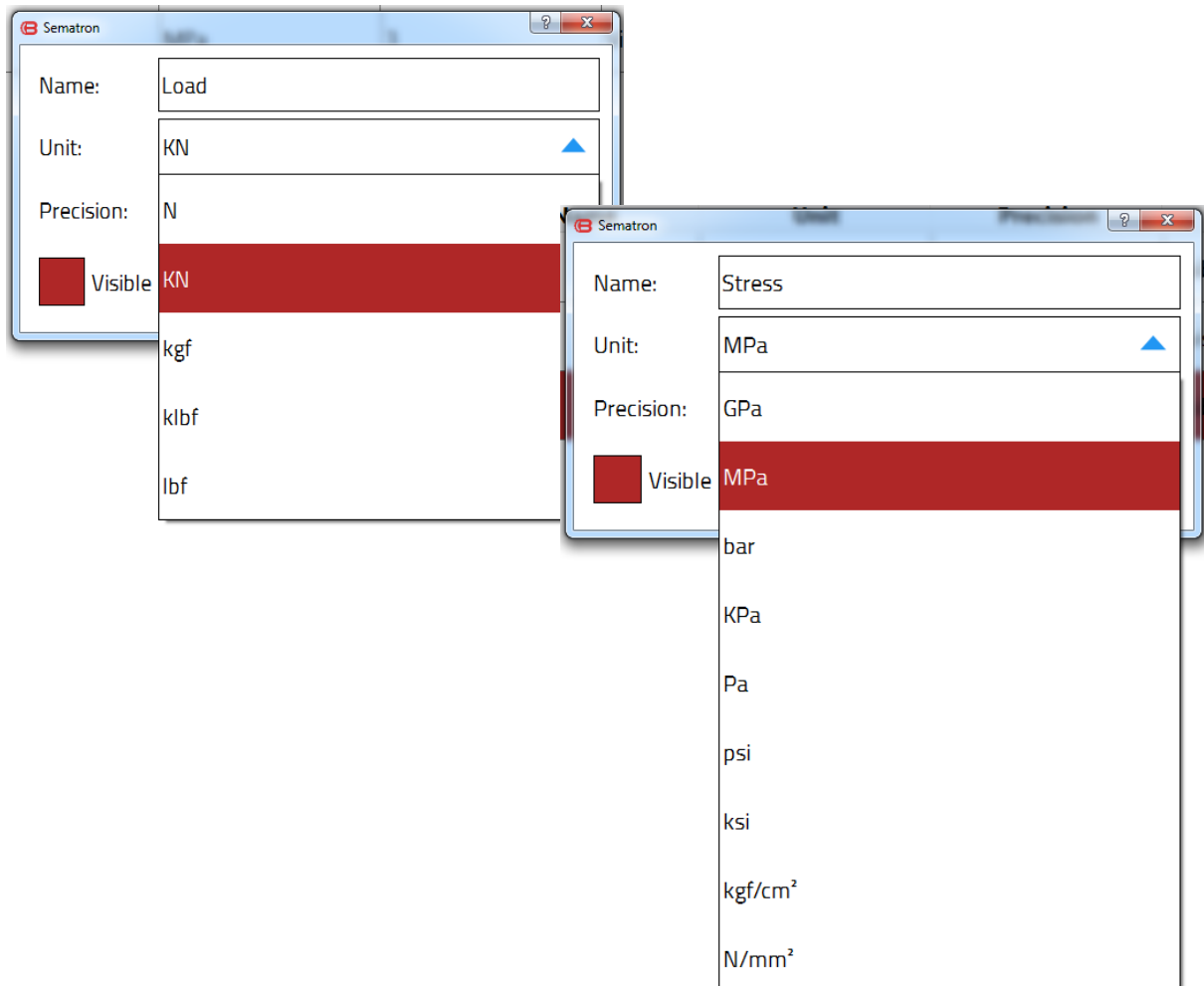
This menu designed to assign a unit name, unit and precision point to transducer which connected to the sensor ports. Also you can decide visibility and activity of the measurement elements. Currently Load, Position and Stress options are defined as valid but you can change all these factors according to your requirements.



	Name	Unit	Precision	Visibility	Activity
1	Load	KN	3	Visible	Active
2	Position	m	3	Invisible	Inactive
3	Stress	MPa	3	Visible	Active



To change the units name you should double click on the tab or touch to the icon. In this section you can define a new **unit name, unit and precision point** proper to the transducer which is added to the sensor port.



Currently you can make load and stress control but in case of the adding a position transducer it will be activated by us.

