

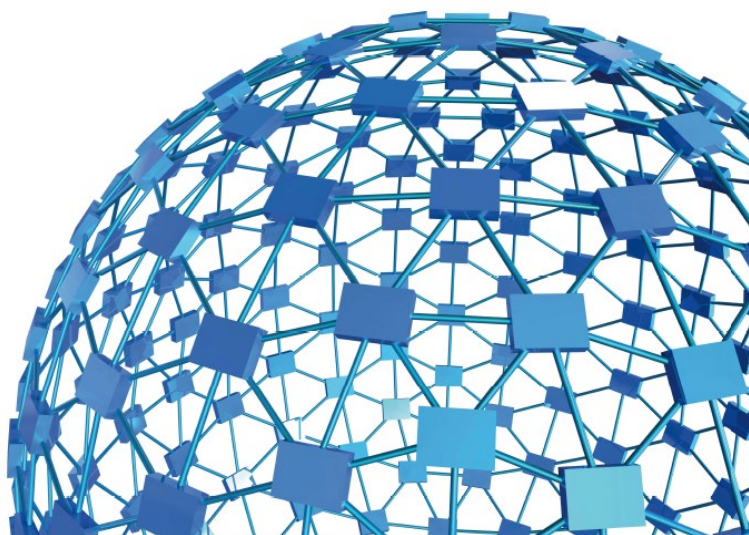


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TRANSFORMING IDEAS  
INTO INSTRUMENTS

# instruction manual

**Lesion Making Device**  
**Cat. No. 53500**



**UGO BASILE S.R.L.**

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**instruction manual**

**Lesion Making Device  
Cat. No. 53500**

Serial No.

## **SAFETY CONSIDERATIONS**

**ALTHOUGH THIS INSTRUMENT HAS BEEN DESIGNED WITH INTERNATIONAL SAFETY STANDARD, THIS MANUAL CONTAINS INFORMATION, CAUTIONS AND WARNINGS WHICH MUST BE FOLLOWED TO ENSURE SAFE OPERATION AND TO RETAIN THE INSTRUMENT IN SAFE CONDITIONS.**

**SERVICE AND ADJUSTMENTS SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL, AUTHORIZED BY UGO BASILE ORGANIZATION.**

**ANY ADJUSTMENT, MAINTENANCE AND REPAIR OF THE OPENED INSTRUMENT UNDER VOLTAGE SHOULD BE AVOIDED AS MUCH AS POSSIBLE AND, WHEN INEVITABLE, SHOULD BE CARRIED OUT BY A SKILLED PERSON WHO IS AWARE OF THE HAZARD INVOLVED.**

**CAPACITORS INSIDE THE INSTRUMENT MAY STILL BE CHARGED EVEN IF THE INSTRUMENT HAS BEEN DISCONNECTED FROM ITS SOURCE OF SUPPLY.**

Instruction Manual dated March 2019  
Revision 0





## Lesion Making Device

Cat. No. 53500

### General

This compact, **solid state DC Lesion Maker** has been designed for the production of localized lesions in small animals, when direct current (DC) is preferred to RF.

It features a regulated power supply combined with a constant DC current generator which operates on either continuous or timed mode.

The Lesion Making Device provides constant DC current in mA from 10  $\mu$ A to 99 mA. The pulse duration may be timed by the instrument between 1 and 99 seconds, or manually controlled.

The current generator is protected against short circuit, preventing the electronics to get damaged due to the electrodes coming accidentally in contact with each other.

Particular emphasis has been placed in the design of a good circuit output/ground insulation; this feature also minimizes spurious current field lines across the tissue, outside the pattern preset by the operator.



**New Model!**

**A precision instrument, which provides constant DC current in mA**

### Main Features

- Violation warning circuit
- Current Range : from 10  $\mu$ A to 99 mA
- 3 modes of Operation
- Digital setting of constant current and time duration
- Pulse Duration : timed between 1 and 99 seconds



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## CHECK-LIST

**53500**

**Lesion Making Device**

CLIENTE / CUSTOMER \_\_\_\_\_

Ordine No. / Order No. \_\_\_\_\_ Data / Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

