HIGHTEST TECHNOLOGY LTD.

ARES – 200 & ARES-200D

INSTRUCTION MANUAL

NOTE:

This manual applies to the ARES-200 and the ARES-200 D digital micro-ohmmeters. The operating procedures are virtually the same for the two models, and any differences are clearly described where applicable.

ARES-200 is a micro-ohmmeter produced with advanced engineering technologies which can apply up to 200 A current. With its easy-to-use software, ARES-200 can easily measure **Static contact resistances** of circuit breaker, shunt, disconnector by applying adjustable current from 1 A to 200 A.

ARES-200

ARES-200 D is a micro-ohmmeter produced with advanced engineering technologies which can apply up to 200 A current. With its easy-to-use software, ARES-200 D can easily measure both **Static and Dynamic contact resistances** of circuit breaker, shunt, disconnector by applying adjustable current from 1 A to 200 A.

ARES-200 D

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Features

- Static (ARES-200) and Dynamic (ARES-200 D) Contact Resistance Measurement
- Adjustable Current: 1 A to 200 A
- Measurement Range from 0.1 μ Ω to 5 Ω
- Typical Accuracy 0.1%
- Static Resistance Measurement
- Dual Ground Test mode
- Built-in Printer
- Internal Memory, USB Flash Drive
- PC control via USB cable
- Optional Bluetooth control and communication (Models: ARES-200 BLUE & ARES-200D BLUE
- 4.3-inch TFT touch Display
- Protection Class: IP67 (case closed)

Technical Specifications

Measurement Parameters	Resistance
Resistance Measurement	Static & Dual-Ground Resistance (ARES-200), Static, Dynamic Resistance & Dual-Ground (ARES-200D)
Measurement Method	ANSI/IEEE C57.12
Test Current	1 A to 200 A
Measurement Range	0.1 μΩ to 5 Ω
Accuracy	Typical: 0.1% ± 0.1% Fs Guaranteed: 0.5% ± 0.1% Fs
Display	4.3-inch TFT touch Display (visible under sunlight)
Memory	Up to 200 records with 25 intervals for each
Communication	USB, Pen drive, Bluetooth (factory-installed option for specific models)
PC Software	DMP Software
Printer	2.25-inch Built-in Printer
Current Clamp	Yes, Optional
Power Supply	100-240 V 50/60 Hz
Dimensions	16.7" x 13.4" x 6.8" (424 mm x 340 mm x 173 mm)
Weight	9 kg
Operating and Storage temperature	Working: -10 °C to + 60 °C Storage: -30 °C to 70 °C
Humidity	95% RH non condensing
Protection Class	IP67 (case closed)
Set of Package	ARES/ ARES-200 D, Power Cable, USB Cable, 33 Feet Measurement Cable, Ground Cable, Cable Bag, 2 Printer Paper, User Manual, DMP Software, Built-in Bluetooth
Options	Hard Carrying Case, Current Clamp, Length Customised Cables
Ordering Information	ARES-200, 200A Micro-Ohm Meter with built-in Printer for Static and Dual-Ground Measurements
	ARES-200 BLUE, 200A Micro-Ohm Meter with built-in Bluetooth & Printer for Static and Dual-Ground Measurements
	ARES-200D, 200A Micro-Ohm Meter with built-in Printer for Static, Dynamic and Dual-Ground Measurements
	ARES-200D BLUE, 200A Micro-Ohm Meter with built-in Bluetooth & Printer for Static, Dynamic and Dual-Ground Measurements

Note

Specifications are valid under 25 ℃ temperature. *Contents subject to change without notice

Precautions

• Please read all instructions before turning on the unit and likewise follow the instructions while operating the device.

• Follow all safety precautions while operating, servicing or repairing the device.

• The user shall accept all responsibility for the operation of the device with the purchase of the device.

• Use, design and manufacture of the device have been carried out with precautions or other special instructions contained in this manual.

• Failure to follow safety instructions and other special instructions may cause problems to the design, and operation of the device.

• HighTest Technology ltd. accepts no responsibility for improper use or improper operation of the device or non-compliance with safety precautions.

1. Safety Operation

• Only qualified personnel are allowed to operate.

• Before operating the device, every testing personnel must read the operational and safety instructions and thoroughly understand the device.

• All testing personnel; either directly or indirectly, must stay away from high-voltage devices while testing.

• Make sure the device is grounded to reduce the risk of electric shock.

• Do not use the device to measure the resistance of inductive devices.

• Do not touch or disconnect any test lead that is connected to a device under test while current is being conducted.

• Make sure that the power cord (PWC-01) supplied with the device is plugged into a grounded power outlet.

• There is a risk of electric shock if the device is not grounded and/or the power cord is not connected to a grounded outlet. It may cause damage to the device and/or injury to the test personnel.

2. Prior to Turn ON

• Check that all circuit breakers under test are offline and fully isolated.

• Do not operate the device in the presence of inflammable or explosive materials.

3. Avoid Unauthorised Disassembly

• The operator must NOT remove the case of the device.

• The device can only be separated from the case and repaired ONLY by an authorised technical service. The disassembly of the device by unauthorised persons will exclude the warranty of the device.

• Do not touch or replace the electronic components of the device with the power cord (PWC-01) inserted.

• To avoid injury, make sure that the circuit has been disconnected from the external and/or internal voltage sources and that the circuit has been discharged before replacing the internal components.

Scope of Supply

If any of the following content is missing or damaged, please contact your authorized distributor or HighTest Technology Ltd.

Standard Content List

ARES/ ARES-200 D	: Contact Resistance Tester with built-in printer
PWC-01	: 1.5 m Power Cord
TEST CABLE SET	: 10 m (33 ft.) Test cable set with heavy-duty alligator clamps (1 x)
GROUND CABLE	: 2.5 m GC-01 Ground Cable (1 x)
USB CABLE	: (USB 2.0/1.1 Standard-B)
DMP Software	: Zipped folder on HIGHTEST USB
User Manual (Soft Copy)	: Soft copy saved on HIGHTEST USB
USB flash drive (Pen drive)	
PP-11	: Printer Paper (2x)
Soft Cable Carrying Bag	

External/Optional Accessories

The following accessories are not included in the standard box contents. Please contact your authorized distributor or HighTest Technology Ltd.

- Hard Carrying Case
- Ammeter Clamp 600A
- Temperature Sensor TEMP-ARES
- Bluetooth

* *Bluetooth option is factory-installed for specified models.*

Overview

The ARES 200/ ARES-200D is a micro-ohmmeter (shunt type ohmmeter) produced with advanced engineering technologies which can apply up to 200 A current, designed to measure small values of DC resistance; ranging from 0.1 micro-ohms to 5000 milli-ohms with high accuracy.

The ARES 200/ ARES-200D is field-portable, rugged, fully automatic and microprocessor-controlled. It is easily operated even by less trained staff. HighTest Technology Ltd. has produced ARES 200/ ARES-200D after long R&D efforts to make accurate and precise measurements even while measuring very small resistances.

ARES 200/ ARES-200D's 4.3-inch TFT touch colour screen shows measurement results and all related identifying data providing great convenience to users for entering test parameters and control functions manifest on control-option menus. ARES 200/ ARES-200D guides its operators to perform tests quickly in barely 15 seconds with its user-friendly interface. With ARES 200/ ARES-200D's temperature measurement channel, the temperature values of the measured sample can be taken and calculated according to the desired temperature value. ARES 200/ ARES-200D's advanced communication technologies make it able to control and monitor tests with both wired and wireless means. The results can be saved in the internal memory of the device or to an external memory location.

Operators can easily print the measurement results with the 2.25-inch built-in printer of ARES 200/ ARES-200D and can prepare on-field reports easily. ARES 200/ ARES-200D's flash memory feature allows controlling, record and store measurement results (up to 100 Test Records). And also, users can copy test records by using a USB drive. ARES 200/ ARES-200D is resistant to impacts and rugged device with IP67 protection (case closed) which weighs only 9 kg.

Static & Dynamic Contact Resistance Test Principle

The micro-ohmmeters operation is based on the electrical relationships described by Ohm's law: $R_x = V/I$, where "I" has a known value selected by the user and "V" is the dc voltage measured across the unknown resistance (typically, a circuit breaker's contacts) is read by a precision voltmeter, Then the contact resistance value, R_x, can be calculated by. Test current is automatically ramped up and down slowly, which virtually eliminates magnetically induced transients through the circuit-breaker current transformers.

The four-wire (Kelvin) DC voltage drop is the typical method used by micro-ohmmeters for the contact resistance test, which ensures more accurate measurements by eliminating the own contact resistance and resistance of test leads.

The Dynamic Contact Resistance Measurement test method is very suitable for circuit breaker diagnostic testing. Tests are conducted with test kit by injecting up to 200A DC and more through the breaker and measuring the voltage drop and current, then the breaker analyzer plots resistance as a function of time.

ARES-200 D analyses and plots the curve of dynamic resistance in high precision with a sampling frequency of 16 kHz and a sampling time of 62,5 μs.

Application Fields of Contact Resistance Tester

Contact Resistance Tester is used to measure resistance in different applications of electrical testing. The test measures the resistance at the micro- or milli-ohm level (ARES 200/ ARES-200D [0.1 uΩ - 5 Ω]) and is used primarily to verify that electrical connections are made properly and to detect potential problems encountered in the field, such as:

- Corrosion of contacts and their surfaces
- Loose connections
- Adequate tension on bolted joints
- Eroded contact surfaces
- Contaminated or corroded contacts

The main reason for using Contact Resistance Tester in electrical sub-stations is to measure the contact resistance in the circuit breakers. These last needs to be able to reliably interrupt short circuit currents without damaging themselves or adjacent equipment even after long idling times, this is why the circuit breaker contacts should be checked regularly to ensure that they are healthy and functional. Damaged contacts or poorly maintained can cause arcing, losing phase, and even fire.

This test is particularly important for contacts which carry large amounts of current (e.g. switchgear busbars) because higher contact resistance can lead to lower current carrying capacity and higher losses.

You can easily avoid the above problems using the HighTest Contact Resistance Tester ARES 200/ ARES-200D. Furthermore, the contact resistance test is part of the acceptance tests of the routine preventive maintenance program, which must be carried out at the production stage of the circuit breakers.

Section 1

Front Panel Components

ARES-200

ARES-200D

1. Power Connector

- ARES 200/ ARES-200D AC power input
- The input voltage should be between 100-240Vac 50/60 Hz.

2. Ground Connector

- To connect the ground cable while performing tests.
- Make sure the Ground is connected before energizing and testing.

3. Display

- 4.3-inch Resistive Touch TFT Display great convenience to users.
- It allows ARES 200/ ARES-200D to show all measurement results on a single screen.
- Visibility in daylight and low light levels
- Able to adjust the brightness level.

4. Emergency Stop Button

Push the emergency button while testing to stop the ongoing test in an emergency. In addition to designated 'Emergency Button', ARES 200/ ARES-200D's power button will also function as 'Emergency Stop'.

5. Power Button

Power Button has some specific tasks apart from the intended purpose.

- To turn ON the device.
- Pressing the power button for 2 seconds while the device is ON will switch off the device automatically. (Display status is negligible.)
- You can switch the device OFF by a single press on the power button while the device is on the main page.
- Can be used as a "**Back**" button on pages other than the home page.
- Can also be used as an "**Emergency Stop**" while performing the test.

6. Current lead Connectors

Make sure the current lead connectors are properly connected before starting the test.

- Snap the test cable into place and turn it clockwise slightly. Check the cable is plugged.
- To remove the test cable, turn it counterclockwise and pull it out.

7. Voltage-sensing connector jacks

Plug voltage-sensing connector jacks in resistor R_x terminals on the front panel and make sure the test cable is properly connected before starting the test.

The current-carrying cables and voltage sensing cables are terminated with heavy-duty alligator clamps to connect to the device being tested.

8. USB Connection Port

There are two USB ports available on ARES 200/ARES-200D.

- USB 2.0/1.1 Standard-A, to connect external USB flash drive to save the test results and to update software.
- USB 2.0/1.1 Standard-B, to control ARES 200/ARES-200D via computer. The cable to be used should not be longer than 1 meter.

9. Expansion

To connect ARES 200/ARES-200D for extension purpose.

10. Current Probe

Used with external clamp ammeter to record current data from the tested sample's ground when the operator would like to use the dual ground option to get more accurate results.

11. Temperature Sensor Connector

To connect a temperature sensor with ARES 200/ARES-200D in order to obtain automatic temperature correction.

12. Printer

ARES/ARES-200 D have 2.25-inch built-in printer which allows the operator to print the measurement results easily. If the paper runs out of the printer, lift the printer cover to load new paper roll and close the cover.

13. External Trigger Connector (in ARES-200D)

This connector will be just in ARES-200D and used to connect ARES-200D with external trigger mode in order to receive voltage data from the device being tested (circuit breaker's contacts).

Section 2

Operating Instructions

1. Instructions

- Unlock the enclosure tabs on the front side of the case to open the lid.
- Plug the ARES 200/ ARES-200D into a grounded power outlet (100-240Vac 50/60 Hz).
- To protect the instrument against static discharge in the substation, always connect the unit's ground stud to the substation ground.
- Connect the test cables to control-panel according to the instructions described above.
- Attach current test-cable clamps to opposite terminals of the resistive load being tested.
- Switch ON the device by pressing the power button of the device.
- Apply the procedures described below and introduce the test parameters to the instrument.
- Finally, you can test by pressing the "**Test**" tab, save the test results in the device memory or print them.

2. Static Resistance Test

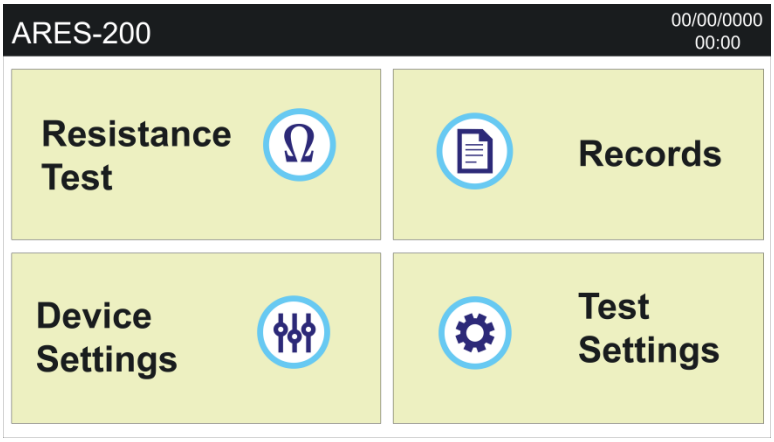
Static Resistance is the nominal ohmic resistance in accordance with Ohm's Law, it is the ratio of voltage and current and is a constant at a given temperature.

3. Dynamic Resistance Test

The dynamic resistance is obtained by direct measurement of both, the current and the voltage of the corresponding circuit breaker terminals. It refers to the change in current in response to a change in voltage at a specific region of the VI curve.

Section 3

Display Introductions



Home Page

- To perform shunt or contact resistance testing.
- To access test records.
- To alter device settings.
- To add test settings and create test templates.
- Displays the date and time information.
- Indicates the current date and time
- Indicates when Bluetooth is active.
- Indicates when the USB memory is inserted. If it is green, the automatic recording option is active.
- Indicates the battery level and status
- Critical battery warning. If the battery is at/below 15%, the display shows the warning. If the battery is at critical level, no test can be performed.

