

Hardware User's Manual

LE12206

Double Digital Stimulator



References:

LE12206 (76-0057)

Version:

V12/06/2015

Limitation of Liability

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Some symbols may have more than one interpretation by professionals unaccustomed to their usage.

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1. SYMBOLS TABLE

Recognising the symbols used in the manual will help to understand their meaning:

DESCRIPTION	SYMBOL
Warning about operations that must not be done because they can damage the equipment	
Warning about operations that must be done, otherwise the user can be exposed to a hazard.	
Protection terminal ground connection.	
Warning about a hot surface which temperature may exceed 65°C	
Warning about a metal surface that can supply electrical shock when it's touched.	
Decontamination of equipments prior to disposal at the end of their operative life	
Waste Electrical and Electronic Equipment Directive (WEEE)	

2. GOOD LABORATORY PRACTICE

Check all units periodically and after periods of storage to ensure they are still fit for purpose. Investigate all failures which may indicate a need for service or repair.

Good laboratory practice recommends that the unit be periodically serviced to ensure the unit is suitable for purpose. You must follow preventive maintenance instructions. In case equipment has to be serviced you can arrange this through your distributor. Prior to Inspection, Servicing, Repair or Return of Laboratory Equipment the unit must be cleaned and decontaminated.



Decontamination prior to equipment disposal

In use this product may have been in contact with bio hazardous materials and might therefore carry infectious material. Before disposal the unit and accessories should all be thoroughly decontaminated according to your local environmental safety laws.

3. UNPACKING AND EQUIPMENT INSTALATION



WARNING: Failure to follow the instructions in this section may cause equipment faults or injury to the user.

- A. No special equipment is required for lifting but you should consult your local regulations for safe handling and lifting of the equipment.
- B. Inspect the instrument for any signs of damage caused during transit. If any damage is discovered, do not use the instrument and report the problem to your supplier.
- C. Ensure all transport locks are removed before use. The original packing has been especially designed to protect the instrument during transportation. It is therefore recommended to keep the original carton with its foam parts and accessories box for re-use in case of future shipments. Warranty claims are void if improper packing results in damage during transport.
- D. Place the equipment on a flat surface and leave at least 10 cm of free space between the rear panel of the device and the wall. Never place the equipment in zones with vibration or direct sunlight.
- E. Once the equipment is installed in the final place, the main power switch must be easily accessible.
- F. Only use power cords that have been supplied with the equipment. In case that you have to replace them, the spare ones must have the same specs that the original ones.



- G. Make sure that the AC voltage in the electrical network is the same as the voltage selected in the equipment. **Never connect the equipment to a power outlet with voltage outside these limits.**



WARNING

For electrical safety reasons you only can connect equipment to power outlets provided with earth connections .

This equipment can be used in installations with category II over-voltage according to the General Safety Rules.

The manufacturer accepts no responsibility for improper use of the equipment or the consequences of use other than that for which it has been designed.

PC Control

Some of these instruments are designed to be controlled from a PC. To preserve the integrity of the equipment it is essential that the attached PC itself conforms to basic safety and EMC standards and is set up in accordance with the manufacturers' instructions. If in doubt consult the information that came with your PC. In common with all computer operation the following safety precautions are advised.



- WARNING**
- To reduce the chance of eye strain, set up the PC display with the correct viewing position, free from glare and with appropriate brightness and contrast settings
 - To reduce the chance of physical strain, set up the PC display, keyboard and mouse with correct ergonomic positioning, according to your local safety guidelines.

4. MAINTENANCE



WARNING: Failure to follow the instructions in this section may cause equipment fault.

- **PRESS KEYS SOFTLY** – Lightly pressing the keys is sufficient to activate them.
- Equipments do not require being disinfected, but cleaned for removing urine, faeces and odour. To do so, we recommend using a wet cloth or paper with soap (which has no strong odour). **NEVER USE ABRASIVE PRODUCTS OR DISSOLVENTS.**
- **NEVER** pour water or liquids on the equipment.
- Once you have finished using the equipment turn it off with the main switch. Clean and check the equipment so that it is in optimal condition for its next use.
- The user is only authorised to replace fuses with the specified type when necessary.



