HP30KV

Hipot DC up to 30,000 V

User guide

GF-2074RE

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⚠ Safety warnings ⚠

- The Instruction Manual and its Safety Precautions must be read and understood before using the equipment.
- Safety procedures and rules for working near high voltage energized systems must be observed during the use of this equipment. The generated voltages may be dangerous.
- Never connect or disconnect the test leads while the hipot is running or when the high voltage light is on. If there is a need to modify the connections, they must be made with the equipment switched off and the potentials discharged.
- Before connecting the hipot, check that the element to be tested is de-energized.
- The equipment panel, terminals and connectors should be kept dry and clean.
- Only use accessories / parts supplied by the manufacturer.
- Caution: Never use the hipot without being properly connected to the protective ground using the appropriate terminals.
- Attention: The power supply protection connection of the hipot is electrically separated from the protective connection of the measuring system, both of which must be properly connected to a secure grounding system.
- Inspect the equipment and cables before each use. If any malfunction or damage is found that could compromise the safety of the equipment, do not use it and contact the service center.
- Due to the large amount of energy generated, the hipot may produce electric arcs and in some cases may heat the sample under test. Precautions should be taken to avoid burns when handling objects under test after applying tension by hipot.
- If you use this equipment other than as specified, the protection it provides may be compromised, thereby endangering you.
- Taking out the panel in order to have an access to the internal parts may be dangerous as there are high voltages inside, capable of causing fatal accidents.

This equipment should only be operated by qualified personnel, properly trained to the work with high voltage and strictly applying suitable safety rules.

Used symbols

	Caution, risk of electric shock.
	Caution, refer to User Guide.
	USB (Universal Serial Bus)
	Equipment complies with current EU Directives.
	Ground protection: terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.
	Double insulation
	The rubbish bin with a line through it means that in the European Union, the product must undergo selective disposal for the recycling of electric and electronic material, in compliance with Directive WEEE 2002/96/EC.
Danger High Voltage	Notice on the panel of the high voltage unit: LED on indicates imminence of high voltage application. Flashing LED indicates high voltage generation.

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1. Description

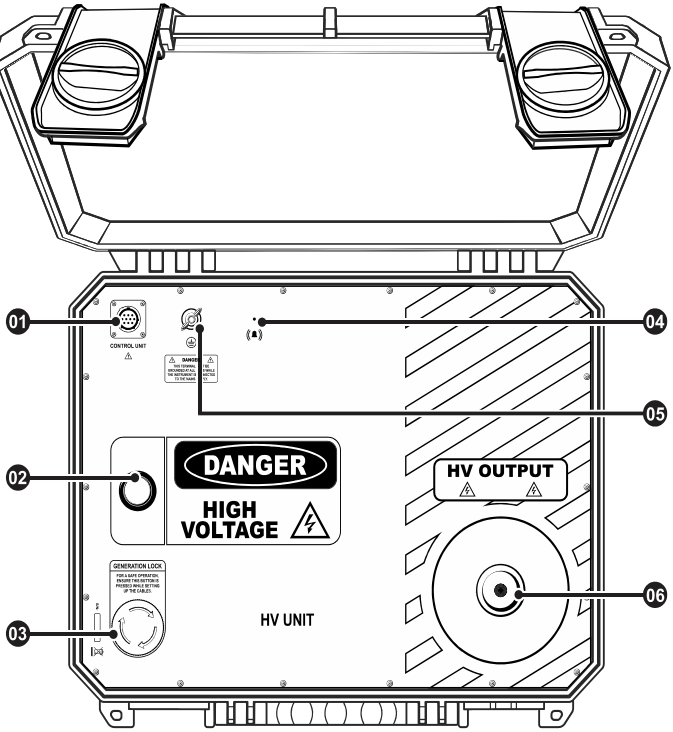
The HP30KV was designed to perform dielectric strength tests with high voltages (up to 30,000 V) while verifying the occurrence of electrical insulation ruptures. Its project was developed with the primary objective of safeguarding the operators' safety. This hipot makes possible the realization of automated tests, LEDs that inform the beginning of the tests, Emergency Stop button on the controller unit and a Generation Lock button on the high voltage unit, buzzer alarm indicating the start and the performance of the test, and can be remotely controlled through an Android device (device not included).