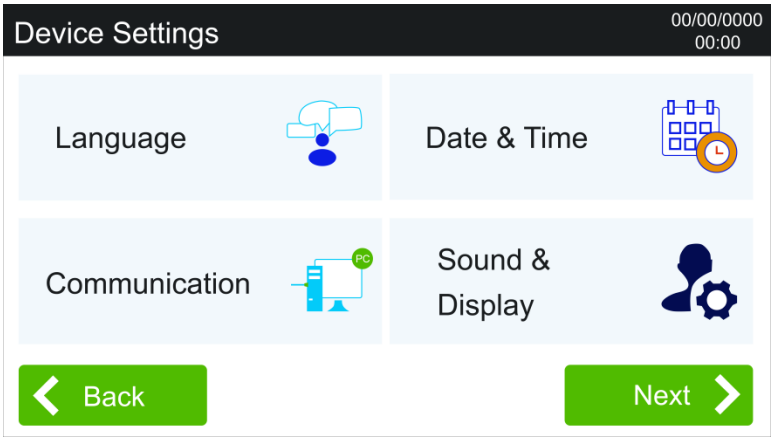
1. Device Settings

In this menu, the device setting can be altered. Device settings consist of 2 pages. You can use the '**Next**'/ '**Back**' tabs to navigate through the pages. You can make the following settings under this menu:

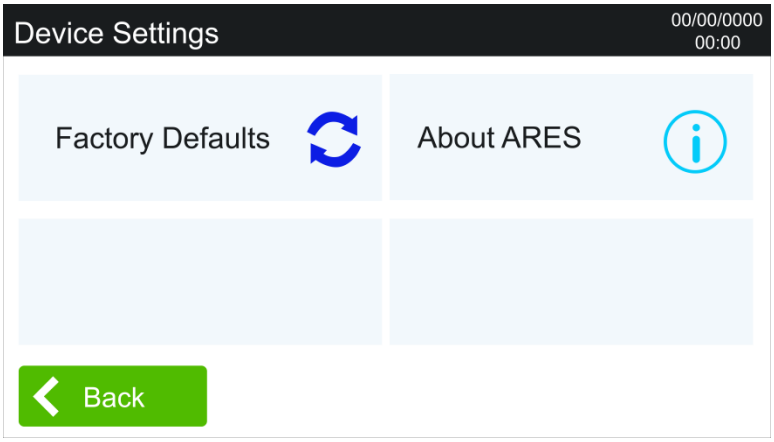
1. Language Settings
2. Date and Time Settings
3. Communication Settings
4. Audio and Display Settings
5. Factory Defaults

6. About ARES/ARES-200 D

Following is the page 1 of '**Device Settings**'



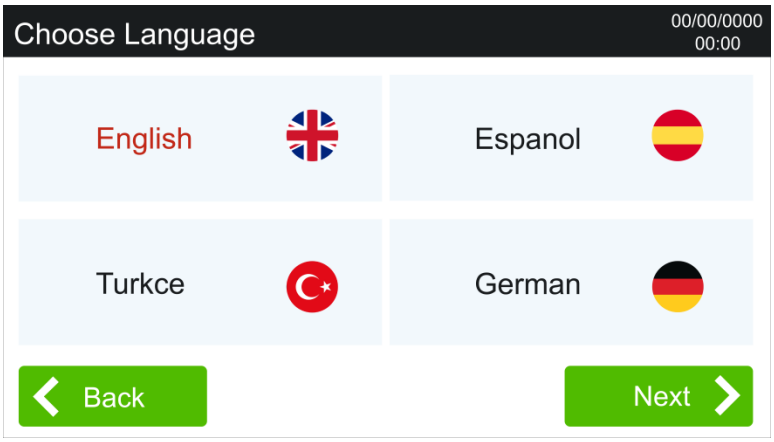
Press the '**Next**' tab to navigate to page 2 of '**Device Settings**'



1.1 Language Settings

ARES/ARES-200 D series supports multiple languages including EN, ES, TR, DE and FR. (Portuguese and many more will be added soon)

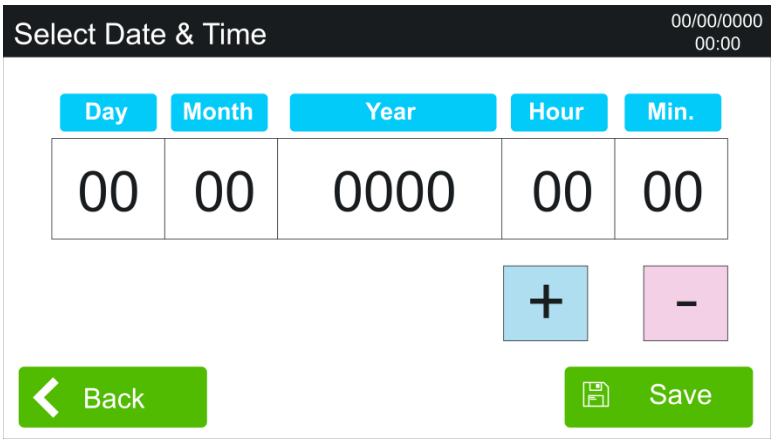
- Press the '**Language**' tab to choose the desired language for changing the default language of the device.
- The active language is marked in red.
- Exit the menu by using the '**Back**' tab.



1.2 Date and Time Settings

ARES/ARES-200 D has a high accuracy real-time clock.

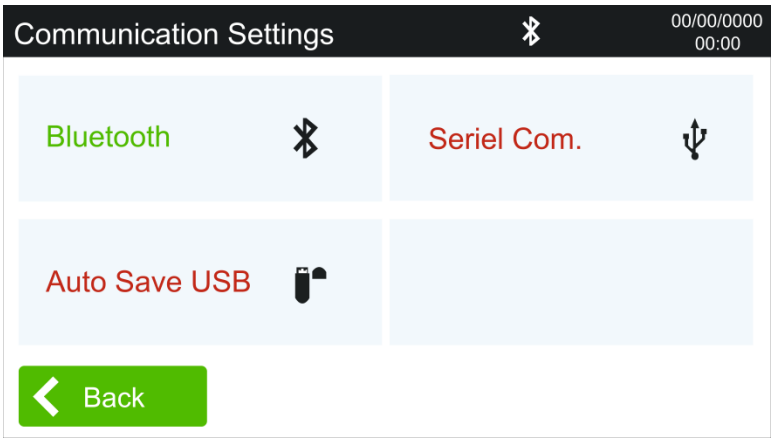
- Press '**Date & Time**' tab in the '**Device Settings**' menu to change date or time.
- Choose the parameter to be changed and then use '+/-' tabs to alter it.
- Press '**Save**' after making the necessary changes.



1.3 Communication Settings

ARES/ARES-200 D has multiple communication options.

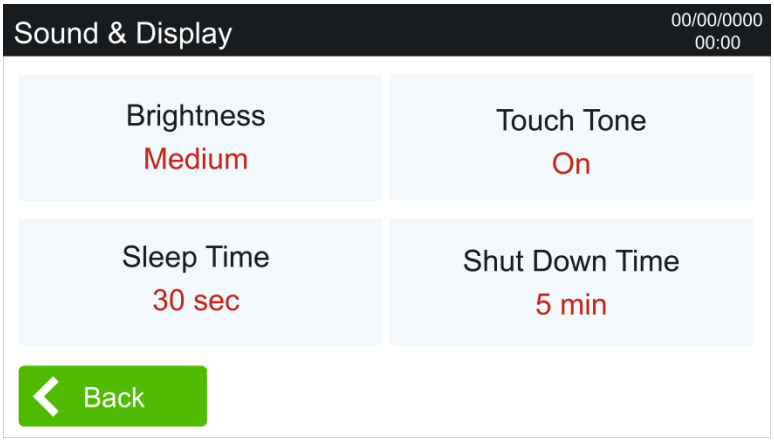
- To control ARES/ARES-200 D via Bluetooth, activate Bluetooth broadcasting by pressing the '**Bluetooth**' tab.
- To control ARES/ARES-200 D via PC Software, activate connection by pressing '**Serial Com.**' tab.
- ARES/ARES-200 D cannot be controlled simultaneously by Serial Communication and Bluetooth. Either one of these two options can be activated at a time.
- The USB connection is activated by pressing the '**USB Storage**' tab to automatically store the test results on the USB memory.
- The chosen option is highlighted in Green.



1.4 Sound and Display Setting

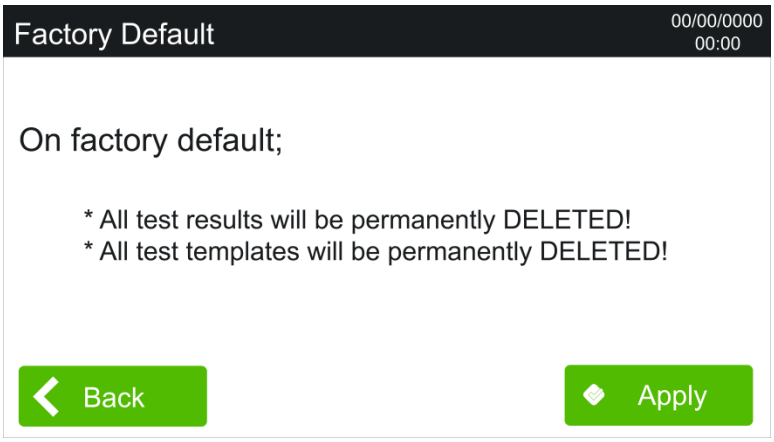
To change Sound and Display settings.

- **Brightness**: The brightness of the display can be set to high, medium and low. Keep the screen brightness to a minimum for longer battery life.
- **Touch Tone**: To turn ON/OFF the touchpad sound.
- **Sleep time**: To set the '**Sleep Time**' to automatically turn off the display after a certain seconds/minutes of inactivity. To turn it on again, press the Power button.
- **Shut-Down time**: To set a time to automatically turn OFF the device after a certain seconds/minutes of inactivity.



1.5 Factory Default

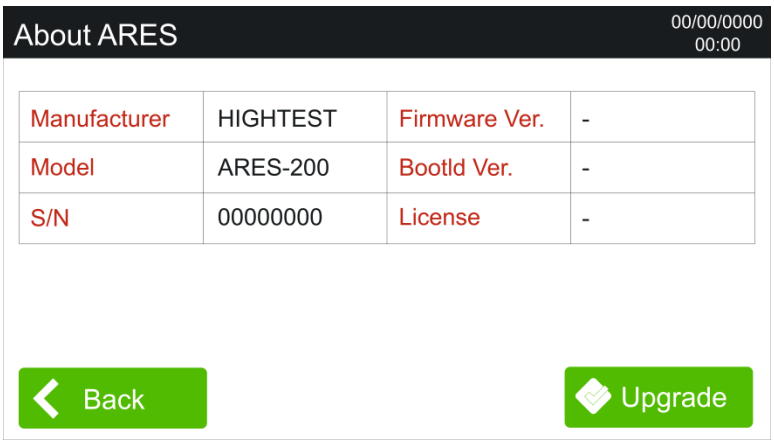
To reset the device to factory default settings. All the saved test results and templates will be permanently deleted.



1.6 About ARES 200/ ARES-200D

Information about ARES 200/ARES-200D is available.

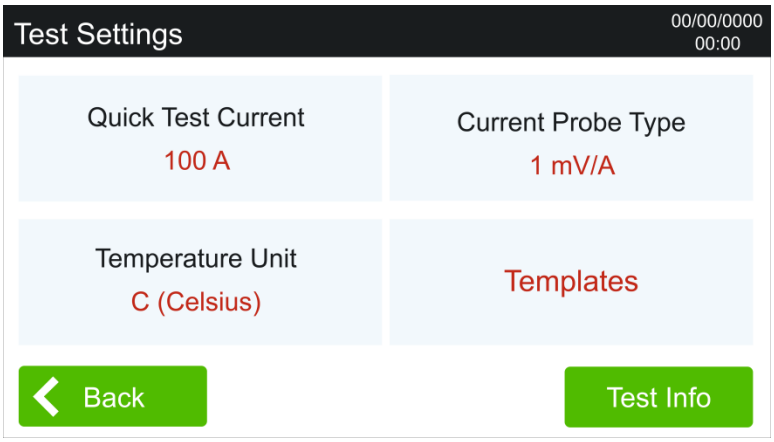
Download the latest version of ARES 200/ARES-200D's software from www.hightest.co.uk for software update and by using a USB, you can update the device by pressing the '**Upgrade**' tab.



2. Test Settings

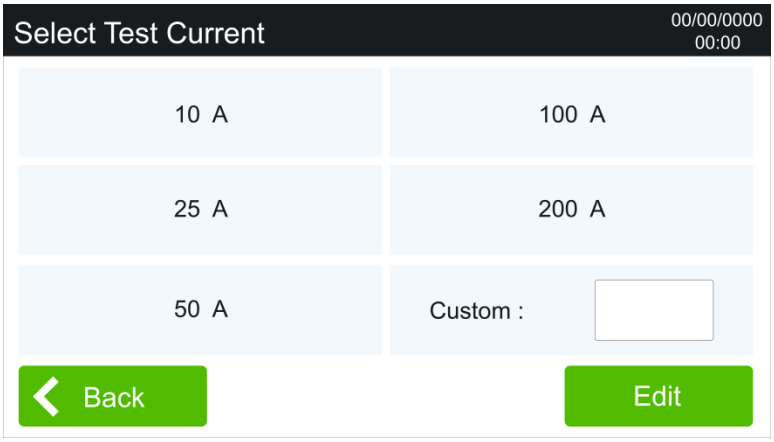
Available on the "**Home Page**" to make necessary settings related to the test to be performed. Test settings consist of one page. Pressing on 'Test Setting' tab directed you to the following screen where you can make the following settings under this menu:

- Quick Test Current
- Current Probe Type
- Temperature Unit
- Templates

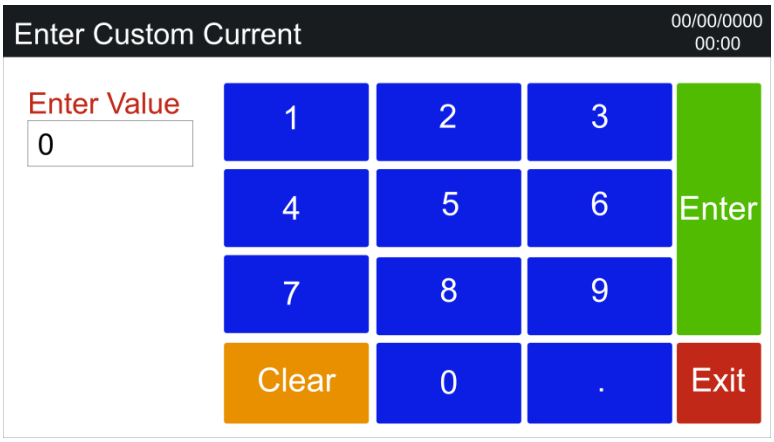


2.1 Quick Test Current

It is used to test quickly without entering test settings. By pressing on the '**Quick Test Current**' tab, users can adjust the test current that will be applied in a quick test. Test current is selectable from the following menu according to the user's preference. You can easily choose the test current from predefined values; 10A, 25A, 50A, 100A, 200 A. Or you can enter custom values by pressing the '**Edit**'.