Figure 1. Power inlet, main switch and fuse holder.

FUSE REPLACEMENT OR VOLTAGE SETTING CHANGE

In case of an over-voltage or other incident in the AC net making it impossible to turn on the equipment, or if the equipment voltage setting is incorrect, check fuses according to the following procedure.

- 1 Remove power cord from the power inlet.

- 2 Open fuse-holder by pulling the flange with a regular screwdriver.



Figure 2. Open fuse-holder door.

- 3 Extract fuse holder using the screwdriver.

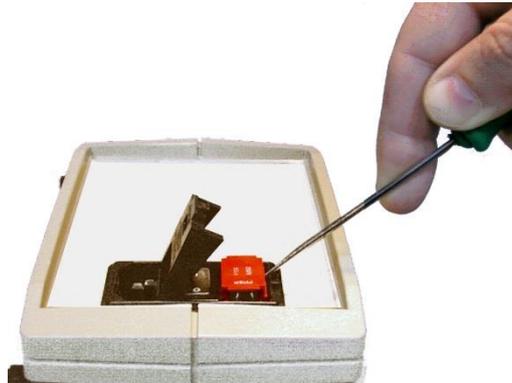
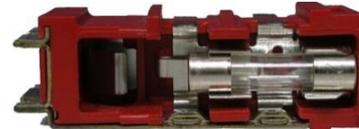


Figure 3. Extract fuse-holder.

- 4 Replace fuses if necessary. Insert fuses in the fuse-holder in the correct position.



CORRECT



INCORRECT

Figure 4. Fuses position.

- 5 Insert the fuse-holder again, positioning it according to the voltage in the AC net.



115V POSITON



230V POSITION

Figure 5 Fuse holder position.

- 6 If the fuses blow again, unplug the equipment and contact technical service.



For electrical safety reasons, never open the equipment. The power supply has dangerous voltage levels.

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6. INTRODUCTION

The Digital Stimulator LE 12206 is a microprocessor based instrument, which provides a wide range of stimulation with single/repetitive pulses of selectable constant voltage/current. The LE 12206 has the possibility of programming the appliance to develop double stimulation. It has two Time Bases and two Power Modules.

A carefully designed and self-explanatory set of front panel controls, make easy the full control of the stimulation parameters, and makes these models ideal for middle range applications.



Figure 6. LE 12206 Digital Stimulator.

The OUTPUT of the stimulation pulses is electrically floating from Ground, that is, it does not refer to Ground. In order to avoid the appearance of parasite signals and frequencies (50 or 60 Hz), it is necessary to keep in mind some precautions, as could be either not to “connect” the stimulated subject to Ground or to the metallic surface in contact with the subject.

It is something clear that it is not strictly necessary to take the aforementioned precautions, because it depends on the nature of the external electric conditions what determines the appearance or not of the interferences. Otherwise, BNC connectors, have their negative connected to Ground to monitor signal in case it was necessary.



WARNING: Do not touch the electrodes when the stimulator is working, you may receive electrical shock.

7. EQUIPMENT DESCRIPTION

7.1. CONTROL UNIT FRONT PANEL

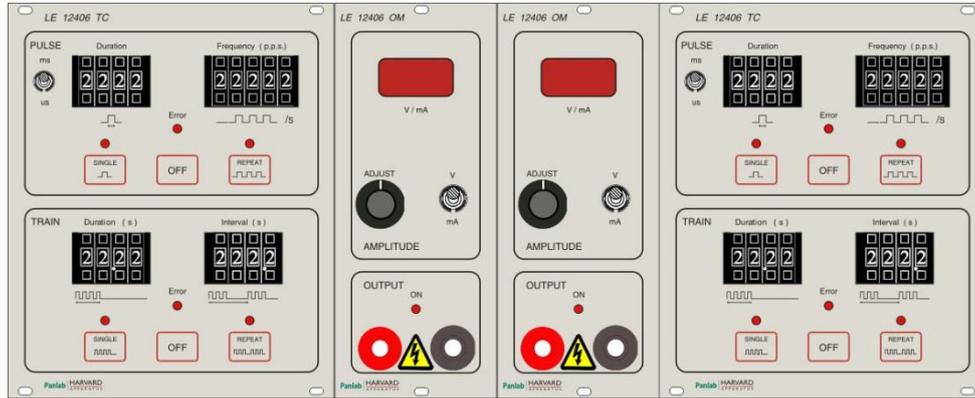


Figure 7. LE 12206 Front Panel.