UB code	CAT.No.	✓	Q.ty	DESCRIPTION	✓	DESCRIZIONE
E-AU 041 USB pen-drive	53500-302		1	INSTRUCTION MANUAL (on USB drive)		MANUALE DI ISTRUZIONE
E-WP 008						EUROPE
E-WP 008-1			1	MAINS CABLE		CAVO RETE
E-FT 003-1			2	FUSES FOR 115 V (T 250 mA)		FUSIBILI PER 115 V (T 250 mA)
E-FT 002-1			2	FUSES FOR 230 V (T 160 mA)		FUSIBILI PER 230 V (T 160 mA)
E-PE 005			1	RED OUTPUT PLUG		SPINOTTO ROSSO
E-PE 006			1	BLACK OUTPUT PLUG		SPINOTTO NERO
E-PE 007			1	GREEN OUTPUT PLUG		SPINOTTO VERDE
		!	Verificare che cambio tensione e fusibili inseriti nel blocco alimentazione corrispondano ai dati di targa			

DATE / /	Serial No.	IMBALLATO DA / PACKED BY	
<b>Set for</b>			
<input type="checkbox"/> 115V 50 Hz	<input type="checkbox"/> 230V 50 Hz	<input type="checkbox"/> 115V 60 Hz	<input type="checkbox"/> 230V 60 Hz

### IMPORTANT/IMPORTANTE:

Check the shipment for completeness immediately after receipt: should you find any discrepancy, please fill in the following part and transmit it to our fax no. **+39 0332 745488**

Al ricevimento della merce controllate che la spedizione sia completa: in caso di discrepanza, completate il formulario di seguito riportato ed **inviate** al nostro fax no. **0332 745488**

FROM: Name	Company/Institution
DATE	REF.

**NOTE**

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# Lesion-Making Device

Cat. 53500

## 1 GENERAL

### 1.1 Introduction of Lesion Experimentation

The surgically or electrically induced lesion has served as an important tool in the experimental search for function in the CNS. Its value has derived in part from the simplicity with which it can be used to study neural mechanisms of behaviour at a basic level.

The advent of the stereotaxic technique, moreover, allowed researchers to produce discretely placed lesions with consistency, especially in sub-cortical structures of the brain.

The strength of the lesion technique resides also in the variety of ways with which to apply it. Manipulating the type of lesion (DC, RF, knife cut, etc.), its size, the type of electrode, the angle of entry, and so on, should continue to expose critically important aspects of neural functions because of the different effects that are produced.

It is no coincidence that the history of the development of these techniques is closely tied to the recent history of theories regarding localization of function in the brain. The traditional view, whose basic tenets are that (1) the functions are represented in discrete brain structures and that (2) the lesions disrupt function by removal of functional tissue in circumscribed sites, have been recently challenged by growing evidence of the importance of **secondary** changes.

These are induced by a lesion, both directly (necrosis, anterograde and retrograde degeneration) and indirectly (transneuronal degeneration, regeneration and sprouting, alteration of neurochemical pools, vascular disruption) and may comprise the more significant neurological changes which can account for alteration of behaviour in a lesion experiment.

New strategy of research utilizing lesions is proposed, suggesting that greater emphasis be placed on the *a posteriori* assessment of secondary changes in the brain as they are correlated with changes in behaviour.

## 2 INSTRUMENT DESCRIPTION

This compact solid-state DC lesion-maker has been designed for the production of localized lesions in small animal preparations, where DC is preferred to RF output.

The 53500 features:

- **Digital setting** of constant current and time duration



- **Violation** warning circuit
- **Current Range** : from 10  $\mu$ A to 99 mA
- **Pulse Duration** : timed between 1 and 99 sec-onds or manually controlled

It features a regulated power supply combined with a constant current generator which operates on either continuous or timed mode and whose output is available from two binding posts located on the right of the top panel, see Figure 1 “Front Panel”.

The current generator is protected against short circuit, which prevents the electronics to get damaged due to the electrodes coming accidentally in contact with each other.

Particular emphasis has been placed in the design of a good output/ground insulation. This feature, beside enhancing safe operation, minimizes spurious current field lines across the tissue, outside the pattern the operator has planned.

A **Violation** circuit warns the operator when the preset current does not flow through the preparation, due to faulty connection or excessive preparation impedance.