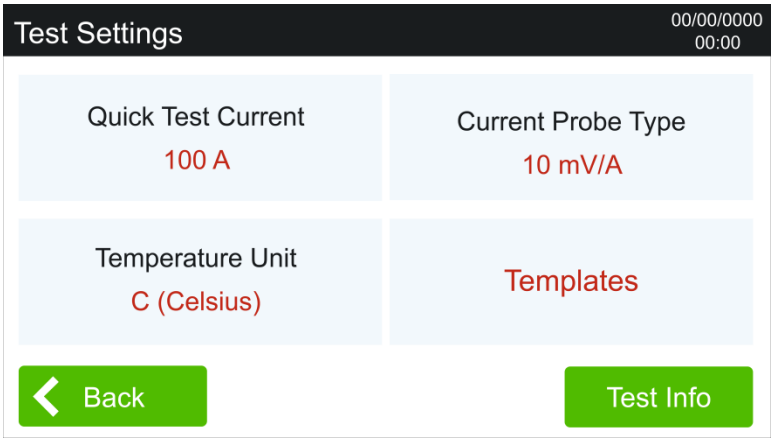


You can enter the desired value using the on-screen keyboard of ARES 200/ARES-200D. To save the entered value press '**Enter**'. If you press on '**Exit**' instead of '**Enter**' the value will not be saved and you will return to the previous page. Then to select the entered test current value press on the '**Custom**' tab.



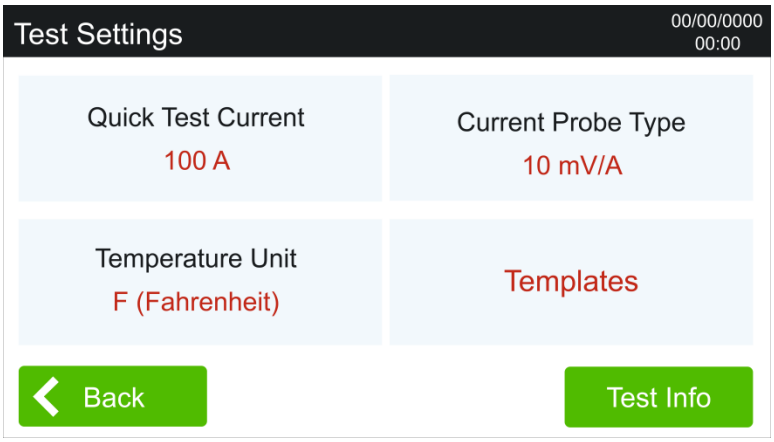
2.2 Current Probe Type

Press the '**Current Probe Type**' tab to set the current probe type that relates to the external clamp ammeter used in dual ground test mode to obtain more accurate results. You can select the current probe type 1 mV/A, 10mV/A, 100 mV/A by pressing on the '**Current Probe Type**' tab.



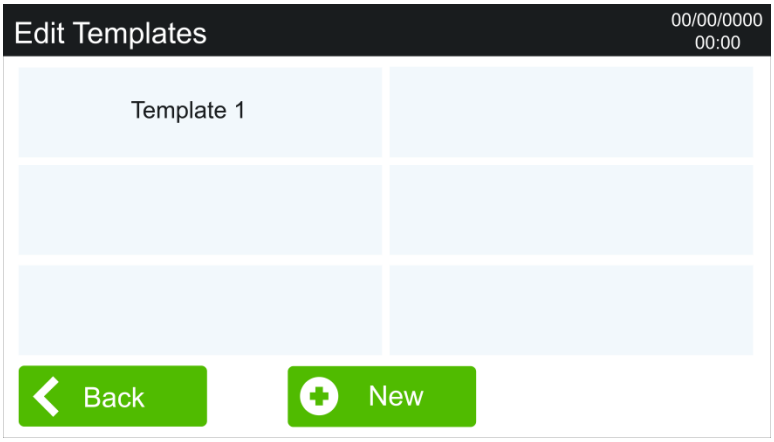
2.3 Temperature Unit

Users can choose temperature units among **'°Celsius'**, **'Kelvin'** and **'°Fahrenheit'** according to their convenience.



2.4 Templates

You can create templates for the frequently tested circuit breaker and make their tests easier and faster. From the templates menu, you can view/modify existing templates by pressing on the desired template. You can save up to 6 different templates in total.

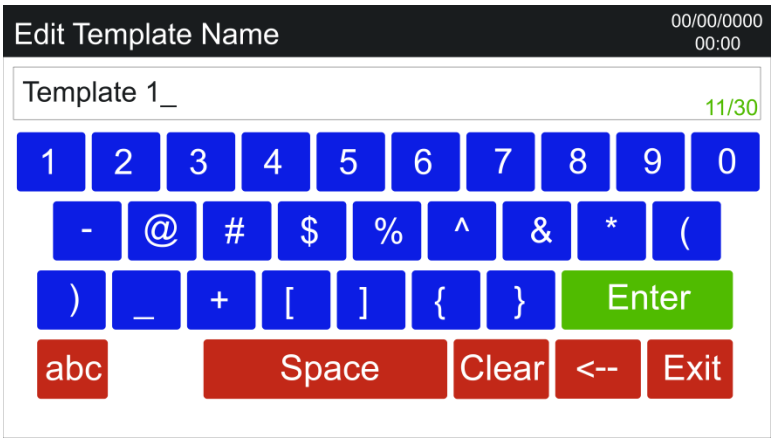


To create a new template:

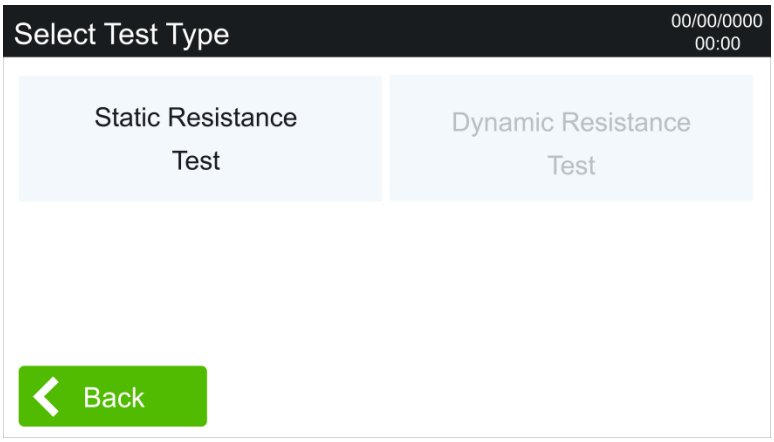
1. Press on '**+New**' tab.

2. Name the template

The default name for all templates is 'Template' use the on-screen keyboard of ARES 200/ARES-200D to enter a new name.

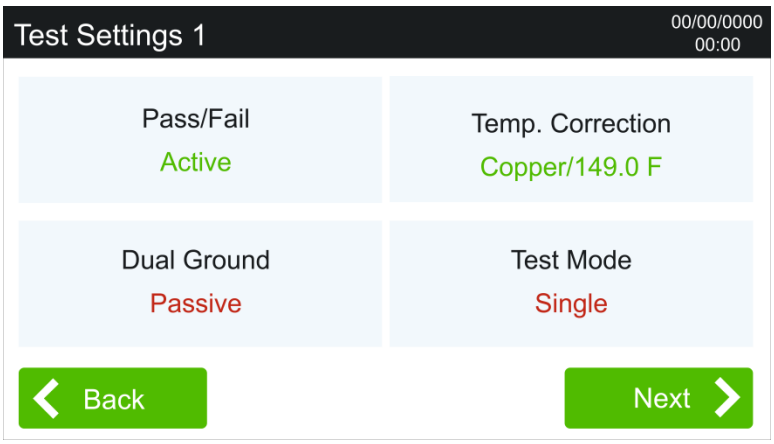


3. Select Static Resistance test because there is no template for dynamic resistance test.

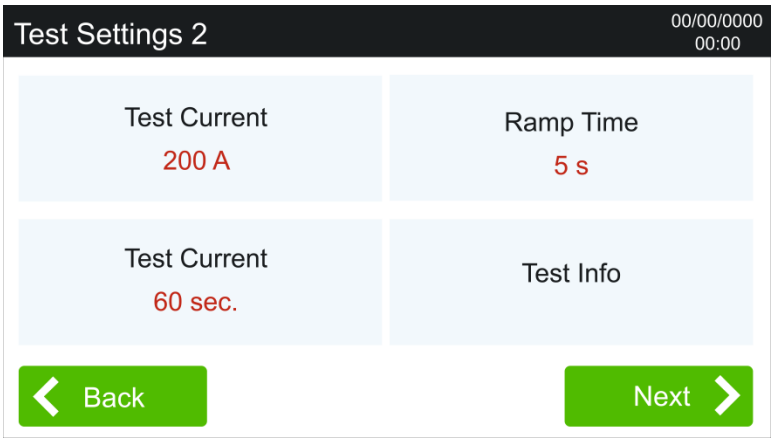


4. Set the template test settings

Test settings consist of 2 pages and you can use the '**Next**'/'**Back**' tabs to navigate through the pages.

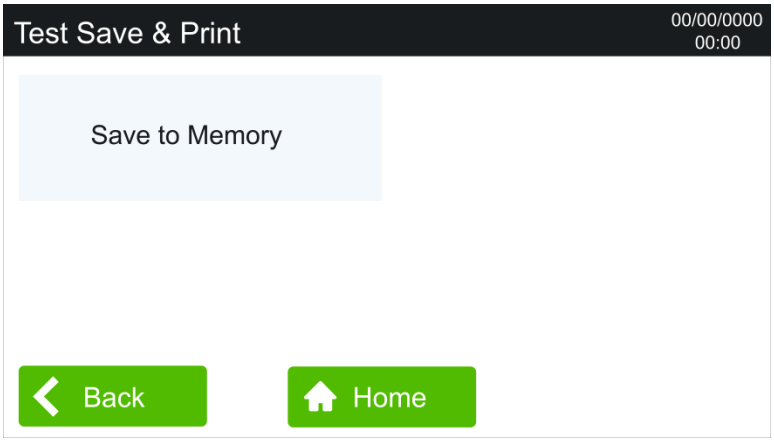


Please see section 3.1 to understand how to set Pass/Fail, Temp. Correction, Dual Ground and Test Mode Settings.

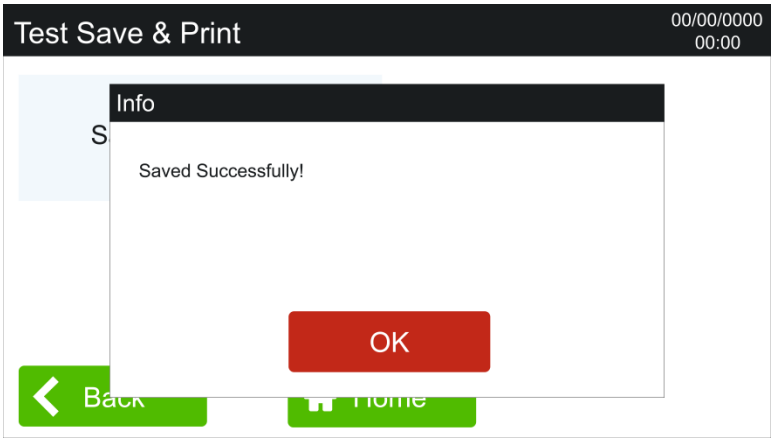


Please see section 3.1 to understand how to set Test Current, Ramp Time, and Test Time Settings.

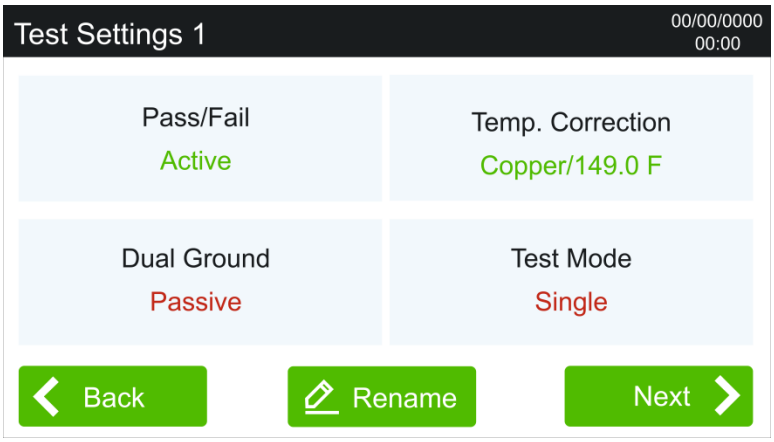
5. Click '**Next**' tab on the screen above then, press '**Save Memory**' on the following screen to save the prepared template.



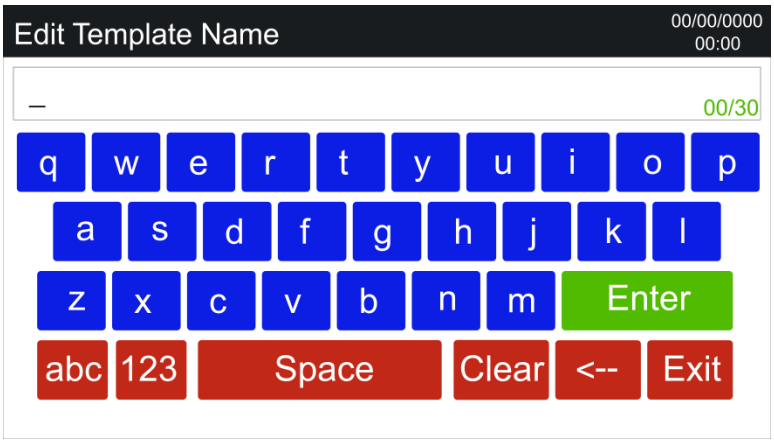
6. Press "**Ok**" to finish the saving procedure



7. To rename the template, press on the respective template in the list on "**Edit Template page**" and use '**Rename**' tab on the following page.

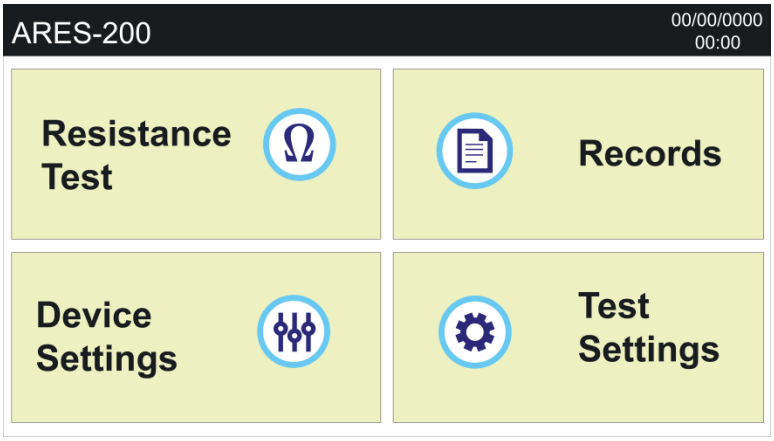


Use the ARES 200/ARES-200D on-screen keyboard to enter the new name



3. Resistance Test

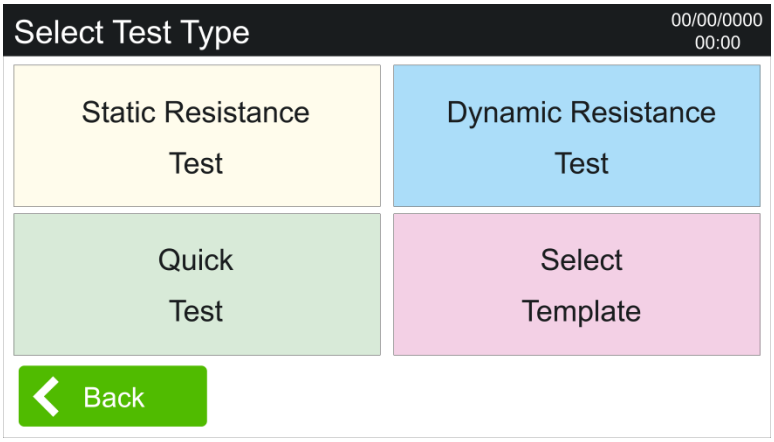
To perform resistance test, press on '**Resistance Test**' tab on the "**Home Page**" screen.