Load units can be selected as **N, KN, kgf, klbf** and **lbf**

Stress units can be selected as **GPa, MPa, bar, KPa, Pa, psi, ksi, kgf/cm²** and **N/mm²**

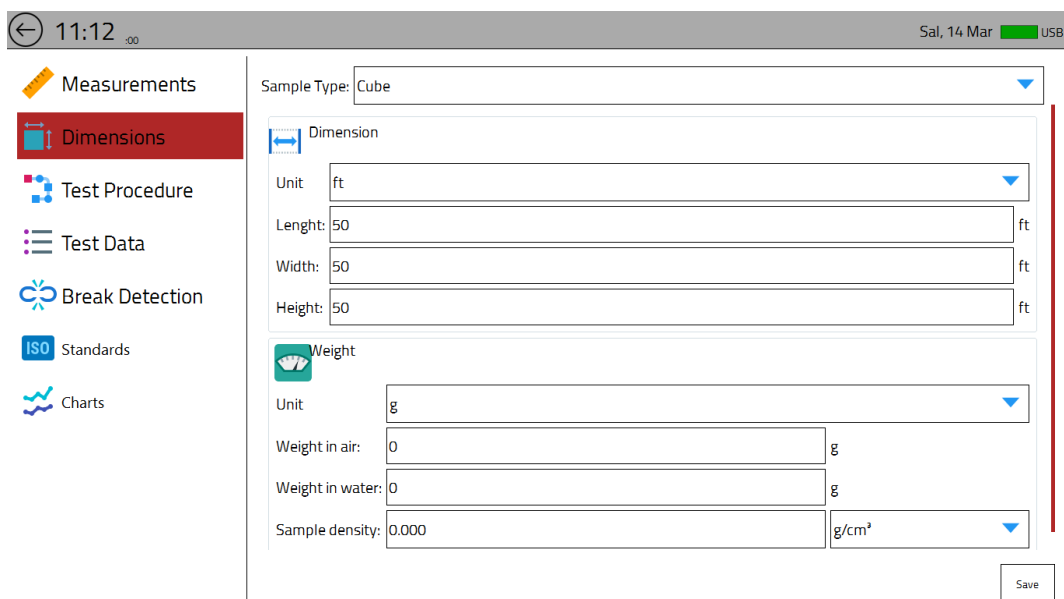
Visibility: When transducer continue to take data, you can decide whether show this data on the test screen or not.

Activity: With this option you can active or deactivate valid transducer.

2.3.2.2 Dimensions

The shape of the sample to be tested can be selected via Dimensions button. You can choose in this menu;

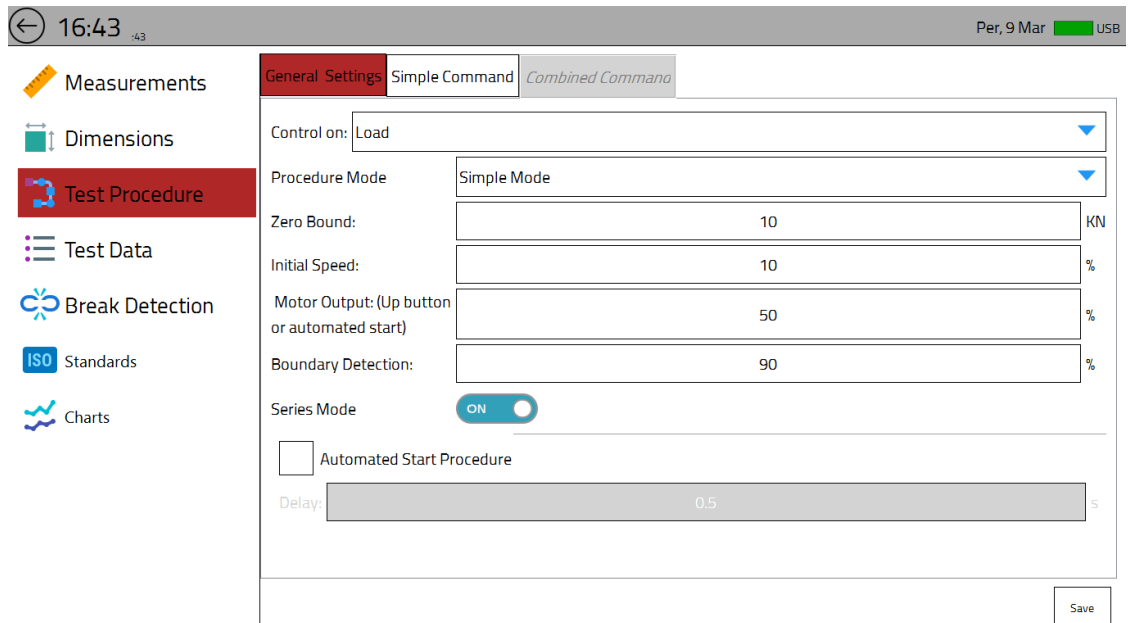
- Test Method** : Compression, 3-Point Flexture, 4-Point Flexture
- Sample Type** : Cube, Cylinder, Cross Section
- Dimensions** : Unit, Length, Width, Height
- Weight** : Unit, Weight in air, Weight in water, Sample density