Dielectric strength tests are aimed at verifying the quality of electrical insulation through the application of high voltage and are mandatory for many industry sectors such as wire and cable production sector, heavy machinery and engines, mining industry, power distributors and all areas involving electrical power systems.

The USB interface allows the communication of the equipment with a PC to transmit the data previously saved. A software analyzes the results and presents them through graphs and tables, automatically generating reports of the tests performed. Due to its constructive characteristics, this instrument is robust, with excellent performance in the field, in strict environmental conditions, typical of tropical regions with extreme temperatures and humidity.

2. Panel control functions

2.1. Generation unit



01 Communication connection to the Controller Unit 02 High Voltage LED (Red) 03 Generation lock button	04 Buzzer 05 Safety ground terminal 06 HIGH VOLTAGE output

Communication connection to the Controller Unit: intended for the connection of the communication cable specially developed for this application. Correctly connect the cable to prevent malfunction of the hipot.

High Voltage LED: It indicates to the operator the presence of high voltage at the HIGH VOLTAGE output. It has two modes:

1. Continuous for about 5 seconds before starting a test.
2. Flashing lighting with test in progress and application of high voltage in the output of HIGH VOLTAGE.

Buzzer output: Hipot's sound alert. Whenever a test is started, before the voltage is applied to the HIGH VOLTAGE output, an beep sounds for approximately 5 seconds. It has a complementary function to the visual warning of the high voltage led.

Generation lock button: for safety of the operator while the unit is being handled, during assembly of the test configuration and connection of the cables, the button must remain on (locked), making it impossible for the equipment to generate high voltage. After configuring and connecting all cables, the button must be unlocked to use the hipot and generate high voltage.

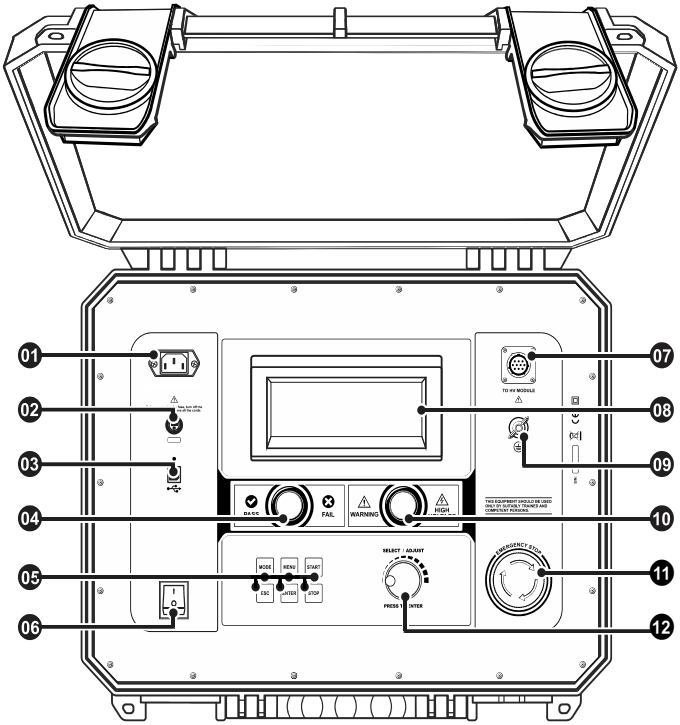
Protective grounding connection: terminal for connection of the high voltage unit to a secure grounding system.

ATTENTION: never use the hipot without the grounding connection.

HIGH VOLTAGE output: high voltage output connector.

ATTENTION: Properly connect the test probe to the high voltage connector to perform the tests, avoiding poorly contact and incorrect measurements.

2.2. Control unit



01 Power cord connector	07 Communication connection to the Generation Unit
02 Fuse	08 Display
03 USB connector	09 Safety ground terminal
04 Result LED (Red or Green)	10 High voltage LED (Red)
05 Keyboard	11 Emergency button
06 On/Off switch	12 Select / adjust control

Power cord connector: intended for the connection of the power cord.