You can carry out a resistance test using the following menu;

- Static Resistance Test
- Dynamic Resistance Test

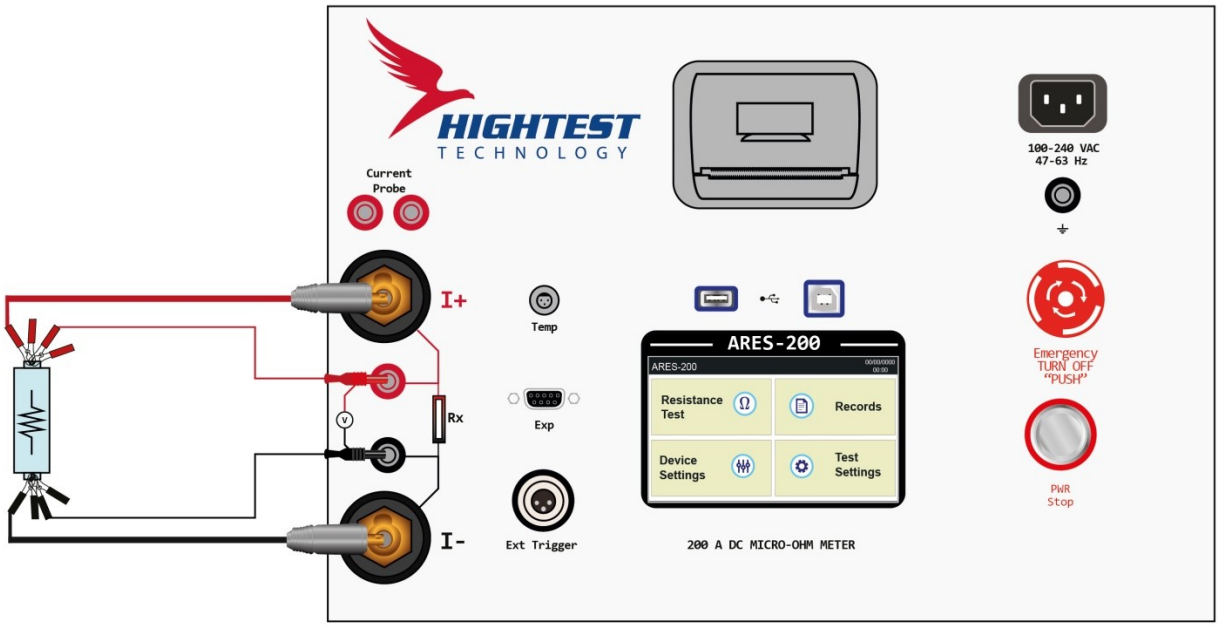
- Quick Test
- Select Template



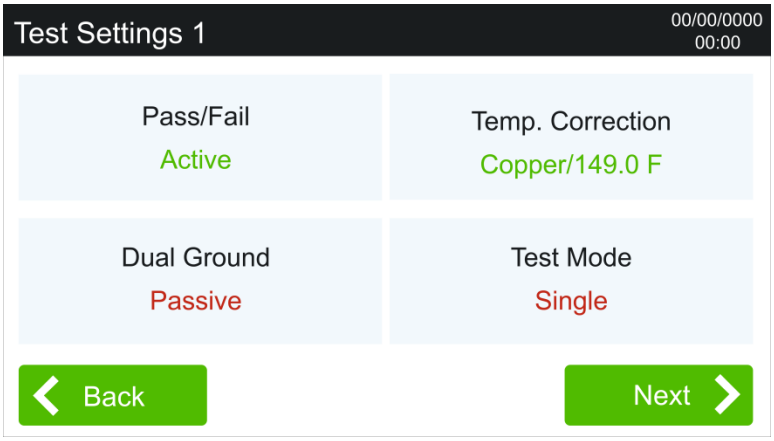
3.1 Static Resistance Test

To test a Shunt or Circuit Breaker contact static resistance. Follow the steps for testing:

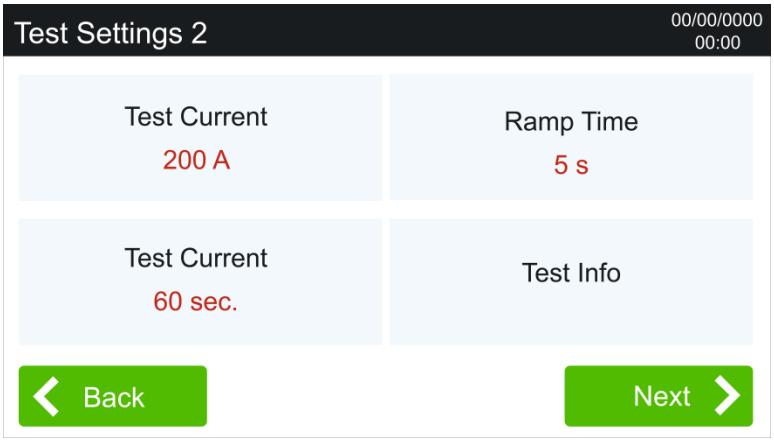
Connect the test cables to the sample to be tested as shown in the figure below and press '**Static Resistance Test**' tab.



Following is the page 1 of '**Static Resistance Test**'



Press the '**Next**' tab to navigate to page 2 of '**Static Resistance Test**'



The above two pages menu consist of the seven main test settings and test information:

Page 1:

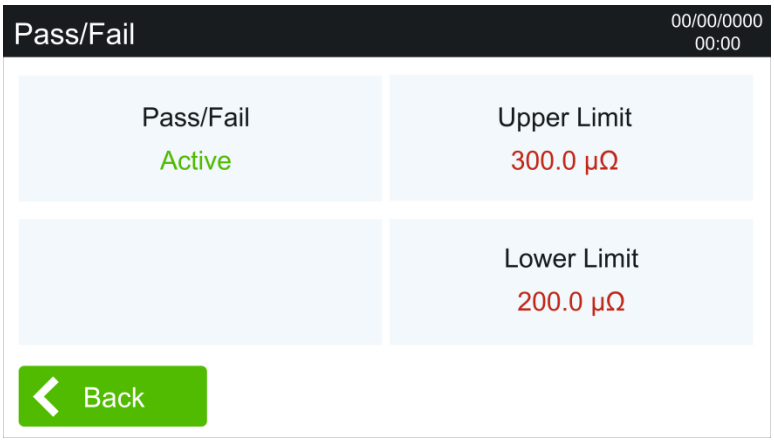
1. Pass/Fail Comparator
2. Temperature correction settings
3. Dual Ground settings
4. Test Mode

Page 2:

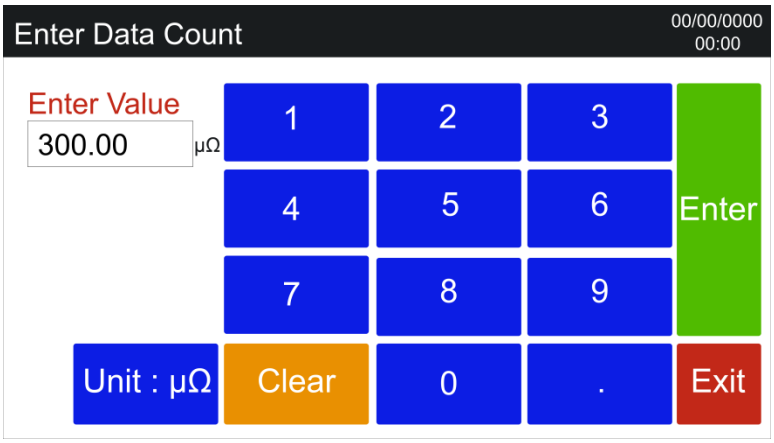
5. Test Current
6. Ramp Time
7. Test Time
8. Test Info

3.1.1. Pass/Fail Comparator Settings

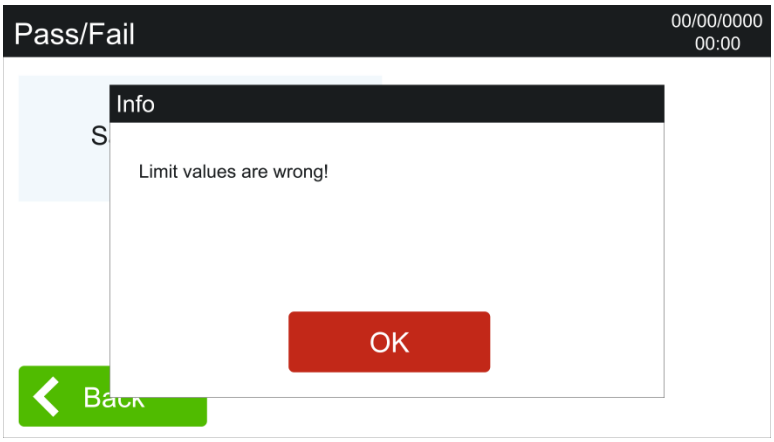
Pass-Fail comparison is possible by setting the Upper limit and the Lower limit values for the resistance to be tested. You can activate or deactivate this option by pressing on '**Pass-Fail**' tab. When the comparator is activated, it will appear in green showing 'Active' on '**Pass-Fail**' tab.



You can enter the upper limit and the lower limit values for Pass-Fail comparison using the on-screen keyboard of ARES-200 by clicking on the respective tab. Users can enter the limits values using ARES 200/ARES-200D on-screen keyboard and choose resistance units among **'Ohm'**, **'Milli-Ohm'** and **'Micro-Ohm'** according to the tested sample by pressing on '**Unit**' tab.

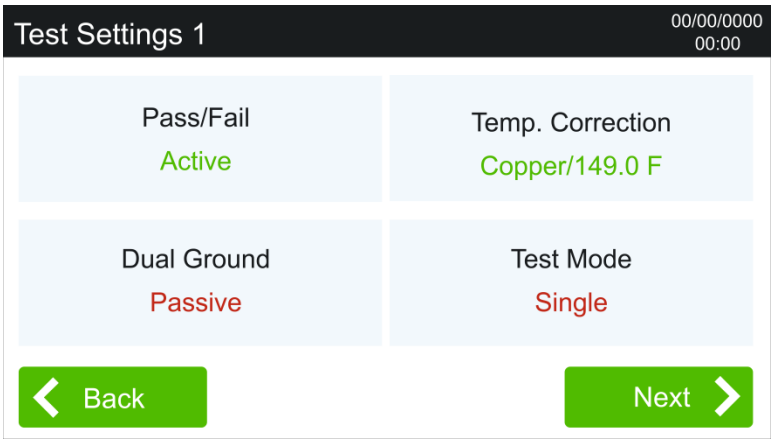


The Upper Limit must be bigger than the Lower Limit value and if you set wrong values, the pop-up below will appear on the ARES-200 screen.

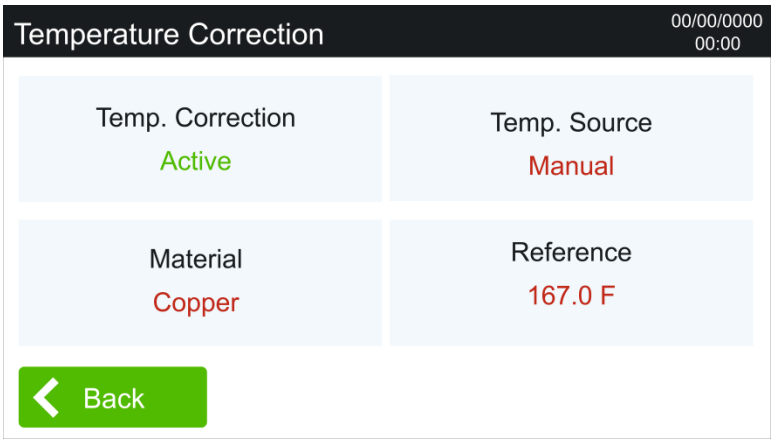


3.1.2. Temperature Correction Settings

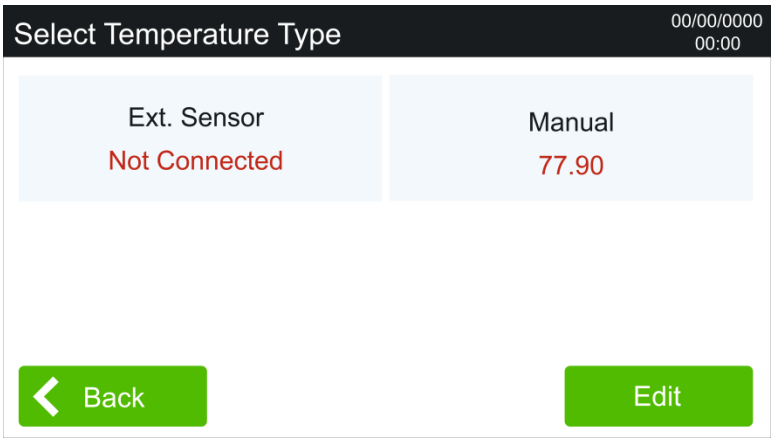
Press on the '**Temp. Correction**' tab to alter the temperature settings for the test.



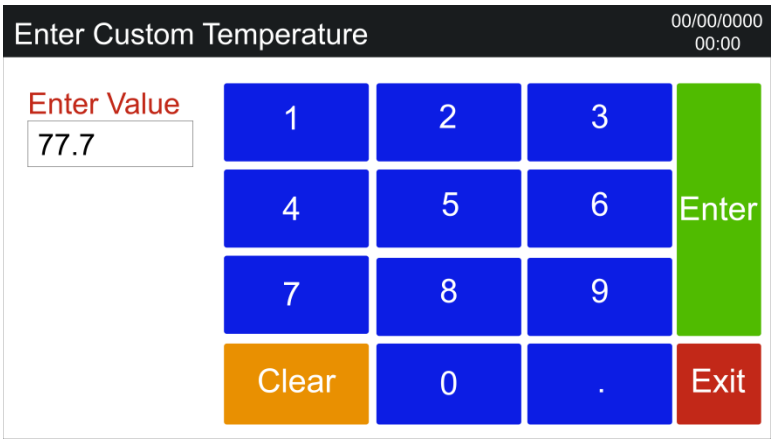
Users can opt for temperature correction or can leave it as '**Passive**' if temperature correction is not required.



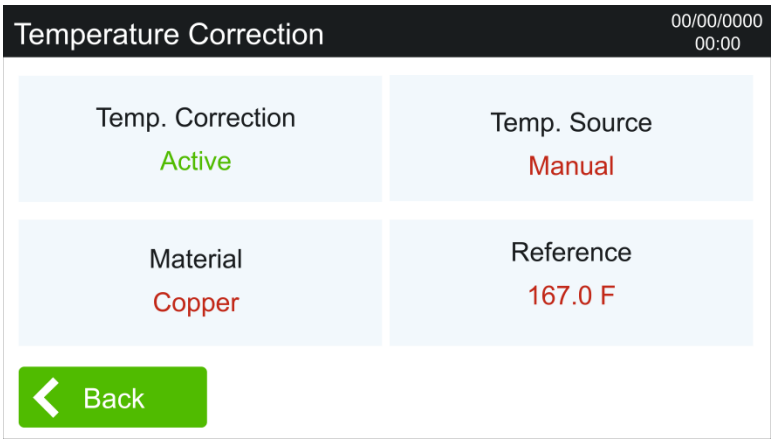
By pressing on the '**Temp. Source**' tab, you can use an optional temperature sensor with ARES/ARES-200 D and select '**Ext. Sensor**' or you can enter the temperature value manually.