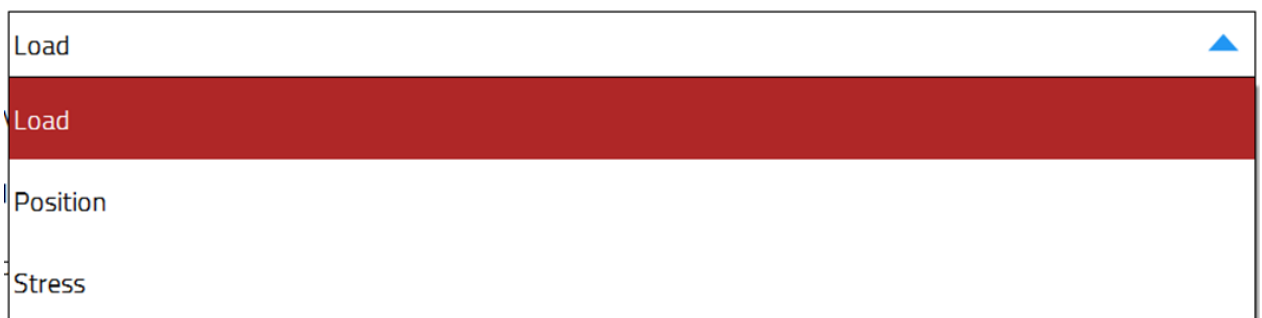
The screenshot shows a software interface with a top status bar displaying '11:12' and 'Sal, 14 Mar'. A left sidebar contains navigation icons for 'Measurements', 'Dimensions' (highlighted in red), 'Test Procedure', 'Test Data', 'Break Detection', 'ISO Standards', and 'Charts'. The main content area is divided into two sections: 'Dimension' and 'Weight'. The 'Dimension' section includes a 'Sample Type' dropdown set to 'Cube', a 'Dimension' icon, and input fields for 'Unit' (ft), 'Length' (50 ft), 'Width' (50 ft), and 'Height' (50 ft). The 'Weight' section includes a 'Weight' icon, a 'Unit' dropdown set to 'g', and input fields for 'Weight in air' (0 g), 'Weight in water' (0 g), and 'Sample density' (0.000 g/cm³). A 'Save' button is located at the bottom right of the form.

2.3.2.3 Test Procedure

This menu is very important for a healthy test conditions and results. Because how will be your test is depending on these adjustments.



First off all you should choose the control type, in this section you have three option **Load, Position and Stress** but current Load and Stress controls are active. Machine movement shapes within your choice. The most of the tests load control is used as first option but different type of the tests can require other control options.



Procedure Mode: In this tab you will see two option **Simple Mode** and **Combined Mode**.

Simple Mode: In this mode you can make simple ramp control by adjusting the actuator's speed in KN/s.


General Settings	Simple Command	Combined Command
Test Speed:	2.400	KN/s

Combined Mode: In this mode user can define a specific test mode which combined of step, ramp, sinusoidal, rectangle, triangle etc.

General Settings	Simple Command	Combined Command	
	Speed [MPa/s]	Destination [MPa]	Delay [s]
1 2		100	5
2 5		500	2

Zero Bound: To obtain more reliable loading user can define a **Zero Bound** point. Until this point unregularly loading will be ignored.

Initial Speed: Adjusts user defined preloading speed.

Motor Output: To move the actuator manually an up button  placed into **Start Test** menu, at the same time you can choose the automated start option to move actuator automatically.

Motor output option placed in this menu to adjust how fast motor will have moved in manual or automated start option.