## 2.1 Controls

The instrument controls are all placed on the top panel, see Figure 1 “Front Panel”; the setting of the desired parameters is made easy by two thumb-wheel switches:

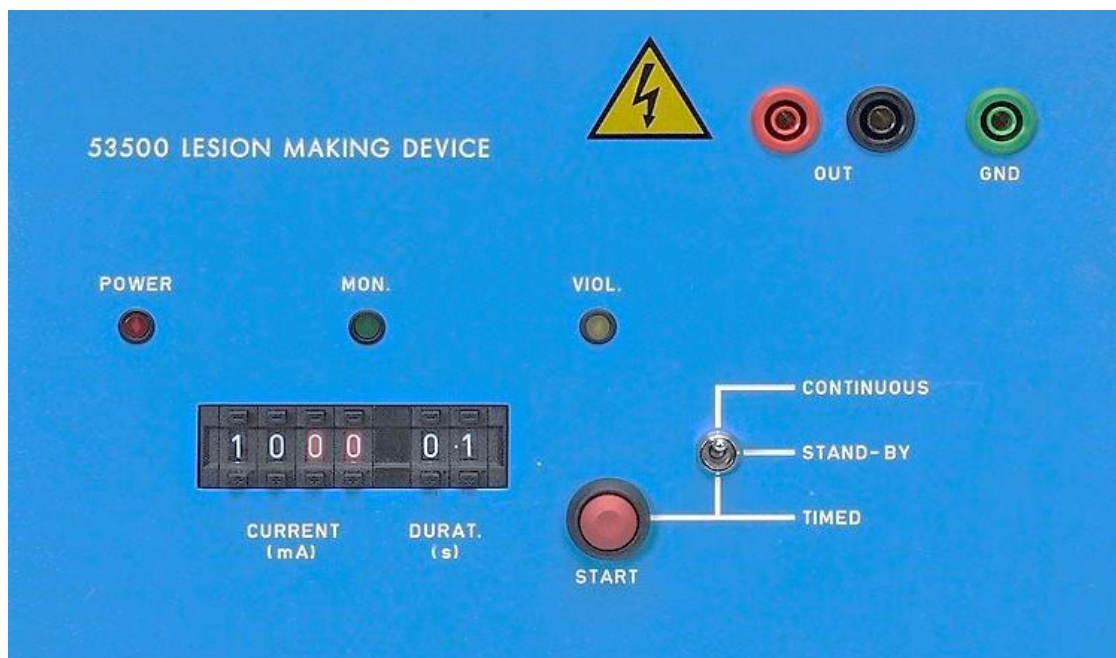


Figure 1 “Front Panel”

### 2.1.1 Current Output

The current output can be selected in the range **10 $\mu$ A to 99mA** via a 4-digit thumb-wheel: the first two digits for the integers, the other two for the decimals.



### 2.1.2 Duration Control

The duration of the lesion generating current can be set **from 1 to 99 seconds**, via a 2-digit thumb-wheel.

As order of magnitude, 1 milliamp for 1 second destroys 1 cubic mm of tissue.

## 2.2 Output Mode Switch

The current delivery mode can be selected via a 3-position switch:-

- When in **CONTINUOUS** mode, from the very moment you trip this switch, the binding posts are energized and the current flows through the preparation in a continuous mode.
- When **TIMED**, the current flow is timed according to the setting; current delivery is started by the **START** key.
- When on **STAND-BY** the instrument maintains its setting and is ready to operate, but no power is delivered to the output binding posts.

## 2.3 Binding Posts

There are three binding posts on the upper right of the Lesion Maker top panel. Output is available from two binding posts: either the **RED (+)** or the **BLACK (-)** can be connected to the lesion making electrode.

The other binding post is usually connected to a pad electrode with electrolyte on the preparation. Either red or black may be grounded via the **GREEN** binding post nearby.

## 2.4 LED Indicators

Three LED indicators are embodied on the top panel:-

- The **POWER** LED on the front panel indicates when the unit is on.
- The **MONITOR** LED monitors the presence of the lesion current and lights, continuously or not, according to the selected mode.
- The yellow **VIOLATION** LED lights and an acoustic signal warns the operator, when the preset current does not correspond to the setting.

## 2.5 Electrodes

Electrodes are not supplied with the Lesion Maker standard package.

Usual needle electrodes, prepared by the researcher according to his/her experimental needs can be used in conjunction with the 53500 Lesion Making Device.

We have the capability and will to manufacture electrodes based on the customer's request. Contact our customer service, see paragraph 5.4.

## 3 INSTALLATION

### 3.1 Unpacking & Preliminary Check

Check the contents of the shipment for completeness, packing list to hand, visually inspecting the instrument as soon you take it out of the packaging. Use the supplied **Check List**.

If the instrument is damaged, inform the carrier immediately, notifying our company. If after having tested it, the Lesion Maker fails to meet rated performances, please contact our after sales service, see paragraph 5.4-Customer Support.



#### **Protect the environment!**

Dispose of packaging properly, according to existing and applicable waste management rules and regulations.

