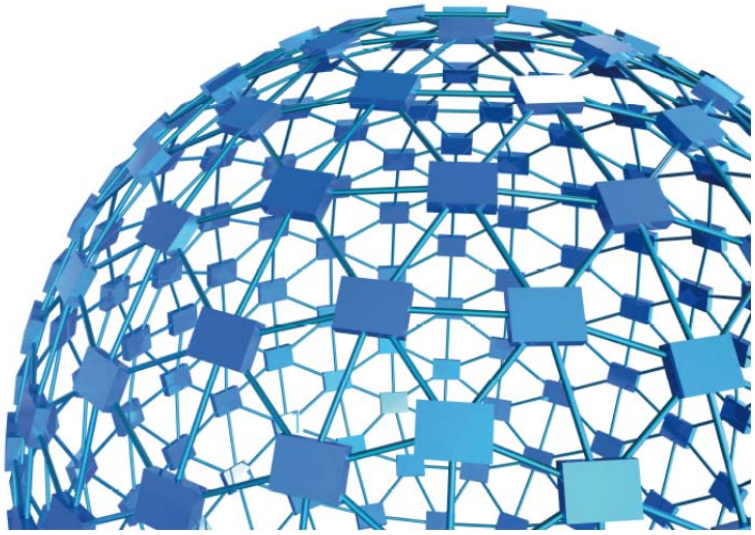
ugo basile®

TRANSFORMING IDEAS INTO INSTRUMENTS

instruction manual

E C T Unit
Cat. No. 57800



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instruction manual

E C T Unit
Cat. No. 57800

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 September 2016
Revision 1

CE

www.ugobasile.com

ECT Unit

Cat. No. 57800

General

The ECT apparatus is specially designed for neurochemical and neuropharmacological research.

A constant current output is used, which ensures reproducible results and accurate determination of the EC threshold while also pinpointing any variations in the threshold, brought about by drugs having a specific action on the cortex and subcortical regions.

The shock parameters have been selected after consulting the most recent literature, to supply the most suitable range when operating with mice and rats.

Consistent reproducible current levels are produced by feedback circuitry that adjust for variance in impedance of the contact from animal to animal.

The Electroconvulsive Device is supplied with auricular (ear lobe) electrodes.

DESIGNED FOR INDUCING CONVULSIONS IN RESEARCH ANIMALS

FOR NEUROCHEMICAL & NEUROPHARMACOLOGICAL RESEARCH

Particularly useful for:-

- General screening of potentially neurotropic substances
- Evaluating the depressant or stimulating action of drugs on the CNS
- Endocrinological investigations on the relationship between the nervous system and the hypophysis

Ugo Basile: more than 10,000 citations

CHECK-LIST
57800 ECT Unit

CLIENTE / CUSTOMER_____

Ordine No. / Order No. _____ Data / Date___/_____/_____

UB code	*CAT.No.*	*√*	*Q.ty*	*DESCRIPTION*		*√*	*DESCRIZIONE*	
	57800-001		1	PULSE GENERATOR			GENERATORE DI IMPULSI	
	57800-002		1	SET OF AURICULAR ELECTRODES			SET DI ELETTRODI AURICOLARI	
E-AU 041 USB pen-drive	57800-302		1	INSTRUCTION MANUAL (on USB drive)			MANUALE DI ISTRUZIONE	
E-WP 008			1	MAINS CABLE	EUROPE		CAVO RETE	EUROPA
E-WP 008-1					U.S.A.			U.S.A.
E-FT 014			2	FUSES FOR 115V (T 2.5 A)			FUSIBILI PER 115 V (T 2.5 A)	
E-FT 014			2	FUSES FOR 230V (T 2.5 A)			FUSIBILI PER 230 V (T 2.5 A)	
	Verificare che cambio tensione e fusibili inseriti nel blocco alimentazione corrispondano ai dati di targa Check that the voltage selector and the fuses correspond to what indicted in the rating marks							

OPTIONS					
	57800-003		1	SET OF CORNEAL ELECTRODES	
	57800-320		1	SET OF 4 FELT PADS FOR 57800-003	
	57800-010		1	BIPOLAR INVERTER	Serial No.
	57800-015		1	ECT MONITOR, including following accessories:	Serial No.
	E-WP 008		1	MAINS CABLE	
	E-WP 027		1	CONNECTION CABLE, 2mm PLUG	
	E-WP 019		1	BNC CABLE	
	E-AU 055		1	POWER SUPPLY	
	E-WP 026		1	CONNECTION CABLE, 4mm PLUG	

DATE / /	Serial No.	IMBALLATO DA / PACKED BY

Set for

☐ 115V 50 Hz ☐ 230V 50 Hz ☐ 115V 60 Hz ☐ 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 inviatelo al nostro fax no. 0332 745488

FROM: Name	Company/Institution
DATE	REF.