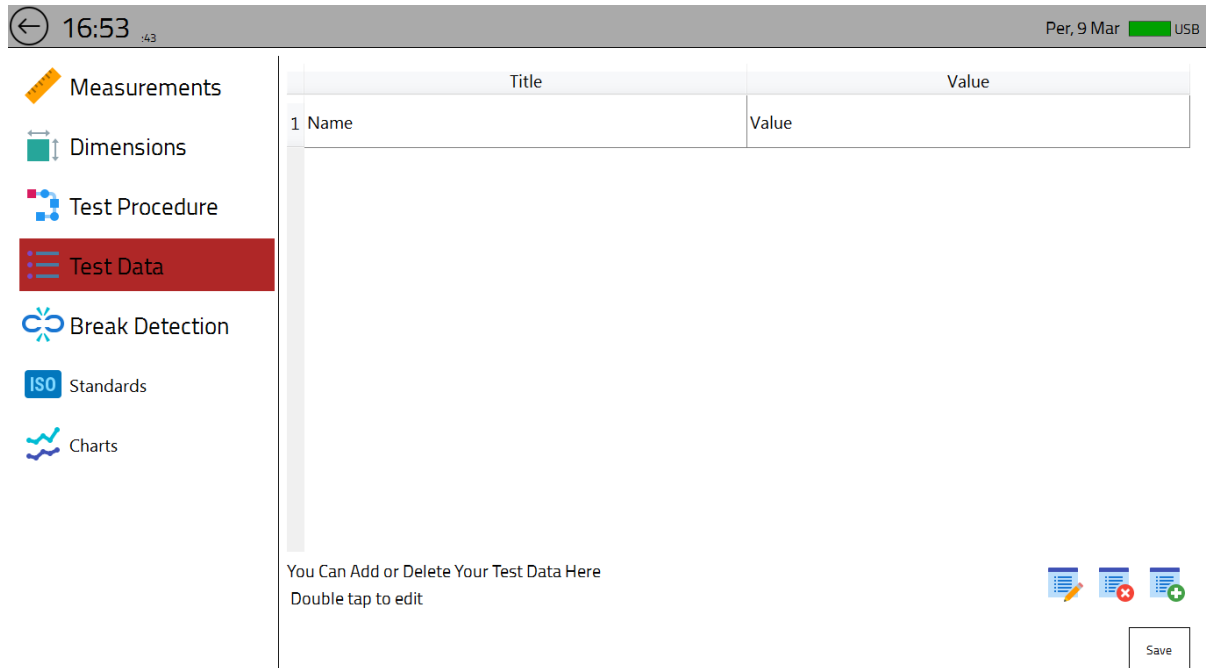
Boundary Detection: When you start a test there will be gap between sample and upper compression platen, before the test sample must be elevated and this gap should be eliminated. To realize this, user can use manual up button or automated start option. During one of this two option to prevent any damage on the sample this controller equipped with **touch detection**. Thus if you even forget your finger on the up button, controller can detect the contact and stops the piston. In this menu you can adjust the percentage of applied initial force for the contact point detection.


Series Mode: In this mode you can make a serial test up to **10** test. Also you can observe all test results in the same graph, thus this option gives you an opportunity to easy compare your results.


Delay: This controller is equipped with **Touch Detection** feature, to prevent any damage on the sample. When machine understand that upper compression platen touch to the sample, stops actuator automatically, waits for a while and softly starts the test. **Delay** tab is for adjust this waiting time. Please notice that this time shouldn't be set more than 1s (Default setting is 0,5s).


2.3.2.4 Test Data

After completing test, you can take PDF or MS Excel version of the test result. If you want to place any information about test, sample or person who made the test, you can enter this section.