### 3.2 Notes on the Instruction Manual

The 53500 Instruction Manual included in the package (on the USB pen drive) is necessary for the correct installation and operation of the instrument.

We recommend reading the manual with attention, as it is essential for the correct installation and operation of the instrument.

Please save the manual, ready to be consulted by the qualified personnel who use the instrument. Print it, only if necessary.

Our Instruction Manuals are available as free download on our web. For any additional information and/or assistance, you are welcome to contact our Service Department (see paragraph 5.4-Customer Support), specifying the serial number of your instrument.

### 3.3 Before Applying Power



#### **WARNING!**

Due to the high voltage involved, the operator should always wear rubber gloves when handling electrodes connected to the instrument in a live experiment.

A yellow warning attached to the front panel reminds that. **DO NOT REMOVE IT!**

Consider the Power Module (see drawing 2), left on the back panel, which encompasses – from left to right - the inlet connection of the mains cord, the mains switch and the fuse holder/voltage selector.

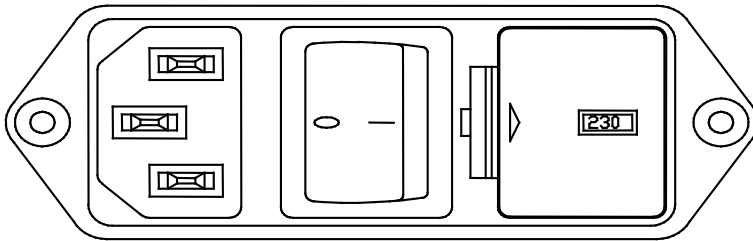


Figure 2, "Power Module"

### 3.3.1 Mains Switch

This two-pole toggle switch, which complies with international safety standards, provides a visual cue, meaning:-

- **OFF** when pressed to the right ("O" side)
- **ON** when pressed to the left ("I" side)

### 3.3.2 Fuse Holder & Voltage Selector

The fuse holder comprises two fuses, one on the live, and the other on the neutral. For both operation at 230 Volts and at 115 Volts, we recommend 160 mA timed fuses (type T160). Use 250 mA fuses (type T250) for operation at 115 Volts.

The fuse holder also embodies the Voltage Selector. Make sure that the flag indicates the correct voltage (i.e., the voltage of your mains). To replace the fuses or change the selected voltage, see paragraph 5.1-Electrical.

### 3.3.3 Mains Cord

It is a standard cable, Cat. # E-WP008. Make sure your power outtake is provided with a reliable ground connection.

## 3.4 Intended Use

The Lesion Maker is intended for investigation use on laboratory animals only.

## 3.5 General Safety Instructions

The following guidelines must be followed to ensure safe operation.

- ! **DON'T** attempt to open or perform any service work
- ! **DON'T** connect up human subjects



## 3.6 Additional Safety Consideration

- 1) Place your Lesion Making Device on a steady flat surface (e.g. your experimentation table).
- 2) Use original accessories and spare parts only, see also paragraph 6-ORDERING INFORMATION.
- 3) immediately disconnect and replace damaged mains cord.
- 4) do not obstruct a comfortable access to the power module.

- 5) do not operate in hazardous environments or outside prescribed environmental limitations (i.e. +10c° / +40c°, 95% max. relative humidity, non-condensing), see also paragraph 6.1-Specifications.
- 6) do not spray any liquid on the connectors and on the geared motor, see also paragraph 5-MAINTENANCE.
- 7) due to the high voltage involved, the operator should **always wear rubber gloves when handling electrodes** connected to the instrument in a live experiment. A warning attached to the front panel reminds that; do not remove it!

UGO BASILE DOES NOT ACCEPT ANY RESPONSIBILITY FOR PROBLEMS OR HARM CAUSED TO THINGS OR PERSONS, ARISING FROM:

- incorrect electrical supply;
- incorrect installation procedure;
- incorrect or improper use or, in any case, not in accordance with the purpose for which the instrument has been designed and the warnings stated in the instruction manual supplied with the instrument;
- replacement of original components, accessories or parts with others not approved by the manufacturer;
- servicing carried out by unauthorized personnel.

### 3.7 Connections

Connect the mains cord to a power outtake, **provided with a reliable earth connection**; connect your electrode to the selected binding posts, see paragraph 4.2.

## 4 OPERATION

First of all, get familiar with the instrument.