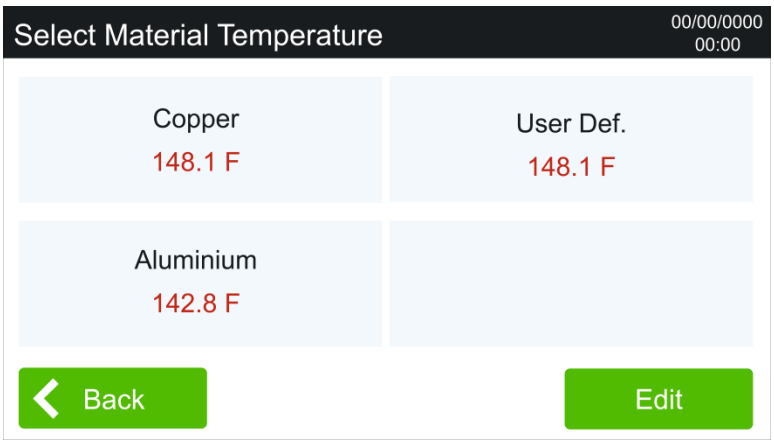
Users can edit the value manually by pressing the '**Edit**' tab on the picture above. To save the entered value press '**Enter**'. If you press on '**Exit**' instead of '**Enter**' the values will not be saved and you will return to the previous page.



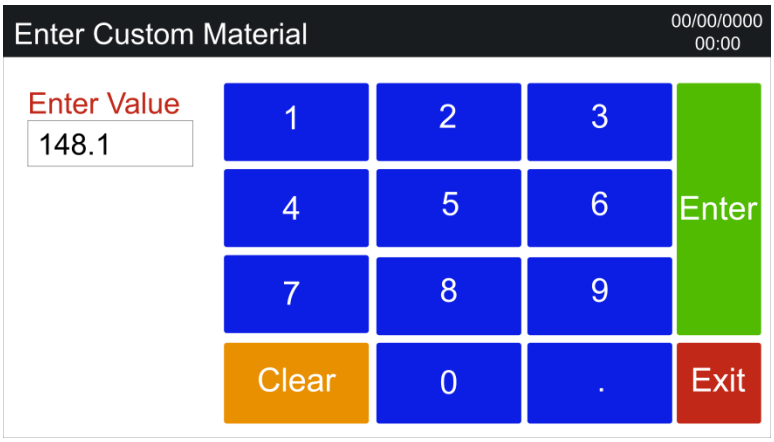
You can choose the heating coefficient of material from the options given (Copper or Aluminium) by pressing on the '**Material**' tab.



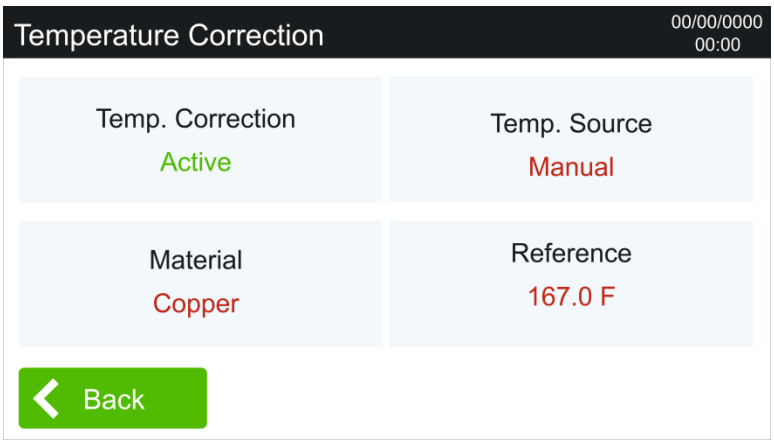
You can enter the value manually by pressing the '**Edit**' tab in Material menu.



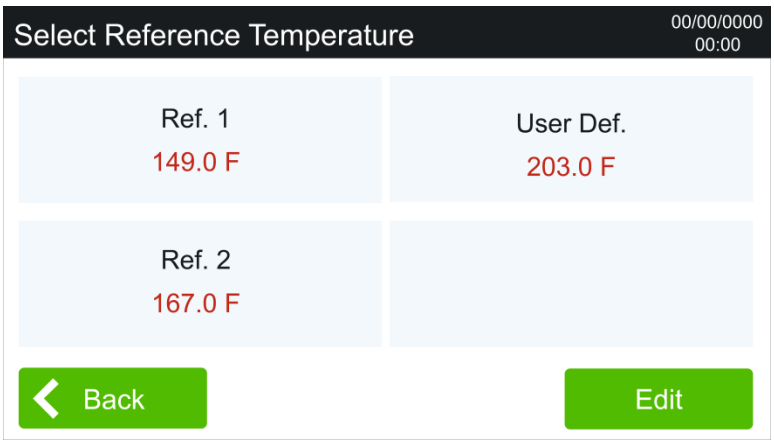
By entering the desired heating coefficient of material using ARES 200/ARES-200D on-screen keyboard and saving it by pressing on '**Enter**', the entered value will be shown on '**User Def.**' tab.



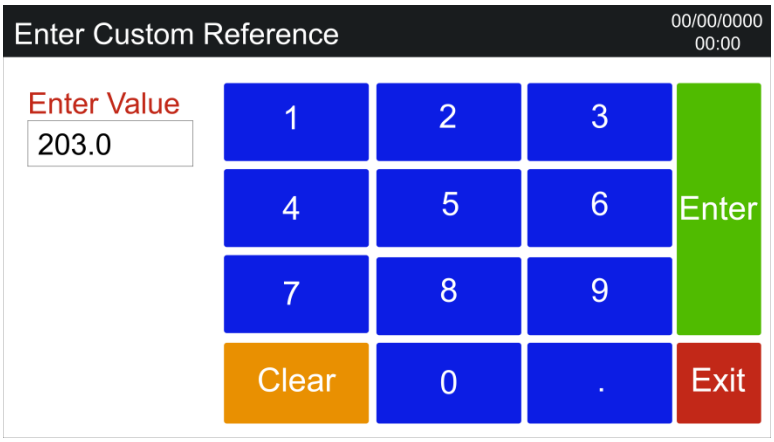
You can choose a reference temperature for your test by pressing on the '**Reference**' tab.



You can manually set the reference temperature by pressing the '**Edit**' tab.

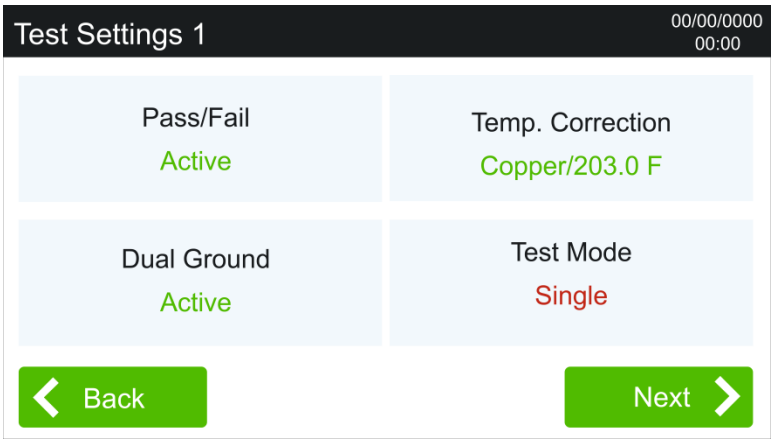


By entering the desired reference temperature using ARES 200/ARES-200D on-screen keyboard and saving it by pressing on '**Enter**', the entered value will be shown on '**User Def.**' tab. If you press on '**Exit**' instead of '**Enter**' the values will not be saved and you will return to the previous page.



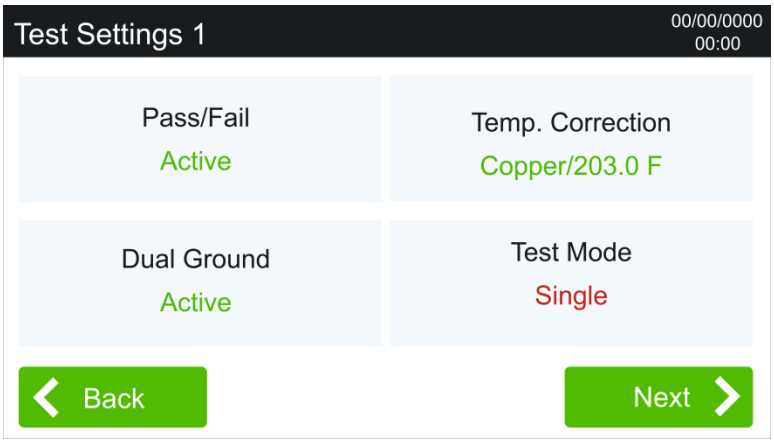
3.1.3. Dual Ground settings

Pressing on '**Dual Ground**' tab users can opt for a dual ground test option or can leave it as '**Passive**' if the dual ground test is not required. When the dual ground is activated, it will appear in green showing 'Active' on '**Dual Ground**' tab.

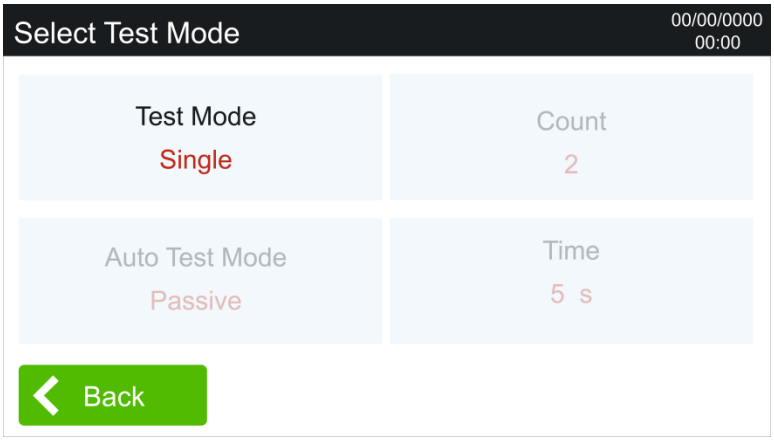


3.1.4. Test Mode

Users can select test mode pressing on '**Test mode**' tab.

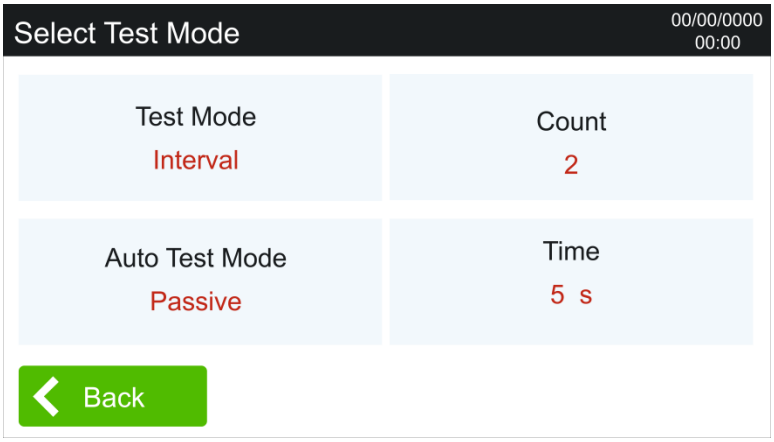


Users can opt for a Single or an Interval test mode using the '**Test Mode**' tab in **"Select Test Mode Page".**

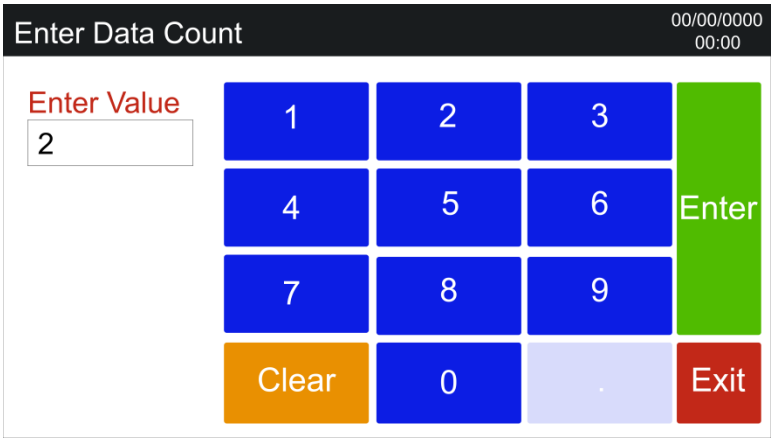


While selecting the interval test mode, other tabs appear which require to set.

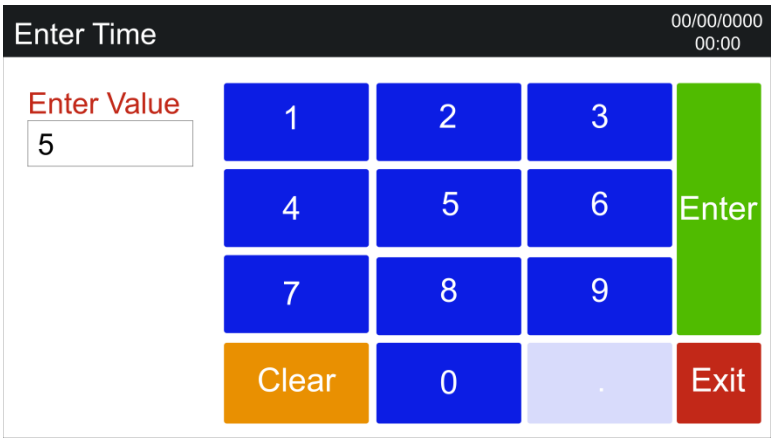
1- Counter
2- Time
3- Auto Test Mode



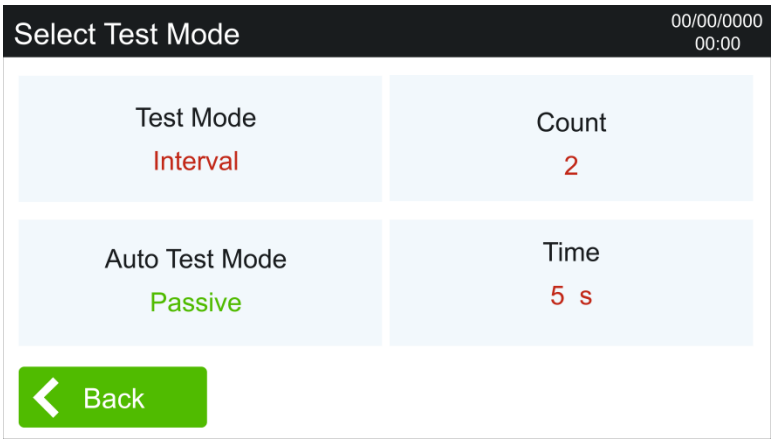
1- Counter: Press on '**Count.**' tab to enter the number of times you want to measure the sample to be tested using the on-screen ARES 200/ARES-200D keyboard.



2- Time: You can also define the test duration for each test that will be performed, by pressing the '**Time**' tab.