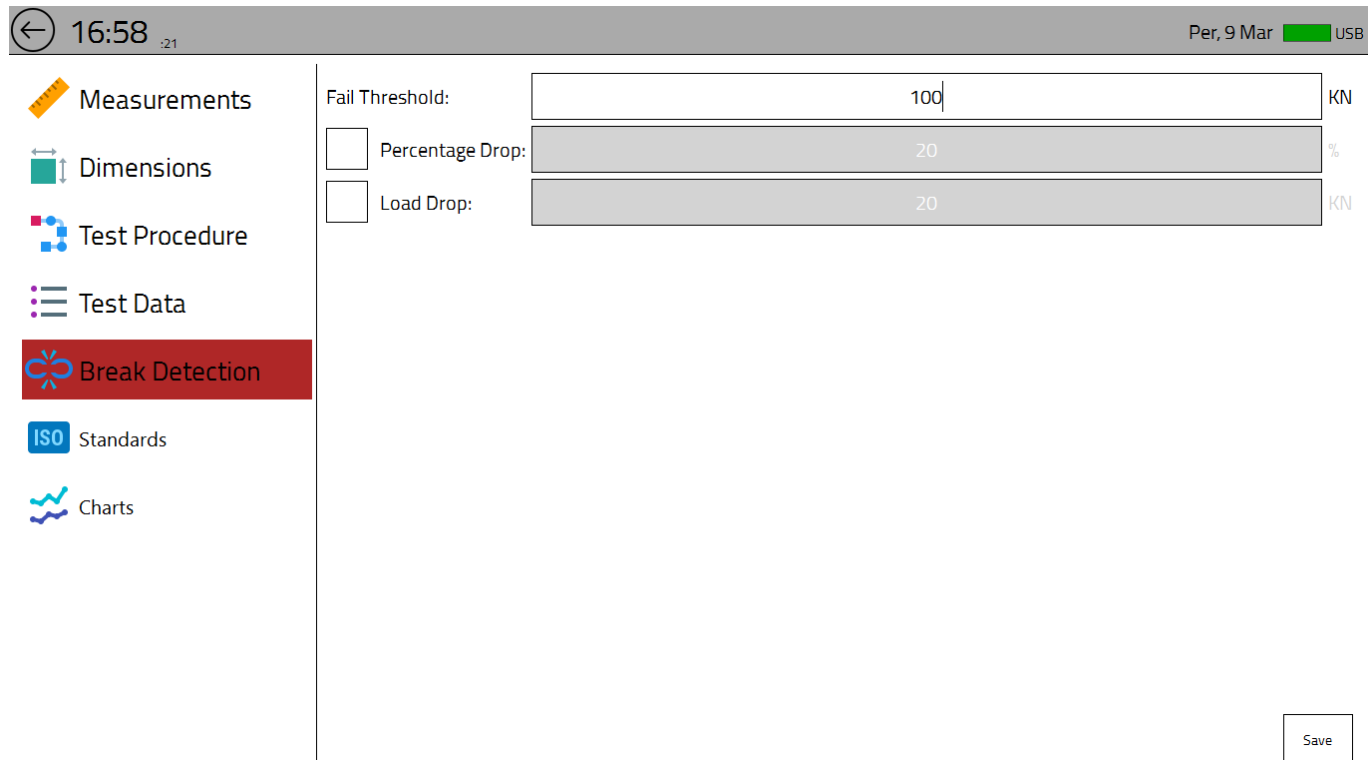
 To edit existing data

 To delete selected section

 To add new test data

2.3.2.5 Break Detection

TESTING Touch Controller is equipped with Break detection feature. Controller is automatically detect breaking of the sample.



Fail Threshold:	100	KN
<input type="checkbox"/> Percentage Drop:	20	%
<input type="checkbox"/> Load Drop:	20	KN

Save

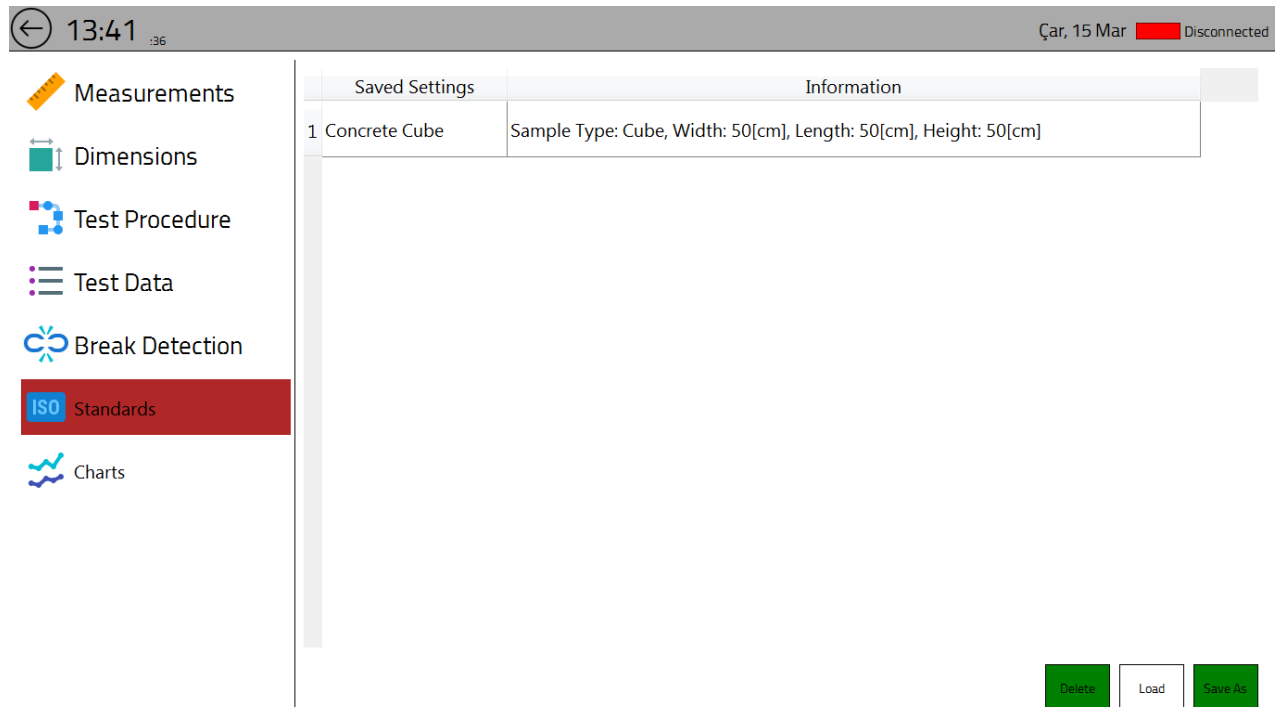
Fail Threshold: It is determined perception threshold of breaking with this parameter. Loading starts when we choose “Start”. Breaking is not detected as long as load value which is read on the screen is not passed this threshold value. So, because of samples and mechanic reasons it is prevented high deflection which happens low load affects system. After this threshold value is passed once, even load fall down under threshold value again, fail threshold happens.