ATTENTION: Check if the mains supply voltage is compatible with the power supply of the hipot.

Fuse: Protection fuse.

On/Off switch: turn on/off the hipot.

USB connector: intended for transfer test data to a computer.

Result LED: Indicates the test result. GREEN: test conditions are met at the end of the test; RED: the insulation was ruptured or the current value exceeded the setting value for the test.

High voltage LED: Indicates to the operator the presence of high voltage at the HIGH VOLTAGE output. It has two modes:

1. Continuous for about 5 seconds before starting a test.
2. Flashing lighting with test in progress and application of high voltage in the output of HIGH VOLTAGE.

Safety ground terminal: terminal for connection of the control unit to a safe grounding system.

CAUTION: Never use the hipot without the grounding connection.

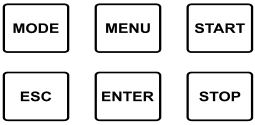
Display: visual communication interface with the operator.

Emergency button: Hipot emergency stop. Immediately interrupts the voltage generation when triggered. See section 5 Emergency stop and Generation lock buttons in this manual for more information.

Select / adjust control: navigation control in the hipot menus. See section 4 Settings and adjustments in this manual for more information.

Keyboard: has navigation function in the menus of the hipot; starts and ends a test; complements navigation by the rotary selector.

2.3. Keyboard (control unit)



Button	Function
MODE	**Mode** – selects the type of test
MENU	**Menu –** Allows you to access the device setup MENU
START	**Start** – Start test
ESC	**ESC –** Cancel setting and return to previous screen
ENTER	**Enter** – Open the selected submenu / confirms the configured value
STOP	**Stop –** End of test

2.4. Display (control unit)

It is on the HP30KV's alphanumeric LCD display that all information regarding equipment measurements and settings and various messages to the operator will be displayed.

Below is an example of the display information, in this case, this is the initial screen of the equipment ready start a measurement.



3. Test area

The HP30KV hipot generates high energy loads to perform the dielectric tests. This generated energy is very dangerous and for that reason it is of extreme importance the correct preparation of the area where the hipot will be used.

There are 3 basic safety conditions of the test area:
• Grounding
• Distance
• Containment

3.1. Grounding

Correct grounding of the hipot and test object is essential not only for the safety of the operator, but also for the proper functioning of the hipot.

3.2. Distance

Keep the generating unit (high voltage) and the test object at a minimum distance of 2 meters from the Control Unit.

3.3. Containment

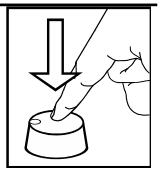
Maintain a minimum distance of 2 meters between the Generating Unit (high voltage) together with the test object, of all **supposedly conductive materials** to avoid leakage of electric current.

Make sure that there are no explosive materials in the testing area.

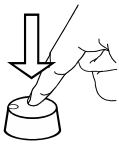
In accordance with current safety standards, the surroundings of the dielectric test area must be isolated and signaled to inhibit the approach of third parties during the tests.

4. Settings and Adjustments

This equipment has a MENU for settings and adjustments. To access the MENU, press the **Selector / Adjust** ( ).



All navigation is performed through the and all panel keys are disabled, with the exception of the key STOP that has the function to cancel and return to the initial screen.

	Short press: Open MENU, open selected sub-menu / confirm settings. Long press (1.5 s): Go back one level or cancel adjustment.
	Change selection / values
STOP	Cancel and close the MENU

ATTENTION: The configuration MENU can not be accessed during the tests.