NOTE

CONTENTS

FIGURE INDEX

ECT Unit

Cat. 5 7 8 0 0

1 GENERAL

The ECT Apparatus is specially designed for neurochemical and neuropharmacological research. It is particularly useful for:

- general screening of potentially neurotropic substances
- evaluating the depressant or stimulating action of drugs on the CNS
- endocrinological investigations on the relationship between the nervous system and the hypophysis.

A constant current output is used which ensures reproducible results and accurate determination of the EC threshold while also pinpointing any variation in the threshold brought about by drugs having specific action on the cortex and subcortical regions.

The shock parameters have been selected after consulting the most recent literature, in order to determinate the range of requirements likely to be needed when operating with mice and rats.

The solid state circuit supplies from 1 to 299 rectangular pulses per second, .1 to .9 ms in width, for duration variable from .1 to 9.9 seconds. Shock current can be accurately preset on a scale of 1-99 mA.

The actual intensity of the shock depends on the current which runs through the subject's body. The instrument automatically adjusts the current to the value preset by the operator, irrespective of the animal's skin resistance and skin/electrode interface conditions. Accordingly, the intensity of the current running through each animal in any given experimental group is identical.

The standard auricular electrodes supplied allow a single operator to deliver shock to a number of animals in a short time. The special output circuit enables any type of electrode to be used, e.g., corneal or temporal electrodes, which can be provided on request.

2 INSTRUMENT DESCRIPTION

The instrument consist of:

1) a constant current **Pulse Generator 57800-001** (see paragraph 2.1.1), which comprises:

- a pulse train generator
- a power amplifier

- a pulse transformer
- two power supplies

2) a set of **Electrodes** (auricular electrodes 57800-002 are supplied as standard)

2.1.1 Pulse Generator

The Pulse Generator is lodged into a resilient cabinet of original design.