- 1) Position the **OUTPUT MODE** switch on **STAND-BY**
- 2) Switch the power **ON**
- 3) Set a **CURRENT** value via the thumb-wheels
- 4) In case a timed duration is required Select the time (**SECONDS** thumb-wheel)
- 5) Position the **OUTPUT MODE** switch on **TIMED** or **CONTINUOUS**. See also paragraph 2.2. The **MONITOR** LED will light (continuously or not, according to the selected mode).

When the preset current does not flow through the preparation, due faulty connection or excessive preparation impedance, the yellow **VIOLATION** LED will light and the acoustic signal will warn the operator.

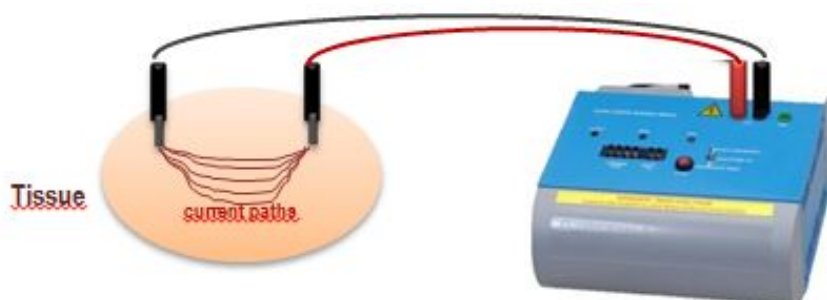
### 4.1 Delivering Lesion Current

Place the electrodes (**remembering the rubber gloves**) and preset the controls according to the parameters you have selected. Then trip the **OUTPUT MODE** switch.

At this point, if the basic parameters of the “whole loop”, i.e., instrument voltage and electrode preparation impedance are compatible with preset current, the green **MONITOR** LED will light.

## 4.2 Suggestions on Electrode Connection

The following scheme suggests how to connect the binding posts and electrodes:



Ground can be useful to suppress R.F. noise

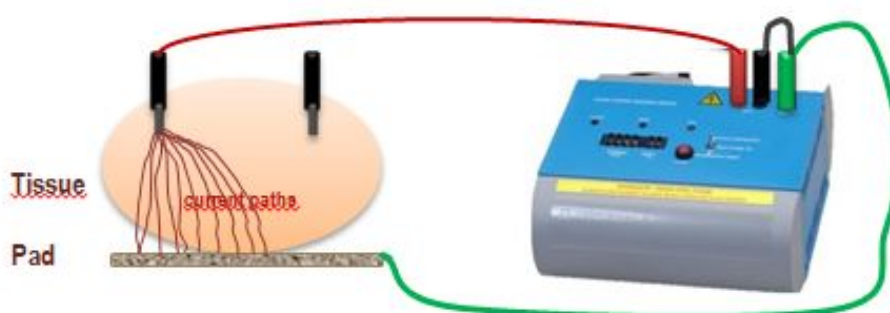
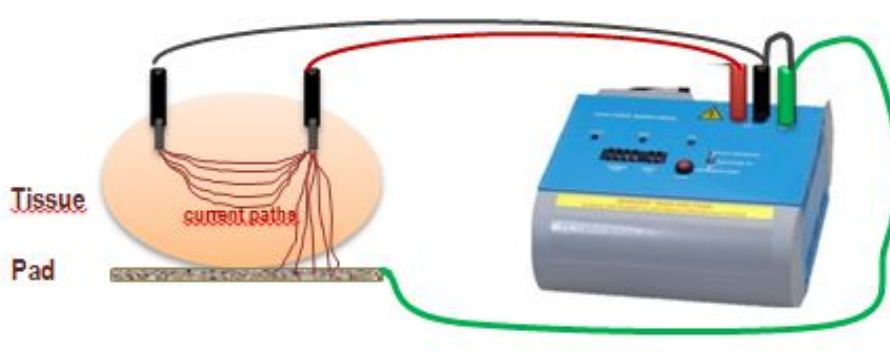
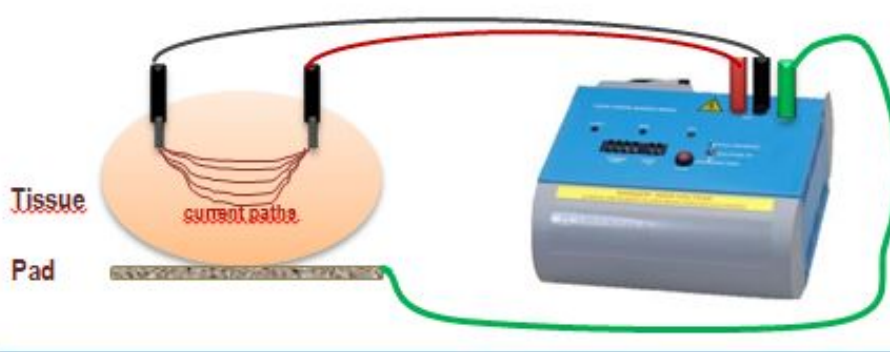