LE 12206 has two time base modules and two power modules, to explain better the elements of these modules the description is done for each one.

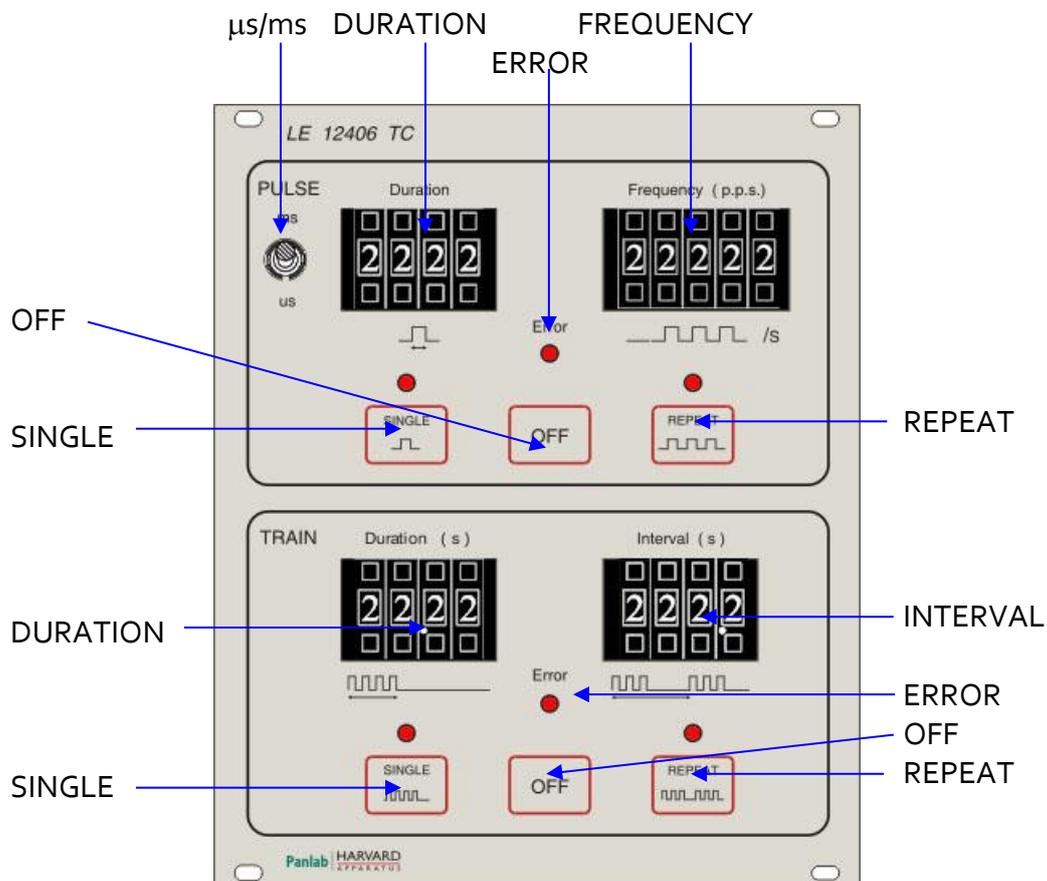


Figure 8. Time base module.