MENU	SUBMENU	DESCRIPTION
SETUP TEST		
	MANUAL	Enables and configures: **Maximum current** (between 50 µA and 20,000 µA selected in steps of 10 µA); **Maximum voltage** (between 3,000 and 30,000 V).
	AUTO	Enables and configures: **Maximum current** (between 50 µA and 20,000 µA selected in steps of 10 µA); **Test voltage** (between 3,000 and 30,000 V); **Dwell time** (between 15 and 1,200 sec.).
	RAMP	Enables and configures: **Maximum current** (between 50 µA and 20,000 µA selected in steps of 10 µA); **Test voltage** (between 3,000 and 30,000 V); **Dwell time** (between 15 a 1,200 sec.); **Ramp up** (between 100 and 9,900 V/s); **Ramp down** (between 100 and 9,900 V/s).
	SVT	Enables and configures: **Maximum current** (between 50 µA and 20,000 µA); **Maximum voltage** (between 5,000 and 30,000 V); **Time step** (between 15 a 120 sec.); **Step voltage** (between 1.0 and 12 kV).
LANGUAGE		Allows you to change the interface language between: English, Spanish and Portuguese.
SETTINGS		
	SET DATE FORMAT	Selecting the date format.
	SET TIME FORMAT	Selecting the time format.
	DATE ADJUST	Setting the date.
	TIME ADJUST	Setting the time.
	DISPLAY ADJUST	Setting the display.
	SYSTEM INFO	Displays the firmware version and serial number.
MEMORY		
	USAGE	Displays the percentage of internal memory used.
	DELETE	Deletes all records from memory.

5. Emergency stop and generation lock buttons

To increase operator safety, the HP30KV has an emergency button on the control unit and a generation lock button on the high-voltage unit.

The emergency button is intended to stop the power generation of the hipot and should be used only in case of extreme urgency, such as the entry of person(s) in the test area or the anticipated / accidental activation of the equipment.

The generation lock button has the purpose of enabling or disabling the voltage generation and must always be pressed during the connection of the test cables. This feature ensures that no voltage will be generated on the high voltage unit while the operator is connecting or disconnecting the cables to the test object. Only after setting up and connecting the cables should this switch be enabled (turn the knob to turn it off) so that it is possible to continue the test and generate voltage.

When the emergency stop button is pressed, the button is "locked". As long as the button is not released, the hipot is blocked from working.

To unlock the emergency stop button:

1. On the control unit, turn the power off using the **power switch** () on the panel and unplug the power cord.

2. Turn the locking knob clockwise (as indicated on the button itself).

6. Connecting the HP30KV

ATTENTION: The procedures below should be made with the control unit **disconnected from the power supply** for a higher safety.

⚠

- The user manual and its safety precautions must be read and understood before using the hipot.
- Safety precautions and local safety regulations must be strictly applied to.
- Check that the element to be measured is not energized.
- For safety reasons, use only the accessories supplied by the manufacturer.

1) Connect equipment units from the wing nut (butterfly) connectors (with protective earth symbol) to a secure grounding system using the cable supplied with the equipment.

Attention: Never use the hipot without it being properly grounded through the appropriate terminals.

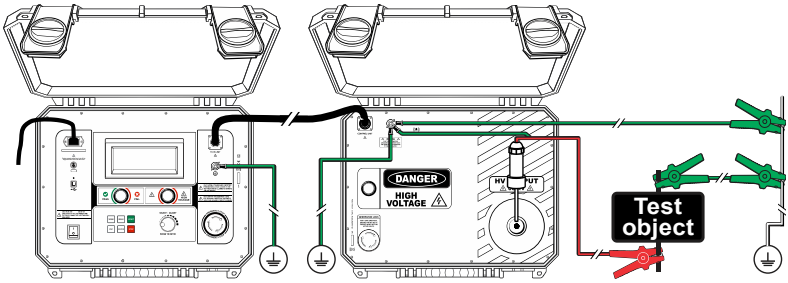
Attention: The power supply protection connection of the hipot is electrically separated from the protective connection of the measuring system, both of which must be properly connected to a secure grounding system.

2) In the (high voltage) generation unit, push the generation lock button. Connect the high voltage cable to the test element and to the high voltage output of the panel. Make sure that the probe has been properly positioned and threaded to the end of stroke without excessive strength.

3) Connect the interconnection cable between the control units and the high voltage unit. For security reasons, the interconnect cable has specific connectors for connection to each hipot unit. Check the correct connection, docking, and thread the cable to the end of stroke without excessive strong to prevent damage to the connectors.

4) Connect the power cord of the equipment (control unit) to a main source with voltage compatible with the specifications of the hipot (200-240 V, 50/60 Hz).

5) Make sure all connections are correct and release the generation lock button on the high voltage unit, allowing the system to work.



Basic diagram of connection of the cables in the control unit, high voltage and in the element to be tested.