Percentage drop: You can adjust the load drop for break detection as percentage of applied force. For example, is the applied force is 1000 KN and percentage drop is %20, machine will detect 200 KN load drop as breaking.

Load Drop: If you choose this option machine will detect breaking according to value that you entered in this section.

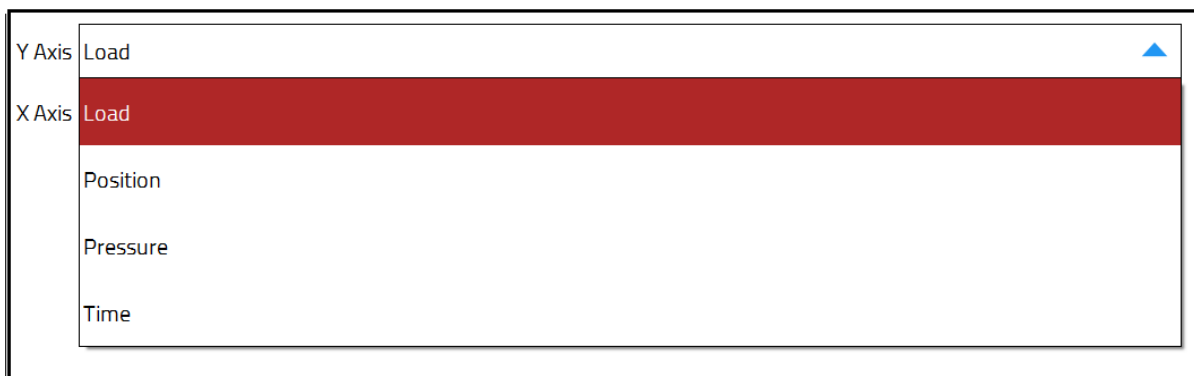
2.3.2.6 Standards

Every test requires its own standards and adjustments for this reason user has to make new adjustments for every new test, to prevent this boring process we added “**Standards**” option to the controller. Thus you can easily save your test adjustments as a standard and can use later as a test method.

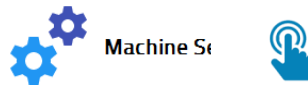


2.3.2.7 Charts

In this menu you can adjust the variables of graphic axes on the test screen. It is changeable as user defined.