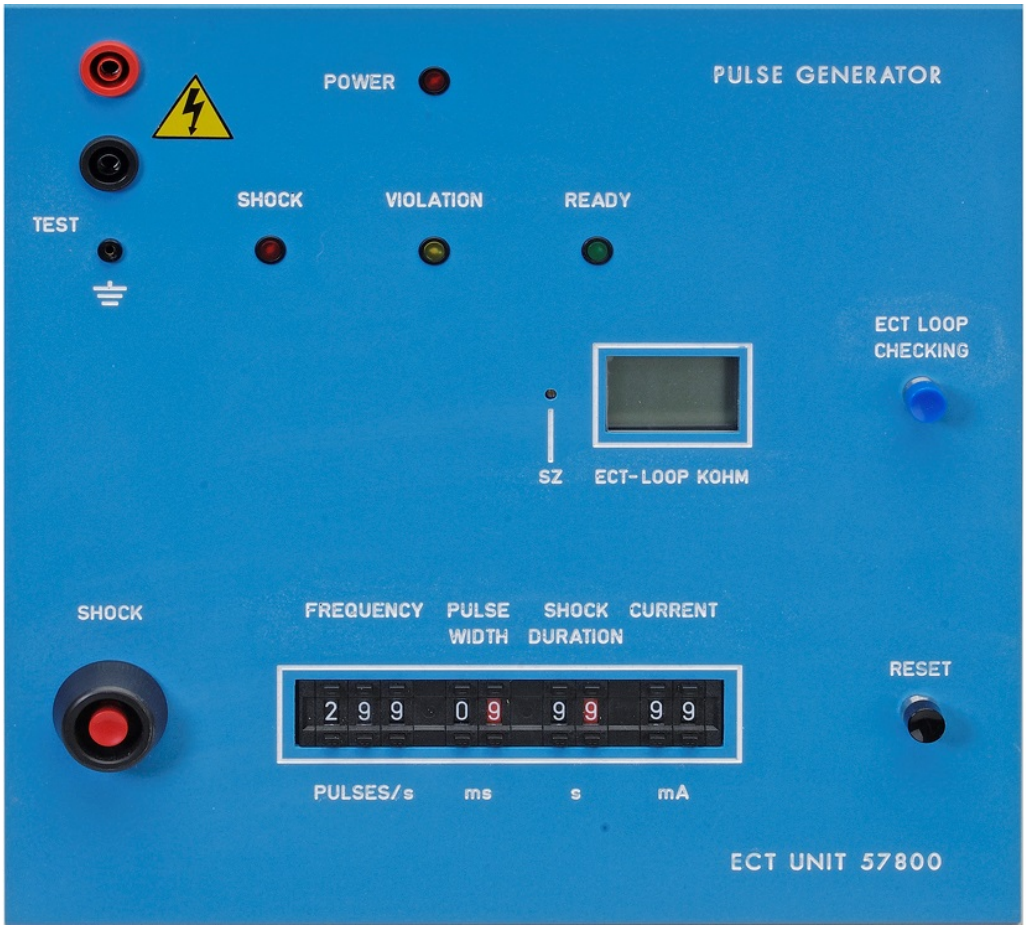

Figure 1 "Upper Panel"

Its upper panel, see Figure above, features the following controls:

2.1.2 Reset

When the apparatus is on, to deliver a shock, the circuit should first be reset by keeping the RESET key depressed (for about 1 second) until the illuminated green legend **READY** is **ON**.

This prevents inadvertent shock delivery due to accidentally depressing the shock key.

IF THE RESET AND THE SHOCK KEYS ARE ACCIDENTALLY DEPRESSED AT THE SAME TIME, THERE IS NO OPERATION.

2.1.3 Shock

This red key causes the instrument to deliver the shock pulse train. Once the RESET (green) LED is ON, **the SHOCK key should be depressed throughout the duration of the shock**, which is monitored by the illuminated red legend.

The shock duration timer (monitored by the red LED) is in fact independent on the time the key is depressed .

In other words, when releasing the shock key, you cut the power off.

This type of actuating arrangement operates as a safety device; even in the unlikely event of an electronic breakdown, no shock can be delivered unless the output stage is energized by the key in the depressed position.

2.1.4 Current Setting and "Violation"

The dual thumb-wheel "CURRENT" presets the shock current between 1 and 99 mA.

In the case the preset current cannot be delivered (for instance due to high animal impedance or to disconnected electrodes), the **VIOLATION** legend and the "beeper" come alive, see also paragraph 4.4-Electrode Positioning.

2.1.5 Shock Parameter Switches

These switches set the shock parameters, i.e., pulse width in ms, frequency in pulses per second, shock duration in seconds and current in mA.

2.2 Electrodes

The ECT Unit is provided as standard with **Auricular Electrodes 57800-002**.

Figure 2 "Auricular Electrodes"

Corneal Electrodes 57800-003 are also available as optional, see paragraph 9.1-Optional.

Figure 3 "Corneal Electrodes"

2.2.1 Electrode Checking

The electrodes can be switched to an internal ohmmeter circuit by depressing the ECT-LOOP CHECKING key.

The Ohmic resistance of the subject is thus displayed on the 2 ½ -digit LCD display, calibrated in KOhm, enabling the research worker to be sure that the electrodes are correctly located and that contact resistance is below 20-25,000 Ohm.

The Ohmic range is 0-199 KOhm. If the load resistance is over 199 KOhm, the display MSD (main significant digit) only (i.e., the left one) is energized and shows "**I**".

3 INSTALLATION

3.1 Unpacking & Preliminary Check

Check the contents of the shipment for completeness, packing list to hand, and visually inspect 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 ECT Unit fails to meet rated performances, please contact our after sales service, see paragraph 7.4-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 57800 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 7.4-Customer Support), specifying the serial number of your instrument.

3.3 General Safety Instructions

The following guidelines must be followed to ensure safe operation.

- ! **DO NOT** attempt to open or perform any service work
- ! **DO NOT** connect up human subjects

The EC treatment must be carried out on an unobstructed **non-conductive working surface**, e.g. , a wooden table, a tile covered laboratory bench, etc.

Ensure that the working surface is clean **and dry**. Conductive surfaces as top of metallic desks, cabinets, etc., must be avoided.

The ECT output is not “floating” and consequently the current would run through the subject’s body, following “wrong” paths, in case the conductive surface happens to be earthed. If the conductive surface is not earthed accidental contact with the operator or other laboratory people may be really dangerous.

! 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!

3.4 Before Applying Power

Consider the Power Module (see figure 4), 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.