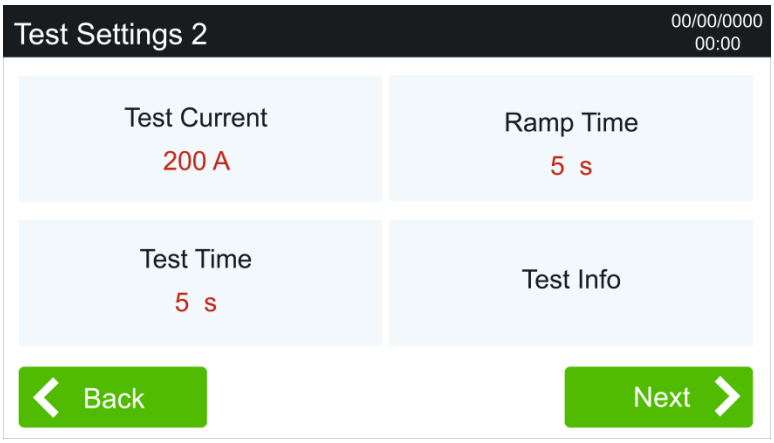


3- Auto Test Mode: While measuring an array of resistance value in a circuit breaker contact, pressing on the '**Auto Test Mode**' tab to activate it, makes testing easier and faster.

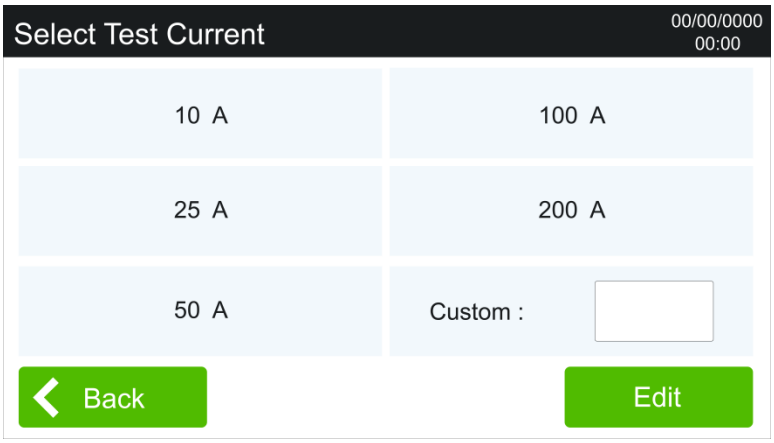


3.1.5. Test Current

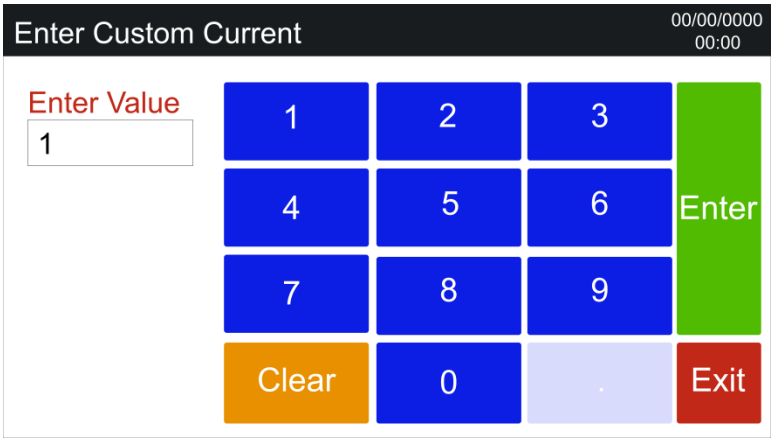
Passing to the second test setting page, the appropriate test current for your circuit breaker or your shunt resistance selection can be by pressing on '**Test Current**' tab on the screen.



Test current is selectable from the following menu according to the user's preference. You can easily choose the test current from predefined values; 10A, 25A, 50A, 100A, 200 A. The page will automatically return to the previous page once you made your selection.

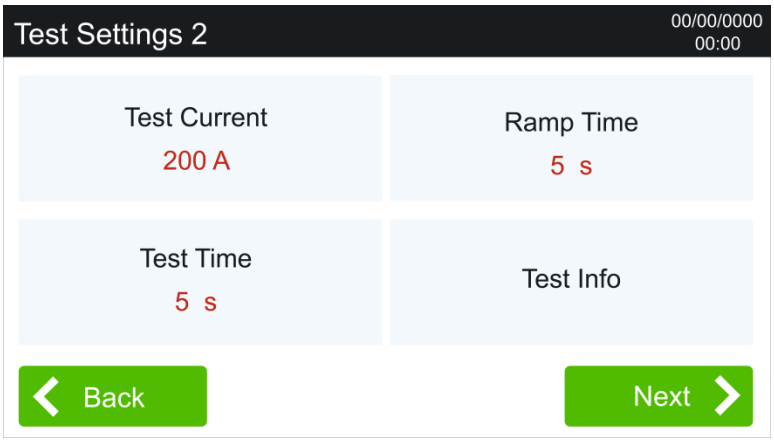


Or you can enter the custom value by pressing the '**Edit**' tab and you can enter a custom value which should not be less than 1A using the on-screen keyboard. To save the entered value press '**Enter**'. If you press on '**Exit**' instead of '**Enter**' the values will not be saved and you will return to the previous page. To select the entered test current value press on the '**Custom**' tab.



3.1.6. Ramp Time

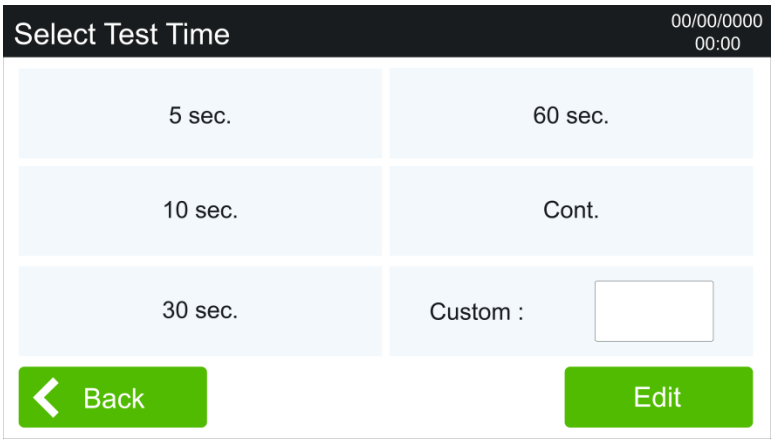
Current ramp time is the amount of time that the applied current will take to ramp up to and ramp down from the final value of the test current chosen by the users. It can be selected from the predefined ramp time list 5 Sec, 10 Sec, 15 Sec, 20 Sec, 30 Sec, 40 Sec and 60 Sec by pressing on '**Ramp Time**' tab.



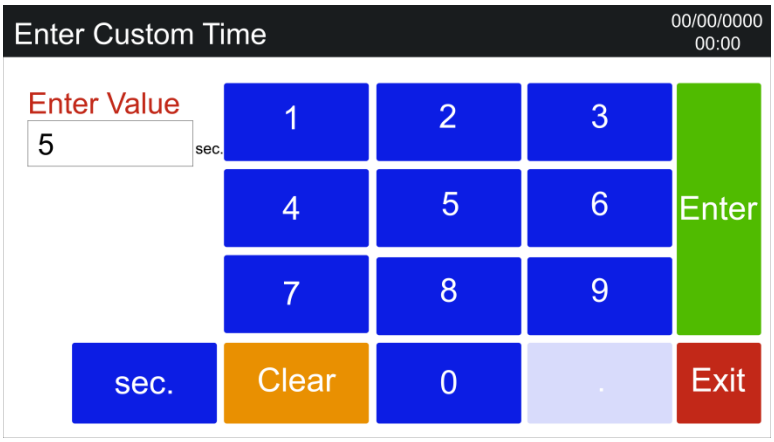
The page will automatically return to the previous page once you made your selection.

3.1.7. Test Time

To change the test duration, click on the '**Test Time'** tab and the following selection screen will appear.

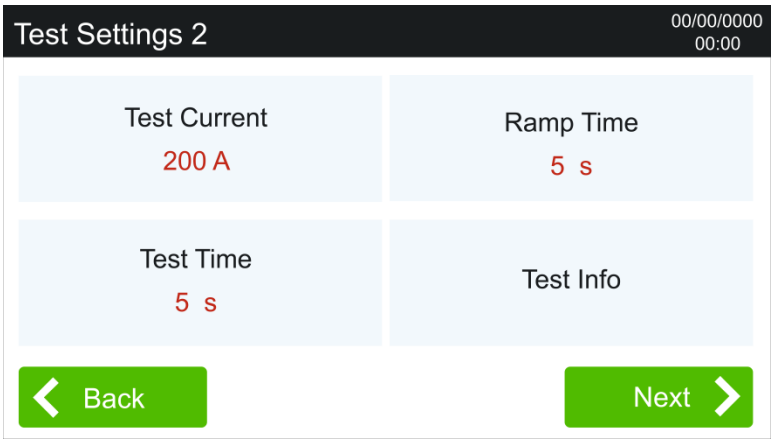


You can make your selection by pressing on the desired test time or press '**Edit**' to enter a custom value which should not be less than 5 Sec. To save the entered value press '**Enter**'. If you press on '**Exit**' instead of '**Enter**' the values will not be saved and you will return to the previous page. To select the entered test time, you should press on the '**Custom**' tab.

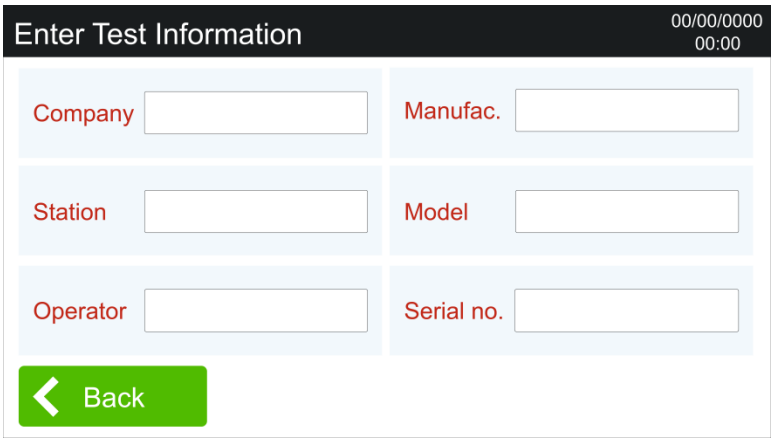


3.1.8. Test Info

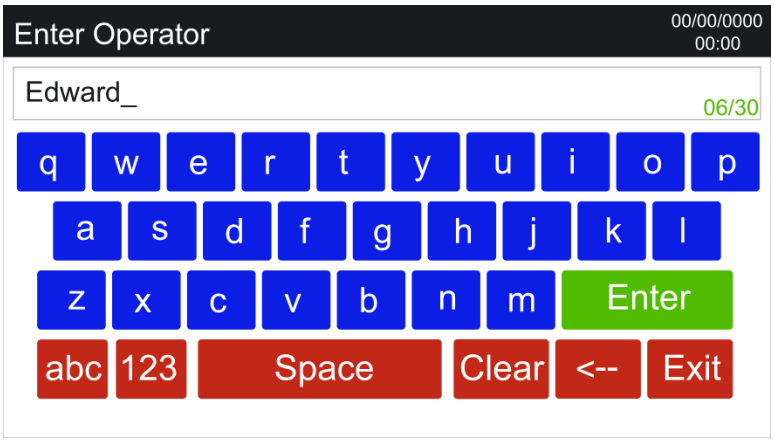
Users can fill out the test information by pressing on the '**Test info**' tab.



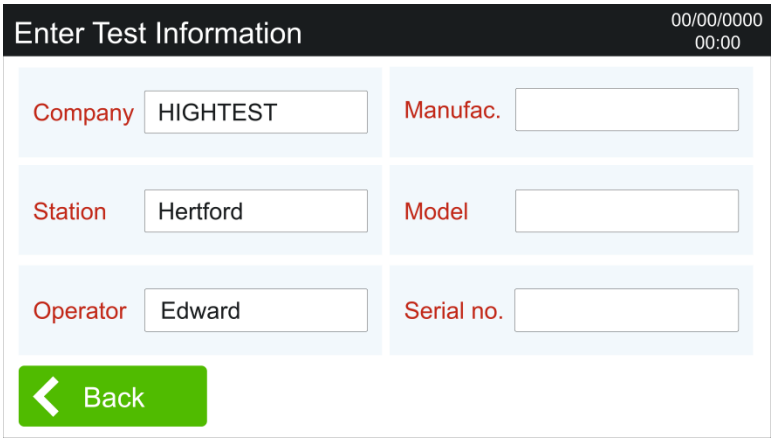
The **"Test Information"** screen consisting of users and the tested circuit breaker information is as follows. You can enter new details or can use already existing default details. Tap on the respective tab to enter details.



You can input the details using the on-screen keyboard of ARES 200/ARES-200D. The page will automatically return to the previous page once you press '**Enter**' to save the entered information.

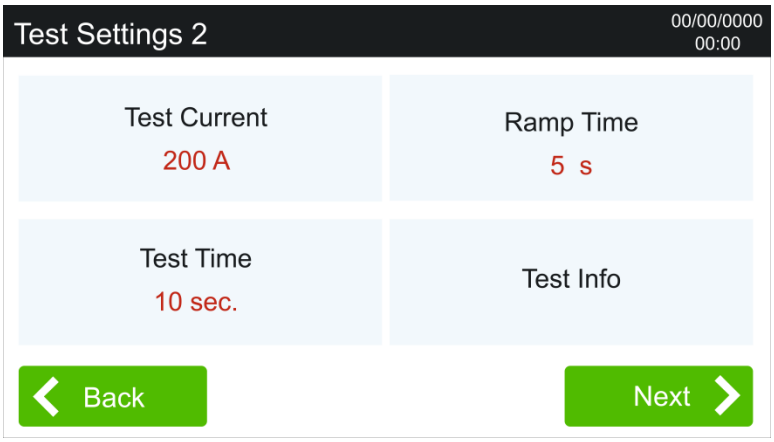


After you finish filling the test information, press the '**Back**' tab to return to the previous page and start the test.

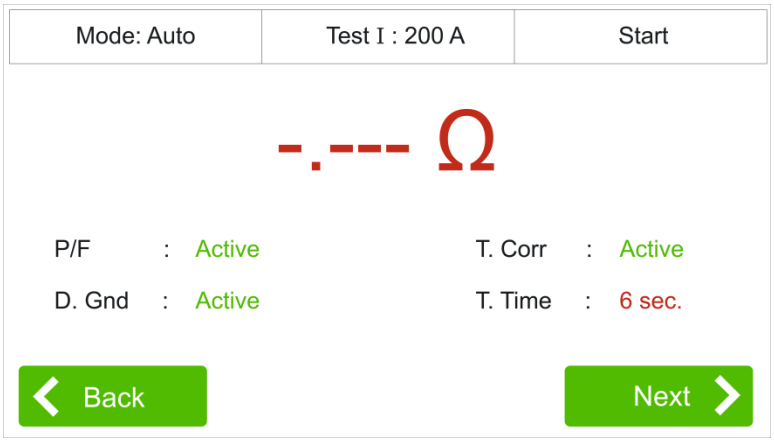


3.1.9 Performing Static Resistance Test

When you click on '**Back**' tab shown on the picture given above, the following page will appear. You can perform the test by pressing on the '**Next**' tab.