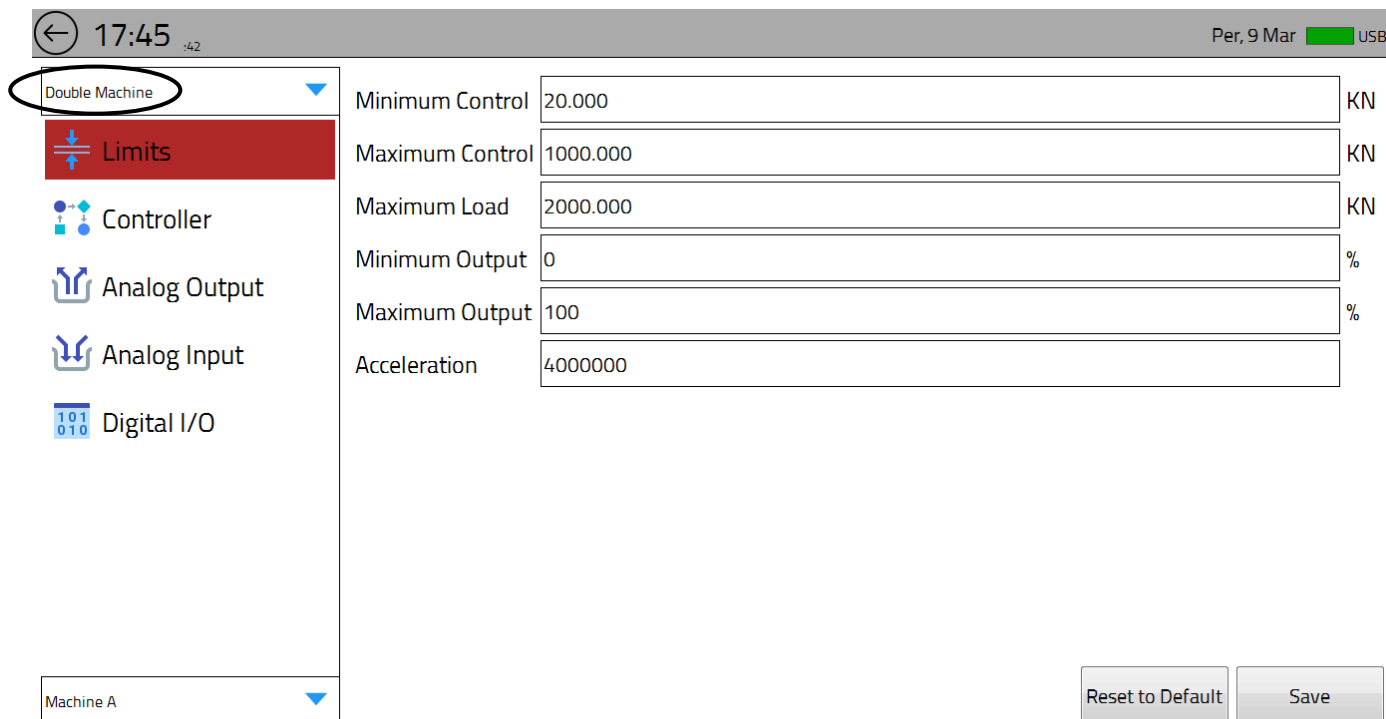


3. Machine Setting



This section should only be used by authorized persons. In this section you can define new devices and sensors to the controller's input – outputs. Also you can adjust parameters of defined devices.

Here you can adjust each machine separately



Limits: User can define limits for healthy test environment and results.

Minimum Control : This set value indicates minimum boundary of control.

Maximum Control : This set value indicates maximum boundary of control.

Maximum Load : Indicates the maximum load boundary.

Minimum Output : Minimum working limit of motor speed.

Maximum Output : Maximum working limit of motor speed.

Acceleration : To Adjust machine acceleration.

Controller: This controller equipped with double closed loop PID controller and all P, I, D values should be set for each device. These parameter are defined as factory default. In order to requirement of these settings please contact with our engineering team.

Analog Output: Motor command and control signal selection for motor drive.

Analog Input: For using of load channel selection

Digital I/O: Bypass valve type selection and control section.

Valve Type	Normally Close
Pre Sink Time(s)	Normally Close
Sink Time(s)	Normally Open

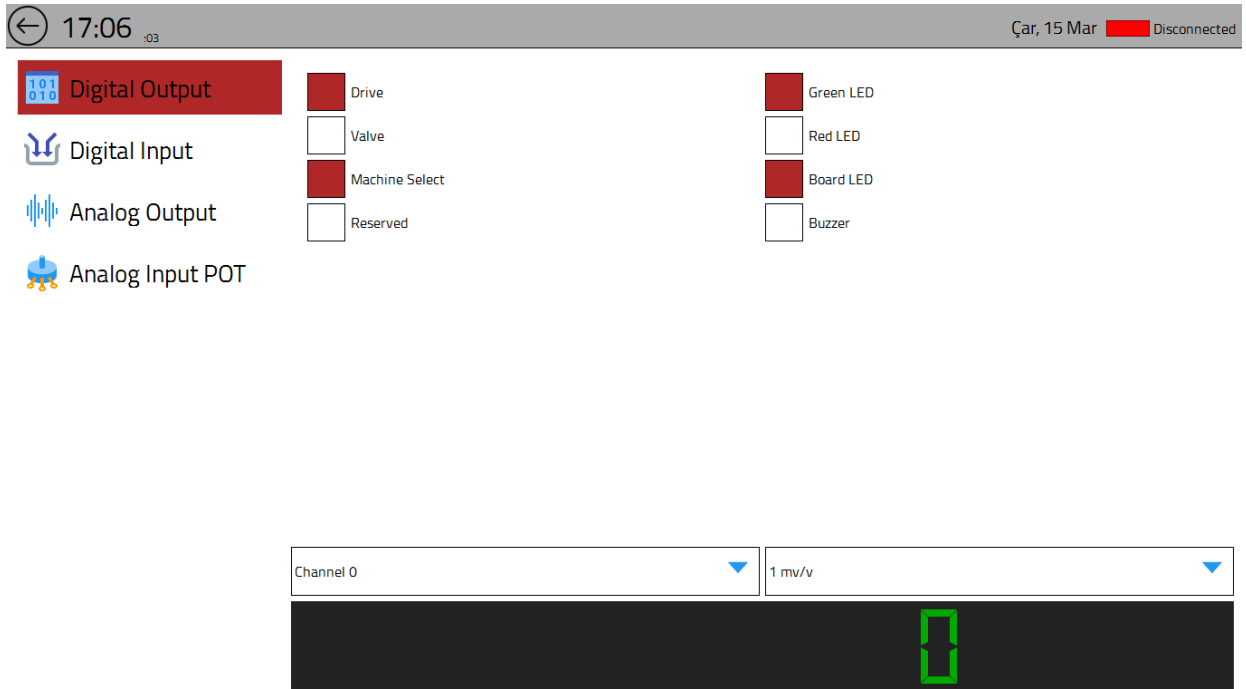
Valve Type: User can select two type of valve; Normally Open and Normally Closed

Pre Sink Time: To set a delay time before sinking process.