- **μs/ms:** Two-position switch that modifies pulse duration selected in the Duration decimal selector.
- **Pulse Duration:** Decimal selector with a range between 0001 and 9999. It is used to set pulse duration and the value is modified by the switch labelled μs/ms.
- **Frequency:** Decimal selector with a range between 00001Hz and 99999Hz. It is used to set the frequency for repetitive pulses.
- **Pulses Single:** When this button is pressed, a pulse of the selected duration is given.
- **Pulse Off:** When this button is pressed, the system exits from the Frequency mode.
- **Pulse Error:** This red led comes on for a few seconds when the Pulse Repeat button is pressed if parameters are not correct. This error occurs when frequency period is lower than pulse duration ($T=1/f$).
- **Pulse Repeat:** When this button is pressed, repetitive pulses are given at the selected frequency with the selected pulse duration if selected parameters are correct. Otherwise the error led comes on.
- **Train Duration:** Decimal selector with a range between 00.01s and 99.99s. It is used to set the duration of a train of pulses at the selected frequency with the selected pulse duration.
- **Train Interval:** Decimal selector with a range between 000.1s and 999.9s. It is used to set the interval at which a Train of pulses will be repeated when the Train Repeat button is pressed.
- **Train Single:** By pressing this button a Train of pulses is given during the selected time at the selected frequency with the selected pulse duration if parameters are correct. Otherwise the Train Error led will come on for a few seconds.
- **Train Error:** Red led that comes on when Train Single or Train Repeat buttons are pressed if parameters are not correct.
- **Train Repeat:** By pressing this button a Train of pulses is given at the selected interval if parameters are correct. Otherwise the Train Error led will come on for a few seconds.
- **Train Off:** When this button is pressed, the system exits from Train mode or Repeat Train mode.

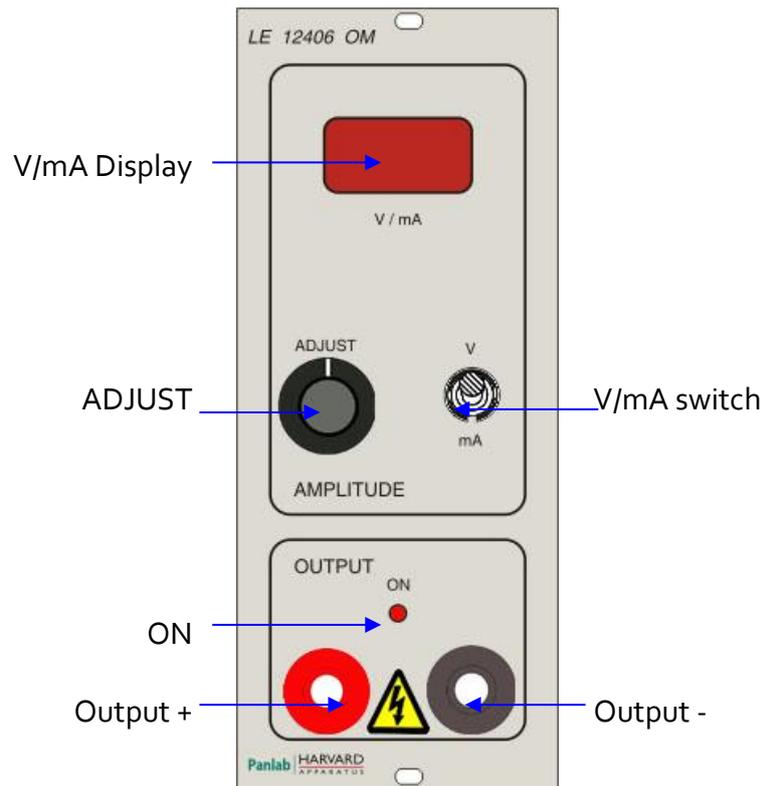


Figure 9. Power module.

- **V/mA Display:** Displays the amplitude of the voltage pulses between 0V and 100V or current pulses between 0 mA and 500 mA.
- **V/mA switch:** 2-position switch to select the mode (voltage/current).
 - Upper position: Sets the system in voltage mode.
 - Lower Position: Sets the system in current mode.
- **Adjust:** Potentiometer that sets the amplitude of voltage/current between 0V and 100V or 0 mA and 500 mA.
- **ON:** Two-colour led. When the output is active, it is green and blinks to the frequency of pulses. An overload is indicated when the led is red. The system enters overload state when there is a short-circuit in the output or output power is higher than module power for 3 minutes. In overload state there are no pulses in the output. To exit from overload state, solve the cause of the problem and wait for around seven minutes.
- **Output +:** Output positive terminal.
- **Output -:** Output negative terminal.