7. Operating the equipment

1. Turn the control unit on with the **on / off** switch ().
2. The display of the device will show the message MEGABRAS HP30KV HIPOT.
3. It will then perform three self-tests and then display the initial screen, informing the currently selected test mode, the current date and time.
4. Press **menu** MENU button to set the desired test parameters (see cap.9 pg. 23)
5. Select the desired test mode (Manual, Auto, Ramp or SVT), using the MODE button.
6. Press the START button.
7. The display will prompt you to confirm the correct connection of the grounding cables (check grounding for greater safety). Continue the test by selecting the **YES** option.

(In case of **manual test,** the rotary ◯ should be used to control the applied voltage)

8. The high voltage LED (red) will light on both the control unit and the generation unit, informing you that the hipot will start the test (for approximately 5 seconds) together with the audible warning on the generating unit. When the high voltage LED start blinking, it indicates that the test is already in progress.
9. After the end of the test, the safety LED keep flashing (indicating the presence of high voltage in the test object) and the result LED will turn on (green on success, or red on test failure).

The HP30KV considers TWO factors to consider a test as failing:

1º – If the test current exceeds the set value for the test;

2º – Insulation breakdown (spark).

CAUTION: Ensure that the test sample is fully discharged (safety LED stop flashing) and grounded before removing the test leads.

Special caution: During the tests always keep away from the generation unit and the test object. Never connect or disconnect test, power, or communication cables while the equipment is running. If you need to make any modifications to the connection, the test should be interrupted and modifications must be made with the control unit disconnected from the mains.

8. Display messages

MEGABRAS HP30KV

When turning the equipment On using the **On/Off** switch, this introductory message appears for a while. During that time, the equipment carries out some functional checking.

AUTO CHECK

Indicates that the equipment is performing internal checks.

PRESS START

Indicates that the equipment is able to start a test, for which the operator must press the key START.

GENERATION LOCKED

If the control unit is turned on without being properly connected to the generating unit, the message GENERATION LOCKED will be displayed intermittently on the last line of the display.

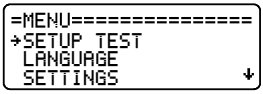
If the Generation Lock button on the high voltage generating unit is triggered this message is also displayed. In this case, unplug the control unit from the mains, release the Generation Lock button and reconnect the hipot to the mains.

INTERNAL PROTECTION ACTIVATED

This message indicates a malfunction on some of hipot's generation component. In this case the equipment should be sent to the technical service.

9. Setting the tests

The HP30KV is a versatile instrument that allows you to perform various types of dielectric strength tests automatically and recorded in internal memory. It is necessary to properly define the tests to be performed, setting the following parameters before starting the measurements: Max Current, Max Voltage, Dwell time, Ramp Up and Ramp Down. It's these settings that automate the modes: Manual, Auto, Ramp and SVT. **To select the test mode, simply press the mode button** [MODE]. All the settings of the hipot are adjusted in the control module, through the menu shown in the display of the equipment. Just press the **menu** [MENU] button, to access the settings.



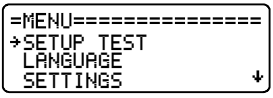
9.1. Manual mode

In this mode the operator will manually control the voltage applied.

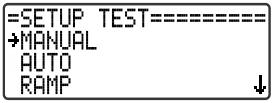
The programmable parameters of this mode are: Maximum current and Maximum voltage

To configure these parameters, follow the instructions below:

- Access the device's MENU using the [MENU] button.
- Use the control, to select SETUP TEST and press [ENTER].



- Use the control, to select MANUAL and press [ENTER].



9.1.1. Maximum current

- Use the control ◯, to select MAXIMUM CURRENT and press ENTER.



- Use the control ◯, select YES to set the max current or NO to perform the test without a current limit and press ENTER.



When selecting YES, with the control ◯, select the current value (50 µA up to 6,000 µA) and press ENTER to confirm.



9.1.2. Maximum voltage

- Use the control ◯, to select MAXIMUM VOLTAGE and press ENTER.



Use the control ◯ to select the desired maximum voltage value (from 3000 to 30,000 V in steps of 100 V) and press ENTER to confirm.