Sink Time: Machine waits along the delay time and starts to sinking along the entered **Sink Time**

4. Electrical Test

This menu is designed for remote service. If user has a problem with machine our technicians can connect the device online or can give instructions from our R&D center to the user.



All the device components have placed in this menu.

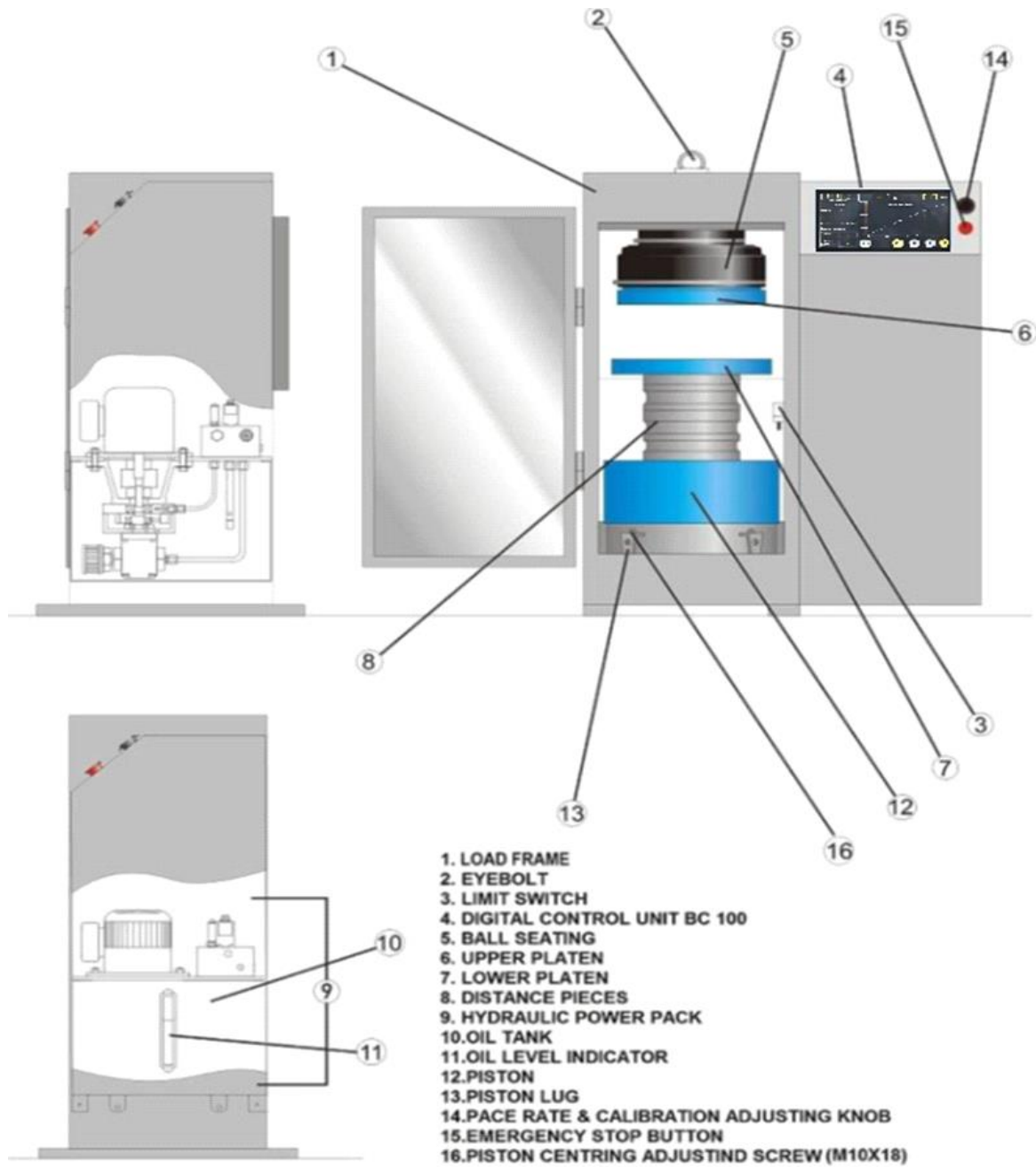
Digital Output: Here we can inspect any problem with Drive, Valve, Machine Select, Control LEDs and Buzzer.

Digital Input: Here we can inspect the problems related with Drive Plug, S0 Plug, S1 Plug, AIN Plug, CAN Plug, Emergency Stop, Door Switch, Up Limit Switch, and Down Limit Switch

Analog Output: This section is used to control motor command and control signal.

Analog Input POT: A potentiometer is placed to the device to drive motor manually, this section allow us the control of this potentiometer.

5. Frame



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