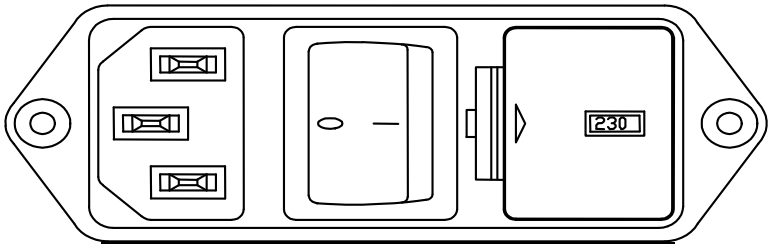

Figure 4, "Power Module"

3.4.1 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)

3.4.2 Fuse Holder

The fuse holder comprises two fuses, one on the live, and the other on the neutral. For operation at 220-230 Volts, we recommend 630 mA timed fuses (type T630). Use 800 mA fuses (type T800) for operation at 115 Volts. For fuse replacement, please refer to paragraph 7.1-Electrical.

3.4.3 Mains Cord

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

3.5 Intended Use

The ECT Unit is intended for investigation use on **laboratory animals only**.

3.6 Additional Safety Consideration

1) Use original accessories and spare parts only, see also paragraph 9-ORDERING INFORMATION.
2) immediately disconnect and replace damaged mains cord.
3) do not obstruct a comfortable access to the power module.
4) do not operate in hazardous environments or outside prescribed environmental limitations (i.e. +10c° / +40c°, 95% max. relative humidity, non-condensing), see also paragraph 8-ECT SPECIFICATIONS.
5) do not spray any liquid on the connectors and on the geared motor, see also paragraph 7-MAINTENANCE.
6) The operator should **always wear rubber gloves when handling electrodes** connected to the instrument in a live experiment. Do not remove the warning attached to the front panel!

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 the two electrode wires (red and black) to the corresponding socket receptacles (following the colour scheme) on the upper panel (see Figure 1 “Upper Panel”).

4 OPERATION

4.1 Switching On

Switch on the 57800 by acting on the Mains Switch placed on the back side of the instrument; see paragraph 3.4.1-Mains Switch and in particular Figure 2 “Power Module”.

4.2 Selecting Pulse Parameters

An ample range of settings is provided (see paragraph 8-ECT SPECIFICATIONS) to enable the researcher to reproduce most experimental schedules quoted in the literature.

As a suggestion, to get familiar with the instrument, the following parameters could be selected for a threshold EC seizures in a 25-30 g mouse:

- Current : 15-18 mA
- Shock Duration : 1 s
- Frequency : 100 pulses per second
- Pulse Width : 0.5 ms

4.3 Electrode Handling

! 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!

The ear electrodes should be dipped in Ringer or similar salty solution to soak the felt pads before clipping them to the animal's ears, to decrease contact resistance, which will further drop if grease and dirt are removed from the ears with cotton wool and ether before starting an experiment. In alternative, smear some conductive gel (e.g. the one commonly used for ECG practice) to the felt-pads on the ear electrodes.

The latter provision is not indispensable, since the subject's resistance is never a major problem: the main feature of the apparatus, the constant current output, ensures reproducible results irrespective of the position of the electrodes and skin/electrode interface conditions.

However, by providing the least possible load resistance, the output voltage for a given current set will also be the minimum possible, because of the Ohm's law.

This makes the whole experimenting safer and less demanding for the ECT Unit high voltage components.

4.4 Electrode Positioning

It is convenient to restrain the animal by holding its neck skin between forefinger and thumb and pressing it gently against the table, while applying the electrodes with the other hand.

We suggest to release the animal before administering the shock, as it is safer the operator hand to be far from the electrodes: despite the gloves, extra caution helps when handling high voltages.

Moreover, when convulsions take place, experience has shown that the animal may get hurt when restrained even by the hand of the operator, not to speak of any other holder, cubicle, tight harness, etc., which are definitely unsuitable.

When operating with mice, because of their small size and extreme motility, as soon the operator releases the animal, it may attempt to turn or jump or both in the legitimate effort to get rid of the electrodes. In this way the electrodes may come in contact over its head.

The instrument is protected against short circuits, so no damage will arise, but – of course – in case of a "short", there will be no ECT!

Experience will teach how to avoid shorts, how to prevent the wires to get entangled, etc. Some "dry runs" may also help to practice the technique of holding the animal, placing the electrodes, etc.