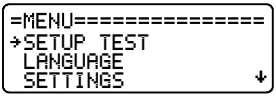
After all parameters have been set, exit the MENU and start the test by pressing START.

9.2. Auto mode

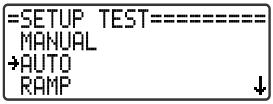
In this fully automatic mode the operator will program the maximum current, maximum test voltage and maximum test time.

To configure these parameters follow the instructions below:

- Access the device's MENU using the MENU button.
- Use the control ◯, to select SETUP TEST and press ENTER.



- Use the control ◯, to select AUTO and press ENTER.



9.2.1. Maximum current

(See 9.1.1, pg. 24)

9.2.2. Test voltage

- Use the control ◯, to select TEST VOLTAGE and press [ENTER].



Use the control ◯ to select the desired test voltage value (from 3000 to 30,000 V in steps of 100 V) and press [ENTER] to confirm.



After all parameters have been set, exit the MENU and start the test by pressing [START].

9.2.3. Dwell time

- Use the control ◯, to select **Dwell time** and press [ENTER].



Use the control ◯ to select the test duration time (from 15 to 1200 seconds) and press [ENTER] to confirm.



After all parameters have been set, exit the MENU and start the test by pressing [START].

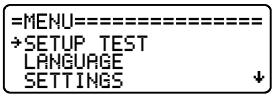
9.3. Ramp test

In this fully automatic mode the operator will indicate max current, the max. voltage, dwell time, ramp up ratio and ramp down ratio.

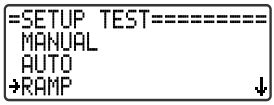
To configure these parameters follow the instructions below:

- Access the device's MENU using the MENU button.

- Use the control, to select SETUP TEST and press ENTER.



- Use the control, to select RAMP and press ENTER.



9.3.1. Maximum current

(See 9.1.1, pg. 24)

9.3.2. Test voltage

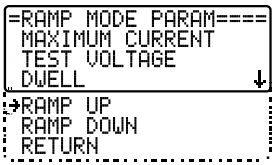
(See 9.2.2, pg. 26)

9.3.3. Dwell time

(See 9.2.3, pg. 26)

9.3.4. Ramp up

- Use the control, to select RAMP UP and press ENTER.

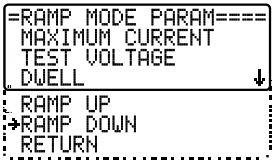


Use ◯ to select the rate in V/s (100 to 9900 V/s in 100 V steps) and press [ENTER] to confirm. After the parameters are configured, set the ramp down according to the following instructions.



9.3.5. Ramp down

- Use the control ◯, to select RAMP DOWN and press [ENTER].



Use ◯ to select the rate in V/s (100 to 9900 V/s in 100 V steps) and press [ENTER] to confirm. After all parameters have been set, exit the MENU and start the test by pressing [START].



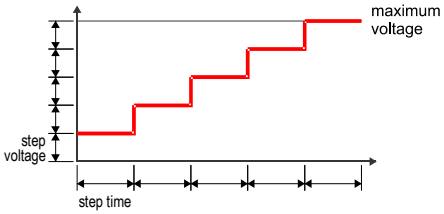
9.3.6. Ramp test result

During the ramp test, the HP30KV displays the total test time and the application duration time of the configured maximum voltage.

After the end of the test, regardless of the result, the display will report intermittently the time mentioned above.

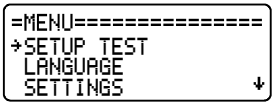
9.4. SVT – Step Voltage Test

In this mode of operation, the user does not set a specific test voltage, but rather the values of **maximum voltage**, **voltage step** and **step time value**. The instrument will start the test by applying the value of the voltage step and increase this value at each programmed time interval until it reaches the maximum voltage value.

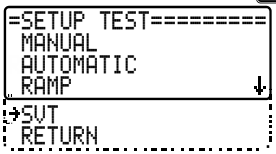


To configure these parameters follow the instructions below:

- Access the device's MENU using the MENU button.
- Use the control, to select SETUP TEST and press ENTER.