Figure 3, "Connecting Electrodes"

## 5 MAINTENANCE

While any service of the instrument ought to be carried out by Ugo Basile personnel or by qualified personnel authorized by UGO BASILE organization, this section of the instruction manuals describes normal maintenance procedures which can be carried out at your facility.



**UNPLUG THE MAINS CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB!**

### 5.1 Electrical

To inspect and/or replace the fuses, **disconnect the mains cable first!** Insert a miniature screwdriver in the slot indentation, see paragraph 3.3.2, and snap out the slide which houses the fuses. For operation at 230 Volts, we recommend 160 mA timed fuses (type T160). Use 250 mA fuses (type T250) for operation at 115 Volts.

Having extracted the fuse slide, the voltage selector becomes accessible. The same miniature screwdriver will help you to pry out the cross jumper on which the operation voltage is engraved. Place the jumper upside down if you have to shift from 115 to 230V or vice versa.

Snap in the fuse slide: the mechanical “click” ensures that it is locked. Check the voltage flag before applying electrical power.

### 5.2 Cleaning

The Lesion Producing Device does not require any maintenance; protect it from dust when not in use.

Organic solvents should not be used for cleaning purposes as they can impair the Perspex surfaces; loose dust may be removed with a soft cloth or a dry brush. Water and a mild detergent or ideally.

### 5.3 Long Inactivity

The instrument does not require any particular maintenance after long inactivity, except cleaning.

### 5.4 Customer Support

For any further information you may desire concerning the use and/or maintenance of the Lesion Maker, please do not hesitate to contact our **service department** (or our local distributor) either directly or via our support page <http://www.ugobasile.com/support.html> :



**UGO BASILE s.r.l.**

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**Phone : +39 0332 744574**



**service@ugobasile.com**  
**logistics@ugobasile.com**  
**sales@ugobasile.com**

**Before sending any instrument to our factory for repair**, please contact our logistics department to obtain a return authorization number (RMA) and shipping/packing instructions.

We may not be held responsible for damages during transport due to poor packing; whenever possible, please use the original packing.

## 6 ORDERING INFORMATION

**53500 Lesion Making Device**, complete with following standard accessories:

**53500-310 Set of 3 output plugs**

**E-AU 041** USB pen drive, including:

**53500-302** Instruction Manual (on USB pen drive)

**E-WP008** Mains Cord – Europe (or E-WP008-1 U.S.A. / E-WP008-2 U.K.)

Set of 2 fuses for either 115 VAC or 230 VAC mains

### 6.1 Specifications

#### Operation

Lesion Making Device	DC Constant Current
Current Range	from 10 $\mu$ A to 99 mA
Compliance Voltage	200 V DC
Max. Electrode Resistance	20 MOhm (10 $\mu$ A) down to 2 KOhm (100mA)
Power Monitoring	via red LED
Current Monitoring	via green LED
Violation Monitoring	via yellow LED
Power Requirement	115 or 230 V, 50/60 Hz, 20 W max.
Operating Temperature	10° to 40° C



Sound Level <45dB

### Physical

Total Weight 1.4Kg

Shipping Weight 3.7Kg approx.

Dimensions 27(w)x25(d)x13(h)cm

Packing Dimensions 45x34x26cm

### Warranty

Warranty 53500 is covered by a 24-month warranty.

## 6.2 BIBLIOGRAPHY

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Don't forget to check our web page periodically for updated bibliography!









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## CE CONFORMITY STATEMENT

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Phone n. +39 0332 744574  
Fax n. +39 0332 745488

*We hereby declare that*

Instrument. **LESION MAKING DEVICE**  
Catalog number **53500**

*is manufactured in compliance with the following European Union Directives  
and relevant harmonized standards*

- *2014/35/UE relating to electrical equipment designed for use within certain voltage limits*
- *2014/30/UE relating to electromagnetic compatibility*
- *2011/65/UE and 2015/863/UE on the restriction of the use of certain hazardous substances in electrical and electronic equipment*

Account Manager

Mauro Uboldi

Nome / Name

October 2018

Date

Firma / Signature