In the early stage of any experimental schedule, it is advisable to check the subject's resistance (see also paragraphs 2.2.1& 4.3). Do not get discouraged if you read 30-50,000 Ohm which may lead you to think, after a check on your pocket calculator, that a current of, say, 90 mA is unattainable.

The Ohmic resistance of the subject decreases in fact by a factor of 3-4 after the first shock pulse.

In any case, during the shock phase, if the preset current and the load are incompatible (see also 2.1.4), the yellow **VIOLATION** legend and the **beeper** come alive.

4.5 Shock Delivery

4.5.1 Shock/Reset Sequence

To deliver the shock, in case the green legend is **OFF** (see also paragraph 2.1.2-Reset), the circuit should be reset by holding the RESET key depressed for about one second.

The green legend lights, indicating that the apparatus is **READY**. Once the reset is done, depress the **SHOCK** key and hold it thoroughly depressed until the red legend **SHOCK** goes out (see also paragraph 2.2).

4.5.2 Pedal Switch

The shock can be delivered by an optional pedal switch, Cat. 57800-005, branched via the connector placed on the instrument back. The pedal switch which performs, from the circuit angle, the same function of the SHOCK key. See paragraph 4.5.1.

The pedal switch leaves both hands of the operator free, which may be helpful when using corneal electrodes, but involves **extra risk**.

EXERT EXTRA CAUTION!

5 TESTING

5.1 Output Monitoring by CRT

Being the ECT output a pulse signal, it is not possible to check its correct operation with a conventional volt/ammeter: the use of a CRT is indispensable to monitor shape, width and intensity of the pulses; moreover it is necessary to rely on a voltage divider, to handle a voltage which is not compatible with conventional oscilloscopes.

To monitor the output signal, connect first a non-inductive resistor, 10,000 Ohm, 10W, across the shock socket receptacles (red & black), to provide a convenient load. To test at max. power parameters, i.e., max. duration, max. current, etc., the load resistor power should go up to 30W. Three pieces 33 KOhm, 11 W, easily available on the market, connected in parallel, will do the job.

Then pick up the voltage to be monitored by CRT from the black socket receptacle on the front panel and the small black jack nearby (GND). Adjust the oscilloscope scale on 0.5V/division, .1 ms time base.

Operate the ECT Unit, setting shock duration to a somewhat large value (6 s) to provide a sufficient monitoring time. 0.2 Volt displayed on the CRT corresponds to a current

through the load of 10 mA. Maximum displayed voltage is 1.98 Volts, corresponding to 99 mA.

Pulse parameters as set by thumbwheel switches (see paragraph 2.1.5-Shock Parameter Switches) can be nicely visualized and measured; current adjusting is possible by acting on the appropriate trimmer pot., located on the main circuit board.

A simpler and safer way to monitor the ECT output is combining the ECT with our ECT Monitor **57800-015**, see paragraph 9.3-ECT Monitor 57800-015.

This useful accessory enables the researcher to connect the ECT Unit to an oscilloscope or a data acquisition system, without risking any damage due to accidental wrong connections.

5.2 Ohmeter Circuit Check

The ECT circuit check can be carried out after a five minutes warm-up time.

Depress the ECT-loop checking key (no matter whether the instrument is on READY or not).

W A R N I N G :

DO NOT PERFORM ECT-LOOP CHECKING DURING SHOCK DELIVERY!

The display will indicate one-blank-blank (see also paragraph 2.2.1-Electrode Checking) on the KOhm scale, which means over 200KOhm.

In fact, there is no “load” across the shock socket receptacles. Connect the electrodes to the socket receptacles by the appropriate fork terminals and short them, for instance by holding them together by 3-4 turns of small gauge copper wire wrapped around.

Depress the key again: the pointer will mark zero-zero KOhm.

For a possible zero adjusting, in case of deviation (e.g., the display shows zero-one), act on the S.Z. (set zero) trimmer pot. located aside the display.

As a further check, connect a 10,000 Ohm resistor across the socket receptacles. The display, when depressing the key, will indicate one-zero.

The purpose of this Ohmmeter is in fact to ascertain the continuity of the shock circuit and to give an order of magnitude of its resistance.

A mispositioned electrode, broken electrode wire, loose fork connection, dry felt pad/s, short circuit, etc., would otherwise be difficult to spot in the course of an experiment (see also paragraphs 2.2.1, 4.3 & 4.4.

6 CALIBRATION

6.1 Preliminary

Both frequency and duration of pulses are synchronized with the mains frequency, therefore they do not need any adjustment. At 1-2 year intervals, it is convenient to check the current scale exactitude.