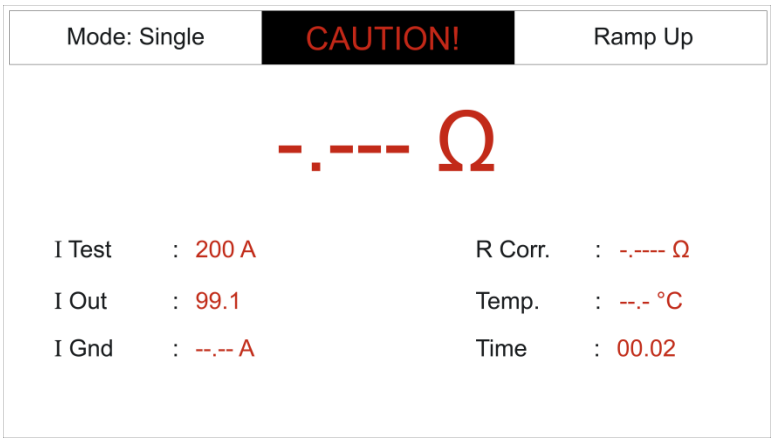


Pressing on '**Next**' tab leads to the following page, which displays all test settings and allows to check them before the test starts. After checking, press '**Test**' tab to start the test.

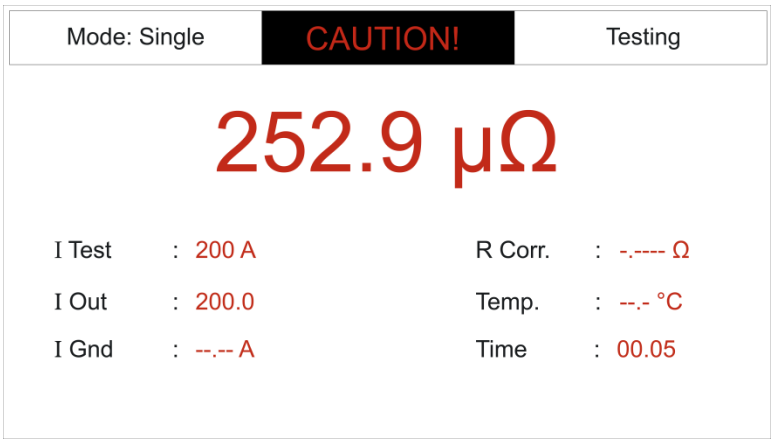


When the test starts, the following screens will appear illustrating; time's, test phase's and output current's changes made during the test and red&black warning indicator in the top-middle of the screen.

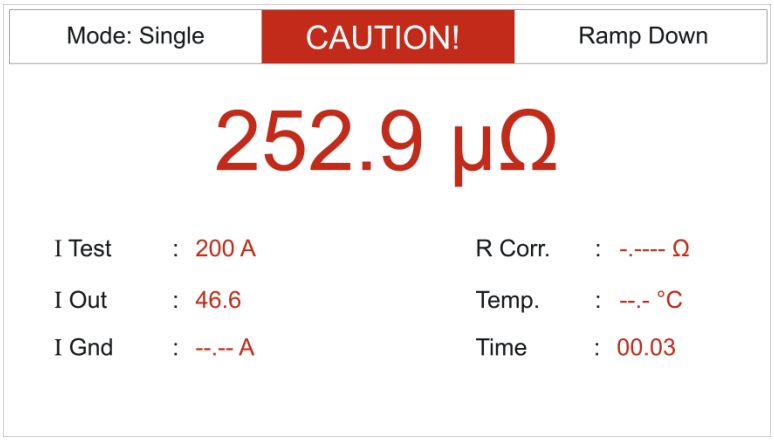
1- While ramp-up



2- While testing:



3- While ramping down



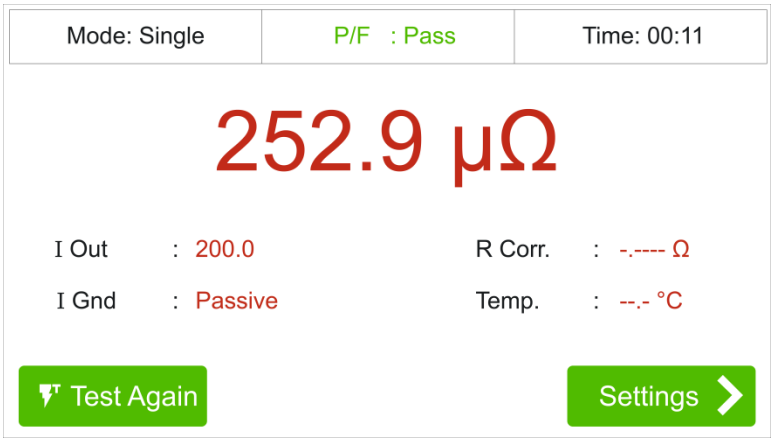
CAUTION!

During the test, you can press the 'Emergency Stop' button on the front panel or you can touch on the 'Screen' or simply press the 'Power Button' in an emergency. The test will be cancelled immediately.

When the test finishes, the following details are shown on the result screen.

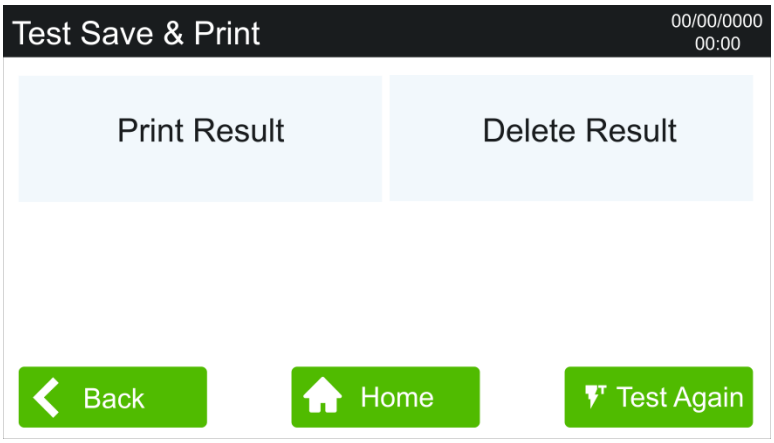
- The measured resistance values
- Test Current
- Ground Current
- Operating temperature
- The measured resistance value with temperature correction

You can repeat the test by pressing on the '**Test Again**' tab or proceed to save the result by pressing the '**Setting**' tab.

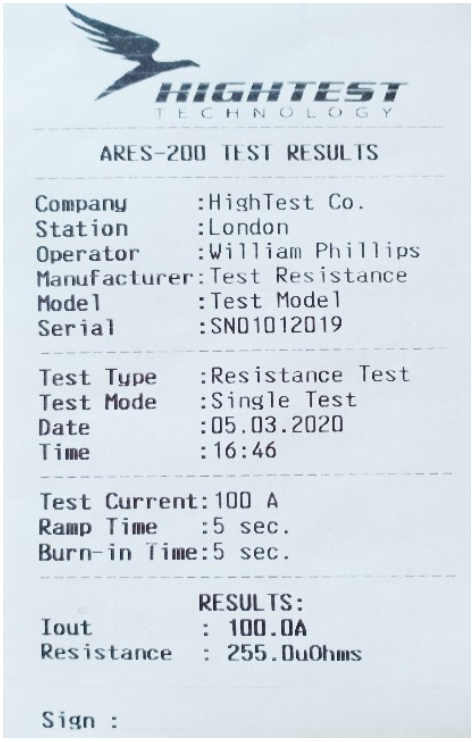


- When you press '**Settings**', you will be directed to the page where you can save and print the test result using '**Save Memory**' and '**Print Result**' tabs respectively. If a USB is connected to the device a 'Save to USB' tab will appear in "**Test Save and Print Page**". If the '**AutoSave USB**' option is activated, automatically the test results will be stored on both internal and the USB memory.

Pressing '**Test Again**' direct you to repeat the test and '**Home**' tab to return to "**Home Page**".

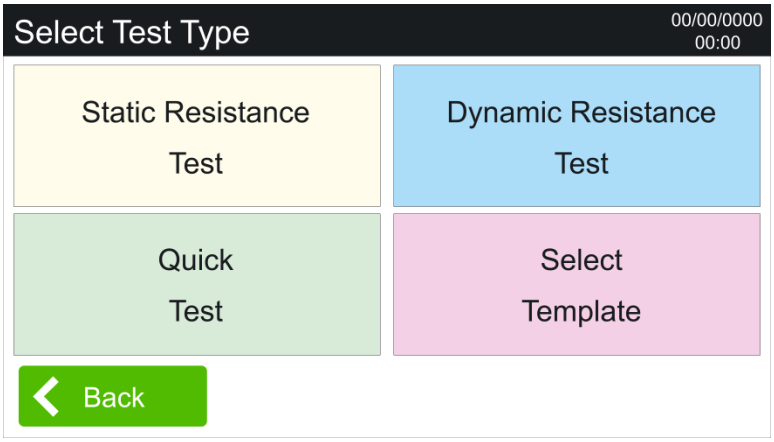


The printed result will look like as follows.

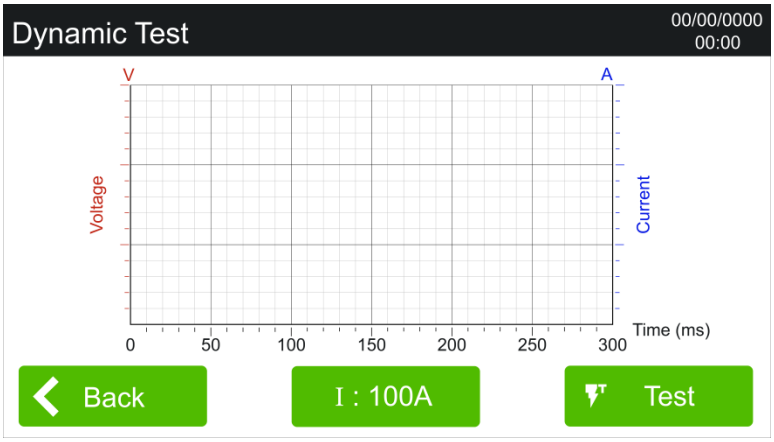


3.2 Dynamic Resistance test(available just in ARES-200D)

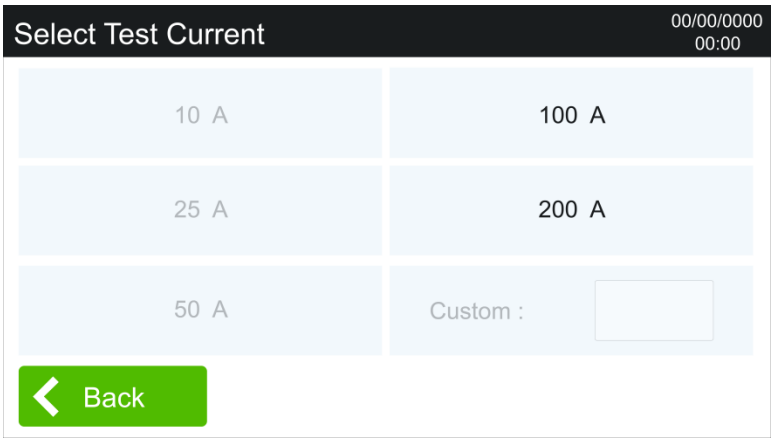
To perform a dynamic resistance test press on '**Dynamic Resistance Test**' tab on "**Select Test Type Page**" as follows.



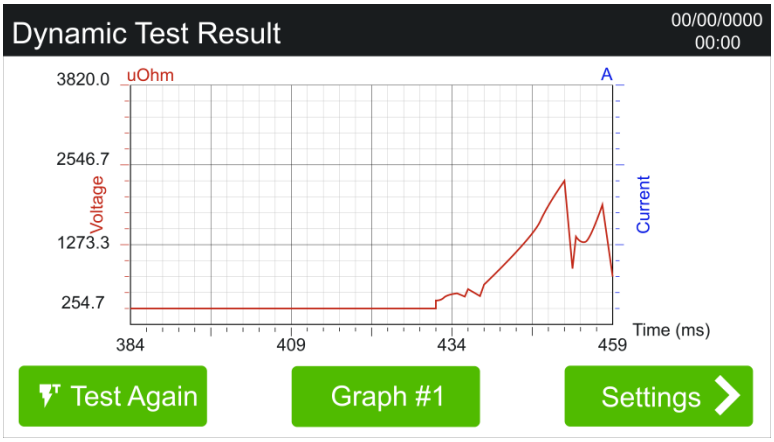
The following page will appear showing; the V-I dynamic resistance characteristic curve and three tabs; '**Test**', Test Current '**I**', and '**Back**'.



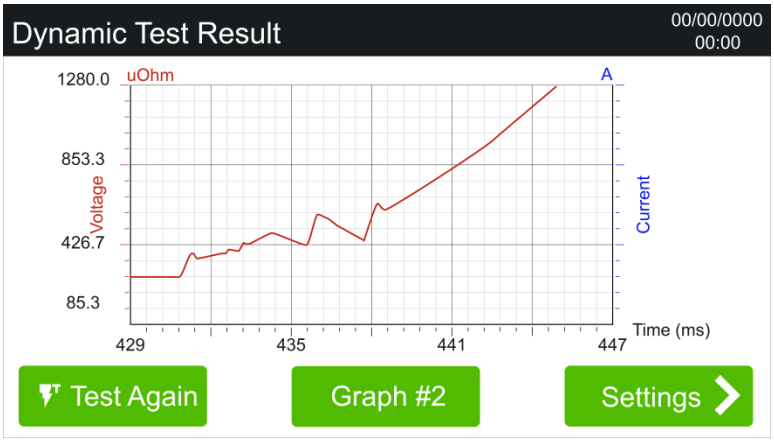
For selecting test current, press on '**I**' tab. Two choices will appear; 100 A and 200 A as follows. The page will automatically return to the previous page once you made your selection, where the selected test current value will be shown on '**I**' tab. Or you can click on '**Back**' tab to return to the previous page without any changing.



Pressing on '**Test**' tab on the **"Dynamic Test Page"** leads to perform dynamic resistance test and the results will be shown on **"Dynamic Test Result Page"** as follows.

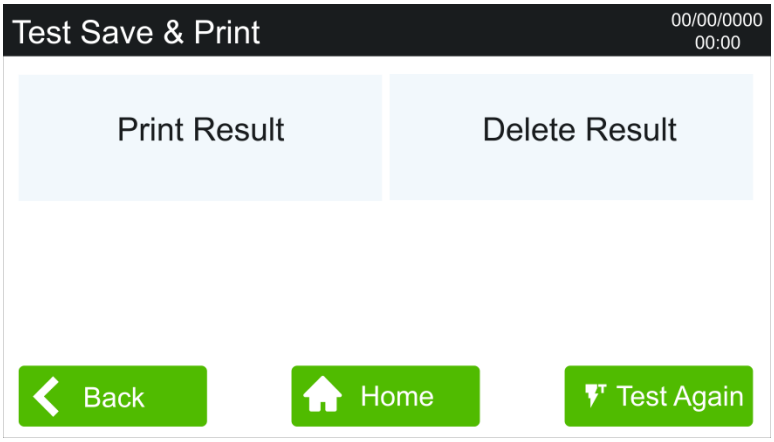


Users can zoom in and enlarge the curve to focus on the critical and important phase of the dynamic resistance result by pressing on '**Graph #1**' tab. You can repeat the test by pressing on '**Test Again**' or proceed to save the result by pressing on '**Setting**'.