- Use the control, to select SVT and press ENTER.

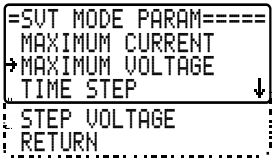


9.4.1. Maximum current

(See 9.1.1, pg. 24)

9.4.2. Maximum voltage

- Use the control ◯, to select MAXIMUM VOLTAGE and press ENTER.

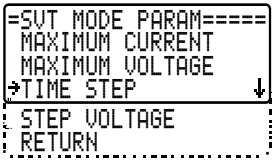


- Use ◯ to select the desired maximum voltage value (5,000 to 30,000 Vs in 100 V steps) and press ENTER to confirm.



9.4.3. Time step

- Use the control ◯, to select TIME STEP and press ENTER.

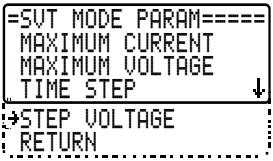


Use ◯ to select the duration of the test steps (from 15 to 120 seconds) and press ENTER to confirm.



9.4.4. Step voltage

- Use the control ◯, to select STEP VOLTAGE and press [ENTER].



Use ◯ tto select the voltage increment for each test step (from 1,000 to 12,000 V) and press [ENTER] to confirm.



After all parameters have been set, exit the MENU and start the test by pressing [START].

10. Other functions

10.1. Internal memory

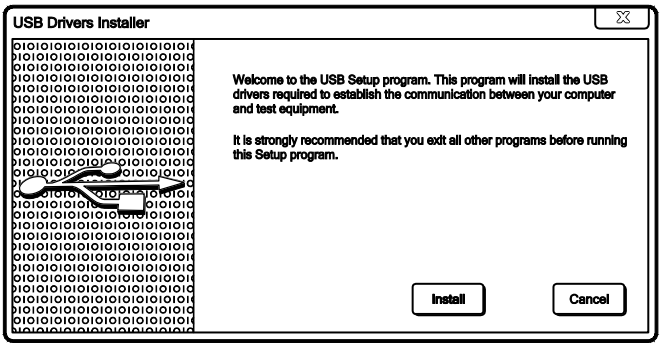
This device has internal memory for up to 16,000 measured values. For safety, always download the memory of the equipment to a computer when the tests are finished.

11. Software

11.1. USB Drivers

To install the USB drivers required for the communication between PC and equipment follow the instructions:

1. Connect the equipment in the PC using the USB cable.
2. If there is an available internet connection, Windows will silently connect to the Windows Update website and install any suitable driver it finds for the device.
3. If no suitable driver is automatically found then you need to insert the CD-ROM, supplied with the equipment, in the PC, run the executable “usb-install.exe” and click in “Install”.



11.2. MegaLogg2 software

This software makes communication between the equipment and a computer with Windows operative system easier. It makes it possible to synchronize the date and time of the equipment internal clock with the computer date and clock, to transfer the stored date, to clear the memory, to generate test reports, etc.

12. Remote control

The Megabras equipment that have Bluetooth interface can be controlled remotely via an Android device (smartphone / tablet) running the application.

BlueLogg

DISPONÍVEL EM Google Play

- *Android™ and Google Play™ Store is a trademark of Google LLC*
- *Bluetooth® is a registered trademark of Bluetooth SIG, Inc. worldwide*

Pairing

To perform the pairing between equipment and the Android device, follow the procedure:

- To enable the Bluetooth, in screen “Applications”, tap "Settings" > "Bluetooth" and drag the Bluetooth slider to the right.
- To pair your equipment, on screen "Applications", tap "Settings" > "Bluetooth" > "Search". Select the equipment and wait for the end of the pairing (If necessary, accept the automatically generated password to confirm or enter the PIN 1234).

13. Cleaning

Before cleaning the equipment, disconnect the equipment from the mains and disconnect all cables.

The panel, terminals and connectors of the equipment must stay dry and clean. Cleaning should be made using a wet cloth in water and a soft detergent or isopropyl alcohol (be sure that the products to be used for cleaning does not affect plastic goods).

After cleaning and before plugging in again, make sure that the equipment is completely dry to avoid risk of electric shock and malfunction of the hipot.