In case a calibration is necessary, **it must be carried out at our laboratory only**. Calibration involves working unit where AC power is available when the upper panel is removed; personal injury or death may result from contact with high voltage circuit.

Please get in touch with our service department, see paragraph 7.4-Customer Support.

7 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 manual section describes normal maintenance procedures which can be carried out at your facility.

UNPLUG THE MAINS CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB!

7.1 Electrical

To inspect and/or replace the fuses, **disconnect the mains cable first!** Insert a miniature screwdriver in the slot indentation, see paragraph 3.4.2, and snap out the slide which houses the fuses. For operation at 230 Volts, we recommend 630 mA timed fuses (type T630). Use 800 mA fuses (type T800) for operation at 115 Volts.

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

7.2 Cleaning

The ECT Unit 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.

Keep electrodes clean for correct operation.

7.3 Long Inactivity

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

7.4 Customer Support

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

UGO BASILE s.r.l.
Via G. Di Vittorio 2
21036 GEMONIO – Varese, ITALY

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.

8 ECT SPECIFICATIONS

General	
Commands	via thumb-wheels
Read-out	liquid-crystal display
Starting	via keys on the electronic unit panel
Power Requirement	115 or 230 V, 50/60 Hz, 75 W max.
Operating Temperature	15° to 30° C
Sound Level	< 70 dB (A)
Shock Pulse Train	
Rectangular Positive Pulses	by H.V. Transformer
Constant Current	by feedback network
Pulse Rise & Fall Time	20 µs
Pulse Width (ms)	0.1 to 0.9 in 0.1 ms steps ± 1%
Frequency (pulses/s)	1 to 299 in 1 pulse/s steps ± 1%
Shock Duration	0.1 to 9.9 in 0.1 s steps ± 1%
Pulse Voltage	max. 2.5 KV

Current Range	1 to 99 mA in 1 mA steps ± 2%
Output Load (at max current)	min. 0 Ohm – max. 25 KOhm
KOhm Display	0 to 199 KOhm, 1 KOhm resolution
Physical	
Total Weight	3.42Kg
Shipping Weight	5.0Kg approx.
Dimensions	276(w)x37(d)x13(h)cm
Packing Dimensions	45x34x26cm
Warranty	
Warranty	57800 is covered by a 24-month warranty.

9 ORDERING INFORMATION

57800 **ECT Unit**, complete with following standard accessories:

57800-001 Pulse Generator

57800-002 Set of Auricular Electrodes

57800-320 Set of Felt Pads for Auricular Electrodes

E-AU 041 USB pen drive, including:

57800-302 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

9.1 Optional

57800-003 Set of Corneal Electrodes

57800-010 Bipolar Inverter (see paragraph 9.2)

57800-015 ECT Monitor, complete with connection cables (see paragraph 9.3)

9.2 Bipolar Inverter 57800-010

The purpose of the optional Inverter 57800-010 is to provide biphasic output, i.e., to alternate the polarity of the pulses delivered by ECT Unit 57800.

Because of the upper frequency operational limit of the reed-delays, the combination ECT-INVERTER can operate up to 100 Hz maximum. The Inverter has its own power

supply and relative mains connection. Its mains switch and fuses (T250mA) are located on the back panel.

A cable provided with LEMO 4-pin connector comes out from the back panel, to be plugged to the ECT's matching connector on the back panel; this cable brings the synchronizing signal to the Inverter, to operate its reed-relay switches.

The ECT output (a bipolar cable is provided) should be connected to the Inverter socket receptacles marked **FROM ECT 57800**).

The inverter socket receptacles marked **OUTPUT** will be connected to the electrodes choosen by the experimenter, either auricular or corneal.

Both ECT Unit and Inverter should obviously be ON for the biphasic operation. If the Inverter is accidentally OFF, there is no output. Switching on both instruments does not involve any priority problem, so to speak. Either one can be switched on fist.

The VIOLATION and ECT LOOP checking functions are operative even when the output passes through the Inverter.

During the shock phase, the Inverter buzzes at moderate but audible acoustic level. It isthe reed-relay operation which involves the vibration of metal reeds, inside glass ampoules. This slight noise doesn't mean "something is wrong": it is physiological.

9.3 ECT Monitor 57800-015

The Ugo Basile ECT Monitor has been designed to check (via an **Oscilloscope**) and/or to acquire (via a **Data Acquisition System**) the output signal of an UGO BASILE ECT 57800.The 57800-015 is fully isolated from the ECT Unit, in order to avoid ground loop and electrical shock.