7.2. CONTROL UNIT REAR PANEL

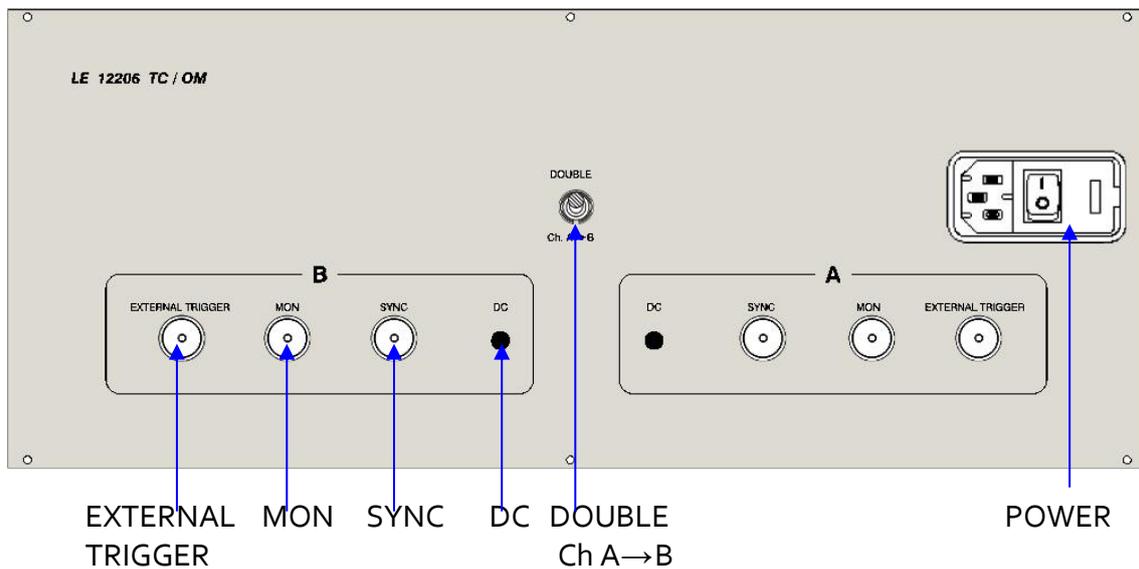


Figure 10. LE 12206 Rear Panel.

LE 12206 Rear Panel has independent BNC connectors for each time base.

- MON:** This BNC connector gives a TTL signal (5V amplitude) with the same pulse duration and frequency that the output signal; it is used if you want to monitor the pulses with an external instrument.
- SYNC:** This BNC connector gives a 50ms TTL pulse when Pulse Repeat  button is pressed.
- External Trigger:** When a TTL signal is applied to this BNC connector system gives pulses in the selected frequency whit the selected pulse duration. It has the same function that Pulse Repeat  button but only when the TTL signal is on.
- DC:** By pressing this button output is continuous while button is pressed.
- Power:** Main switch, fuse holder and power inlet.
- DOUBLE/Ch A→ B:** Two positions switch that sets the 2 time bases as independent (**Double**) or when it's in **Ch A→ B** and Train Repeat A  is pressed when it ends jumps to Train Duration B and then jumps to Train Interval A and so until Train Off button is pressed.
 - Upper position: Double.
 - Lower Position: Ch A→B.