14. Maintenance

Before each use, check the equipment for visible damage to the enclosure, panel, cables, and accessories. If any malfunction or damage is found that could compromise the safety of the equipment, do not use the hipot and contact the service center. Do not use the equipment if the power cord or any other cable (interconnect or accessory) is damaged and contact service.

Fuse: the control unit has a fuse in the power input. To replace the fuse:

1. Disconnect the equipment from the power supply and disconnect the cables from the control unit;
2. Use a screwdriver to open (¼ turn) the fuse compartment;
3. Replace the fuse with an equivalent, as indicated in the product's specifications.
4. Completely close the fuse compartment (¼ turn) using a screwdriver.

Fuse Schurter, model SPT 5x20 (Time-lag) 8A/250V.
High breaking capacity.

⚠ Disconnect the power cord from the equipment before accessing the fuse holder.

⚠ To replace the fuse, use only the fuse type specified in the equipment.

15. Technical specifications

Test voltage	:	Up to 30,000 V.
Test voltage resolution	:	100 V between 10 kV and 30 kV. 10V up to 9.99 kV.
Test voltage accuracy	:	± (2% of nominal value ± 2 digits) with 1 mA load.
Polarity	:	Negative voltage, ground positive.
Leakage current	:	Max. 20 mA.
Leakage current resolution	:	0.01 mA.
Leakage current accuracy	:	± (2% of nominal value ± 2 digits).
Display	:	Alphanumeric.
Ripple	:	< 2%.
Safety features	:	Remote control via Bluetooth. Emergency stop buttons. Self-detection of sparks. Visual indicators (LEDs). Sound indicator.
PC Interface	:	USB.
Advanced features	:	Ramp and SVT test. “Pass-fail” and fixed time tests Internal memory.
Built-in chronometer	:	Indicates elapsed time from the beginning of the measurement mm:ss format, up to 20:00.
Software MegaLogg2	:	It allows to transfer the data stored in the equipment memory to a PC, to analyze them, to present the results in tables and graphs, to generate reports of the tests.
Environmental protection index	:	IP54 (with the cover closed).
Safety	:	Conforms to IEC 61010-1.

Power supply	:	Mains: 200-240 V, 50/60 Hz, 720 VA
Fuse	:	20 mm, T, 250 V, 8 A.
Operating temperature	:	-5°C to 50°C.
Storage temperature	:	-25°C to 70°C.
Humidity	:	95% UR (non condensing).
Altitude	:	≤ 4000 m.
Equipment weight	:	Control module: approx. 15.43 lb (7 kg). High voltage module: approx. 15.65 lb (7.1kg).
Dimensions	:	Control module: 17.54" x 14.14" x 7.5" (450 x 360 x 190 mm). High voltage module: 17.54" x 14.14" x 7.5" (450 x 360 x 190 mm).
Supplied accessories	:	1 - Interconnection cable* (controller ↔ module). 1 - High voltage cable*. 1 - Return cable HV*. 1 - Protective grounding cable*. 1 Power cable. 1 USB cable. 1 Carry case. 1 Operation Manual. 1 Software.

* Supplied with different lengths on request.

Subject to technical change without notice.

16. Warranty

MEGABRAS warrants the products for two years from date of shipment. We will repair, without charge, any defects due to faulty materials or workmanship. For warranty repair information, visit our webpage **www.megabras.com**. This warranty does not apply to accessories or damage caused where repairs have been made or attempted by others. Warranty period for accessories and batteries is 6 months except for LFP batteries, which have the same warranty period as the equipment itself.

MEGABRAS's warranty obligation is limited, at MEGABRAS's option, to free of charge repair or replacement of the defective product within the warranty period, or to refund of the purchase price.

Any costs for transportation to manufactures facility is the responsibility of the customer. The manufacturer assumes no risk for damage in transit.

If MEGABRAS determines that the failure was caused by misuse, alteration, accident or abnormal condition or handling, you will be charged for the repair and transportation.

The manufacturer does not take any responsibility for any eventual damage due to the use or impossibility to the use of the equipment such as the loss of memory data, accidents in the field, loss of profit, etc.