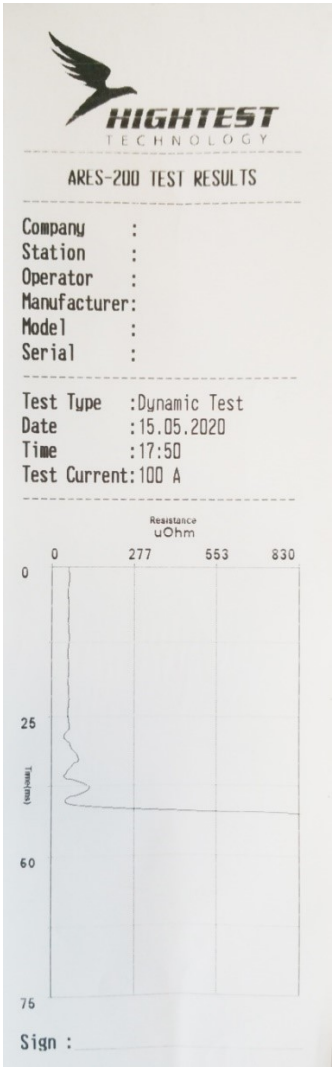


When you press '**Settings**', you will be directed to the page where you can use '**Print Result**' or '**Save Memory**' tabs to Save or Print the test result. If a USB is inserted to the device, the test result will be saved to

the USB instead of Device memory. Pressing '**Test Again**' direct you to repeat the test and '**Home**' tab to return to "**Home Page**".

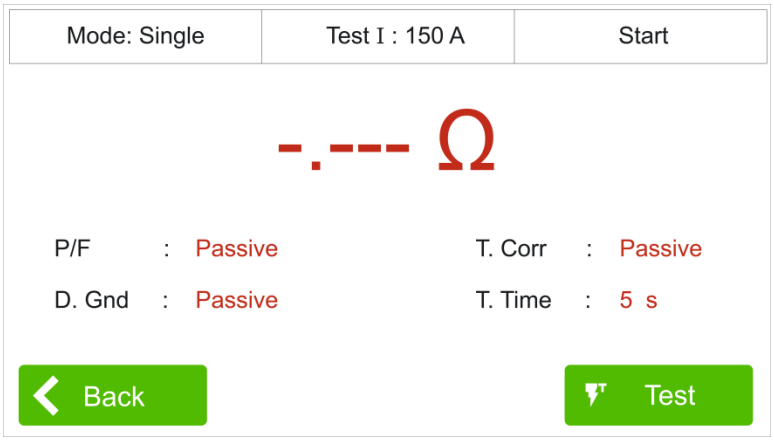


The printed result will look like as follows.



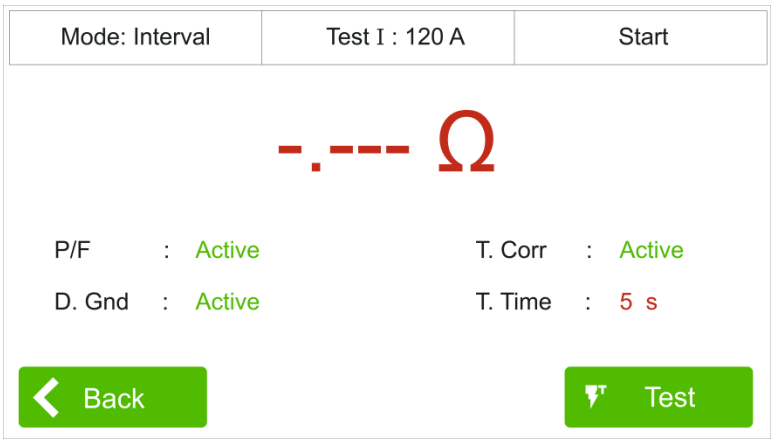
3.3 Quick Test

It is used to test quickly without entering neither test information nor test settings. When you press '**Quick test'**, you will be directed to the page where you can find the quick test current entered as described in the quick test menu in (section 2.1) in the top-middle of the screen. In the quick test, the test settings are set as default as are shown in the picture below; (Pass/Fail: Passive, Dual Ground: Passive, Temperature Correction: Passive, Test Time: 5 Sec and Test Mode: Single).



3.4 Select Template

To test circuit breakers using already saved templates press on '**Select template**' tab and choose the desired template by clicking on it and proceed to '**Test**'. The test settings entered previously by the users in the chosen template will be displayed on the following screen.

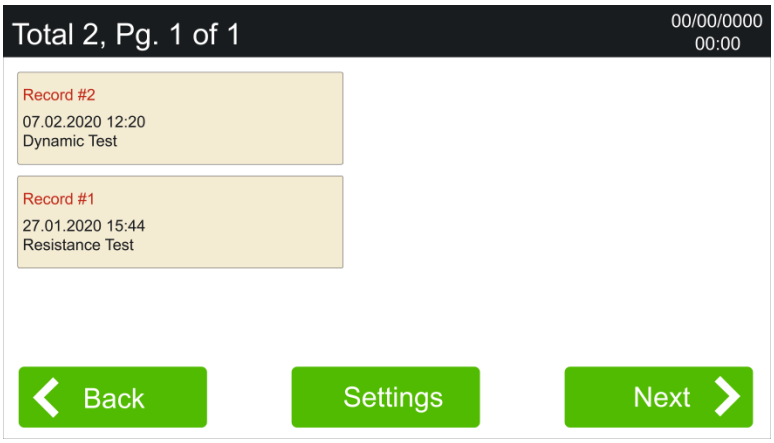


4. Test Records

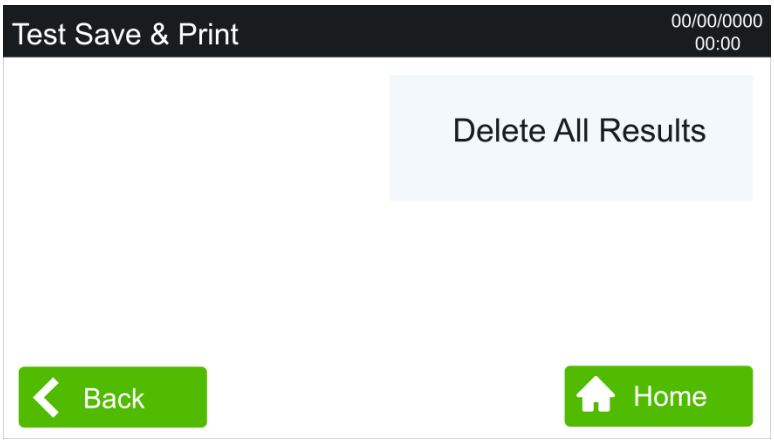
You can access the test results that you have already saved from the '**Test Records**' menu. ARES 200/ARES-200D can store 250 test results in its internal memory, each test can hold up to 100 measurements. In addition to the internal memory, ARES 200/ARES-200D has unlimited extended memory by using an external USB. When a USB is connected, the test records will be saved to USB.

When we examine this page:

- 1st Line Record Number,
- 2nd Line test date and time,
- 3rd Line indicates the test type (Dynamic (ARES-200D) or Static resistance).

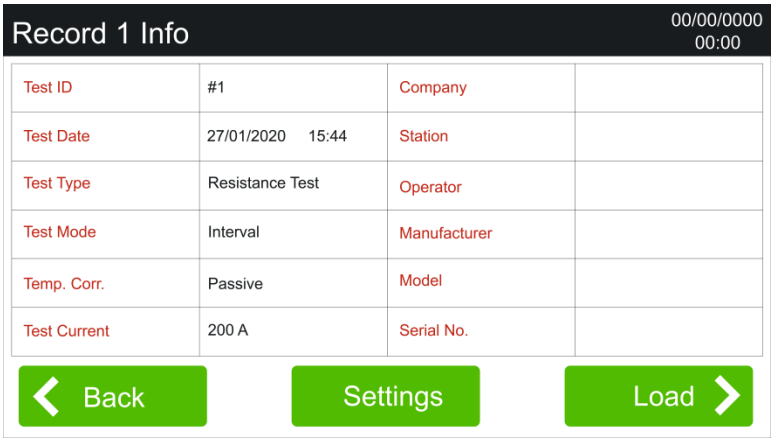


You can use the '**Next**'/ '**Back**' buttons to navigate through the pages. You can delete all test results using the '**Settings**' tab on the picture above.



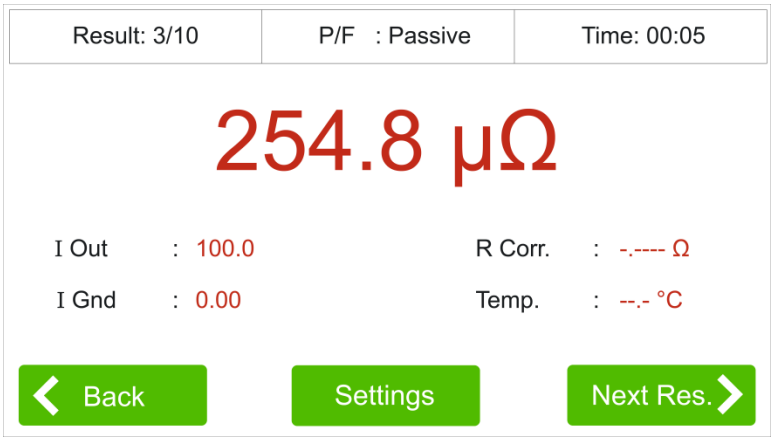
You can access the details of the records by clicking on them and you can navigate through the screens with the '**Next**'/ '**Back**' tabs. You can use the '**Settings**' tab in the middle of the screen on the picture below to direct print, save to USB (if it is connected) or delete the selected result.

Use the '**Next**' tab to move to the next step, and the details of the test records will be displayed as shown in the following two pictures.

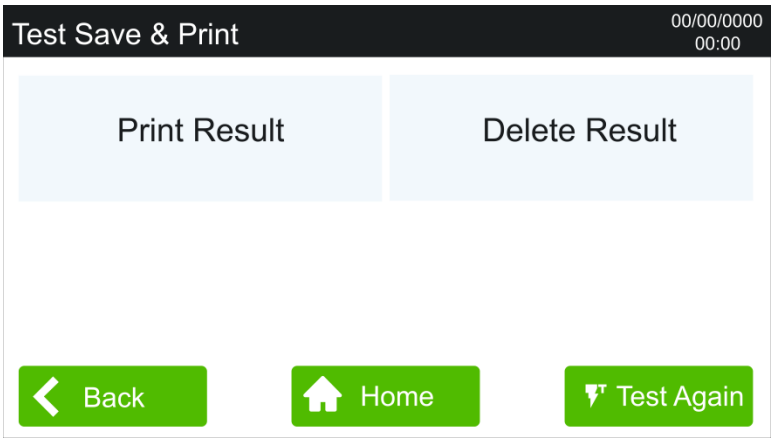


The test results screen will change according to the test mode.

1- If it is an **Interval Mode Test**, many pages will display the results where you can navigate through them by using '**Next Res.**'/'**Prev. Res.**'.

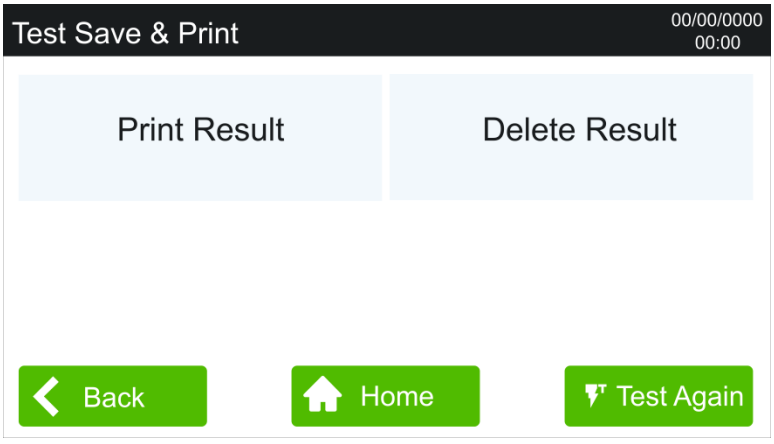


And you can use the '**Settings**' tab to direct print, and save to USB (if USB is inserted) or delete the selected result.



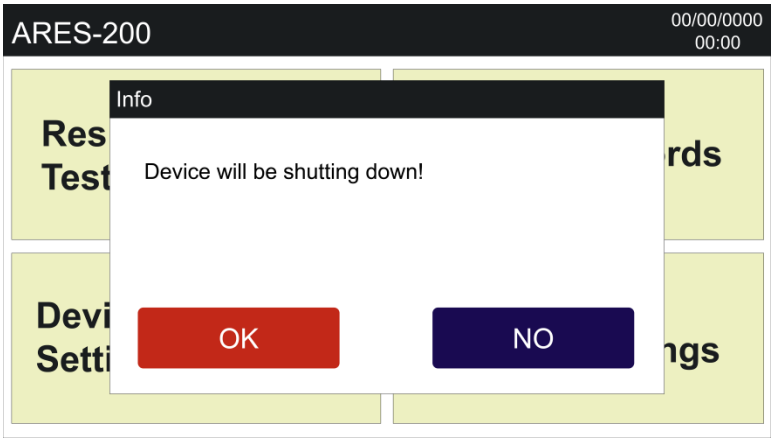
2- If it is **Single-Mode Test**, all results will display only on one page as shown on the following page.

When you press '**Next**, you will be directed to the page where you can use '**Print Result**' or '**Save Memory**' tabs to Save or Print the test result (in the case of an interval test mode '**Next'** tab will be on the last page of the test results).

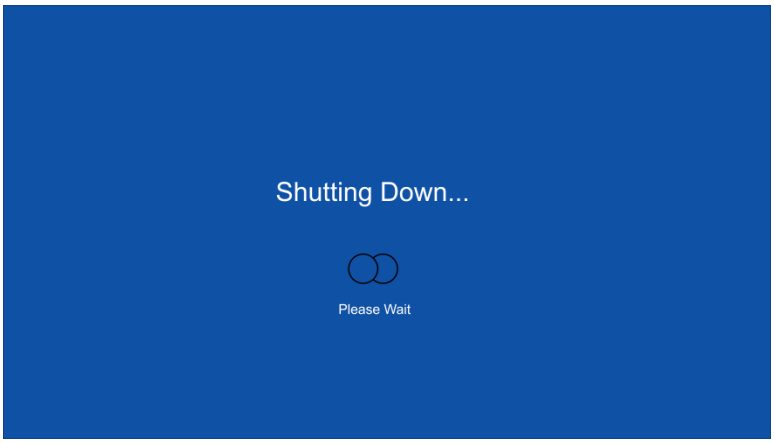


When you finish the tests, please make sure to remove all cables from the control-panel according to the instructions described above and switch off the device.

When the screen is on "**Home Page**" you can switch off the device by pressing the power button once, then click the '**Ok**' tab. This is recommended because it saves all changes made on test information.



Users can switch off the device automatically by pressing the power button for 2 seconds (Display status is negligible). This is not recommended because it may lose the last recorded test information.



HighTest Technology Ltd. is a leading manufacturer based in the UK which produces high precise test equipment. We mainly focus on the development, manufacture and marketing of Transformer test systems.

We have several years of experience in the field of developing and producing high end test equipment. Customer satisfaction is our prime motto. We supply our test equipment worldwide to Transformer manufacturers, Electrical utilities, general contractors and service companies. Our test equipment is designed and produced according to the most widely adopted international standards. As we value our customers the most, our well experienced team always provide an excellent after-sales support and technical assistance.

Please contact HighTest Technology Ltd. or our authorized distributor in your region for any queries regarding this device.

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