With the multi-position selector, it is possible to change the gain ratio between the ECT current signal, and the voltage output signal of the 57800-015.

Gain up to x50 allows one to measure even small current across the electrodes.

Figure 5 "ECT Monitor"

9.3.1 How to Use the Device

Before operating the 57800-015, a simple setup procedure is necessary.

Connect the ECT unit to the Monitor 57800-015 using the cables provided: the larger cable connects to the “black socket receptacle”, the smaller one to the “ECT ground” socket, see Figure 4 “ECT Monitor – Back Panel”.

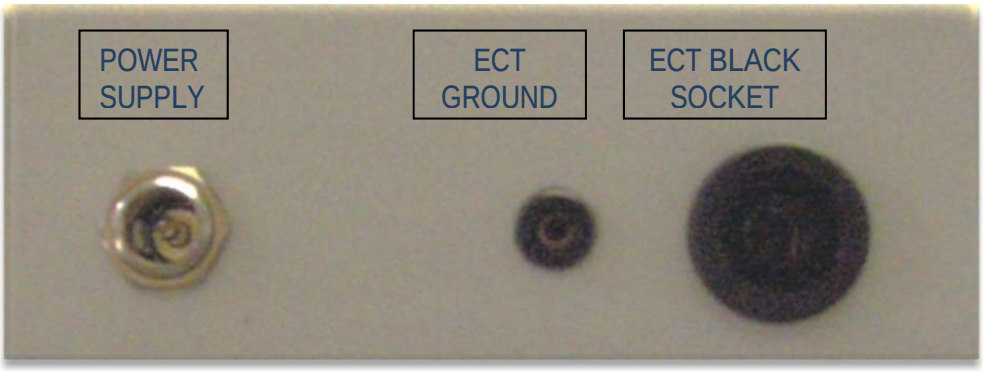

Figure 6 “ECT Monitor – Back Panel”

Connect the ECT Monitor to an Oscilloscope or a Data Acquisition System, using the BNC socket on the front panel.

The BNC cable is provided with the device, but any common BNC cable is ok to use.

The 57800-015 is now ready to be turned on; connect the power supply and turn on the acquisition system or oscilloscope.

9.3.2 Ratio Convertion and Examples

When the ECT Current is set on **1mA,** the ECT Output (GND-Black Socket receptacle) corresponds to **20mV.**

The following are some examples of the Output voltage at different ECT current settings:

ECT current	ECT-MONITOR Output (Gain x5)	ECT-MONITOR Output (Gain x10)	ECT-MONITOR Output (Gain x20)	ECT-MONITOR Output (Gain x50)
10mA	1V	2V	4V	10V
99mA	9.9V	11V distorted signal (*)	11V distorted signal (*)	11V distorted signal (*)
05mA	0.5V	1V	2V	5V

(*) the signal is distorted over 11V, because this is the voltage limit for the monitor.

9.3.3 Warnings

a. Be sure to connect the ECT to the 57800-015 in correctly. If the two socket are inverted, the output signal will be negative referred to ground. The instrument will not be damaged, but the output may not be visible.

b. When connecting the BNC signal output to any acquisition card, oscilloscope, or recording system, adjust the gain switch according to the current desired in the experiment. To avoid a distorted signal (max output +/-11V), be sure to adjust the gain appropriately. Increase gain for best resolution of lower currents.

Decrease gain when testing high current settings, so that output being monitored does not exceed the range of the ECT monitor.

As an electric shock will be supplied by the ECT unit, 57800-015 reproduces the same wave shape, converted in voltage.

c. Be sure to connect the BNC cable with the plus (hot) in the inner side and the shield (cold) in the outer side. Otherwise, the output signal will be inverted on the oscilloscope.

9.3.4 Monitor Specs.

- 100% tested for high-voltage breakdown
- Rated 1500Vrms, 5000Vrms (pulse 1msec)
- High IMR (Isolation Mode Rejection): 140dB@60Hz
- 50KHz Bandwidth
- 0.010% non linearity maximum
- bipolar operation: VO = +/-11V

10 BIBLIOGRAPHY

- M. Svensson et alia: “**Effect of Electroconvulsive Seizures on Cognitive Flexibility**” Hippocampus 26(7): 899-910, ***2016***
- J. Coppens et alia: “**Anticonvulsant Effect of a ghrelIn Receptor Agonist in 6Hz Corneally Kindled Mice**” Epilepsia 57(9): e195-e199, ***2016***
- F. Tomaciello et alia: “**Resveratrol Lacks Protective Activity Against Acute Seizures in Mouse Models**” Neuroscience Letters 632: 199-203, ***2016*** (*6Hz model*)
- R.J. Schloesser et alia: “**Antidepressant-like Effects of Electroconvulsive Seizures Require Adult Neurogenesis in a Neuroendocrine Model of Depression**” Brain Stimulation 8(5): 862–867, ***2015***
- A. Kretschmann et alia: “**Different MicroRNA Profiles in Chronic Epilepsy Versus Acute Seizure Mouse Models**” J. Molecular Neurosc. 55(2): 466-479, ***2015***

- O. J. Imoru et alia: "**Evaluation of Anticonvulsant Activity of Aqueous Leaf Extract of Telfairia occidentalis in Mice**" Eur. J. Medicinal Plants 5.3: 272-280, ***2015***
- M. Svensson et alia: "**Effect of Electroconvulsive Seizures on Pattern Separation"** Hippocampus 00: 1–10, ***2015***
- M.J. Benson et alia: "**A Novel Anticonvulsant Mechanism Via Inhibition of Complement Receptor C5ar1 in Murine Epilepsy Models**" Neurobiology of Disease 76:87-97, ***2015 (****Corneal Electrodes****)***
- L. Walrave et alia: "**Validation of the 6 Hertz Refractory Seizure Mouse Model for Intracerebroventricularly Administered Compounds**" Epilepsy Research 115: 67-72, ***2015*** (*6Hz model*)
- K. Leclercq et alia: "**Low potency and limited efficacy of antiepileptic drugs in the mouse 6 Hz corneal kindling model**" Epilepsy Research 108(4): 675-683, ***2014*** (*6Hz model*)
- K.M. Ryan et alia: "**Electroconvulsive Stimulation Alters Levels of BDNF-associated microRNAs**" Neuroscience Letters 549: 125–129, ***2013***
- N.K. Thomas et alia: "**Triheptanoin in Acute Mouse Seizure Models**" Epilepsy Research 99(3): 312-317, ***2012***
- S.A. Epps et alia: "**Seizure Susceptibility and Epileptogenesis in a Rat Model of Epilepsy and Depression Co-Morbidity**" Neuropsychopharmacol. 37: 2756-2763, ***2012***
- M. Gasior et alia: "**Anticonvulsant and Proconvulsant Actions of 2-deoxy-D-glucose**" Epilepsia 1-10, ***2010***
- A.L. Hartman et alia: "**Efficacy of the Ketogenic Diet in the 6-Hz Seizure Test**" Epilepsia 49(2): 334-339, ***2008***
- J.E. Ploski et alia: "**Electroconvulsive Seizure-Induced Gene Expression Profile of the Hippocampus Dentate Gyrus Granule Cell Layer**" J. Neurochemistry 99 (4): 1122-1132, ***2006***
- K. Takahashi et alia: "**Expression of Ndrg2 in the Rat Frontal Cortex After Antidepressant and Electroconvulsive Treatment**" Int. J. Neuropsychopharm. 8: 381-389, ***2005***
- R.M. Kaminski et alia: "**Allopregnanolone Analogs that Positively Modulate GABAA Receptors Protect against Partial Seizures Induced by 6-Hz Electrical Stimulation in Mice**" Epilepsia 45(7): 864-867, ***2004***
- C.A. Altar et alia: "**Electroconvulsive Seizures Regulate Gene Expression of Distinct Neurotrophic Signaling Pathways**" J. Neuroscience 24(11): 2667-2677, ***2004***

Notes

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CE CONFORMITY STATEMENT

Manufacturer	**UGO BASILE srl**
Address	Via G. di Vittorio, 2 – 21036 Gemonio, VA, ITALY
Phone n.	+39 0332 744574
Fax n.	+39 0332 745488

We hereby declare that

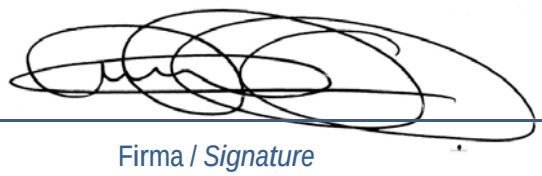
Instrument.	**ECT UNIT**
Catalog number	**57800**

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*