8. EQUIPMENT CONNECTION

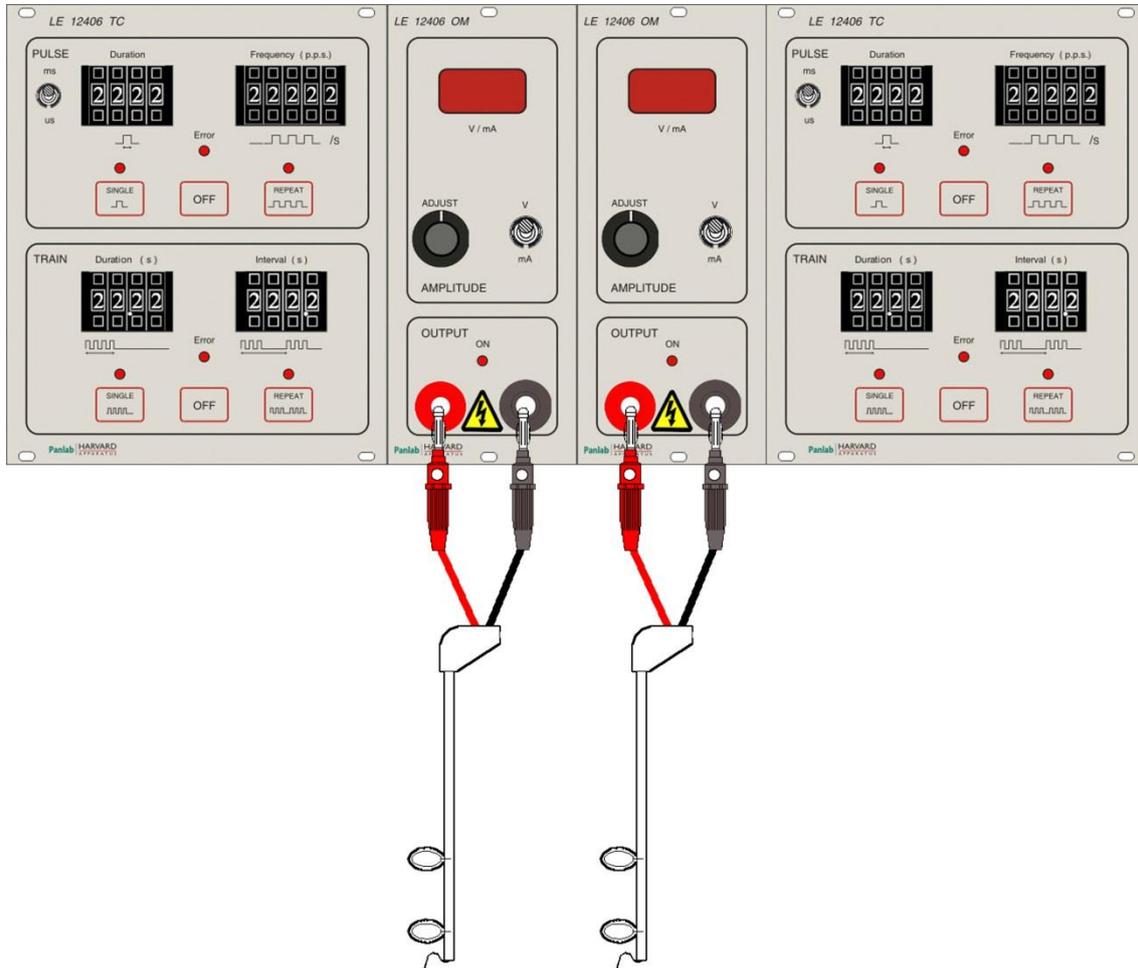


Figure 11. LE 12206 connections.

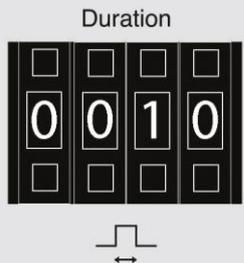
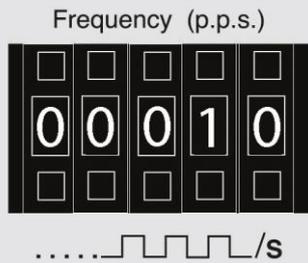
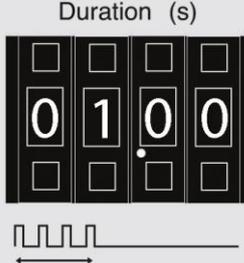
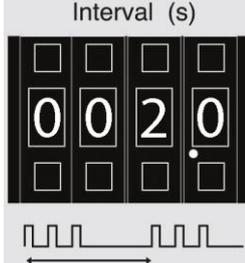
Just connect the electrodes to both positive and negative outputs of each Power Module. If you want to monitor pulses you can use MON output, as synchronism signal for Repeat Pulse you can use SYNC TTL output. To activate remotely with a TTL signal you can use External Trigger input.

9. WORKING WITH THE EQUIPMENT

9.1. TIME BASE

To illustrate the manner of working with the time base, an example is shown to clarify settings and the results attained when different buttons are pressed.

Assume that the decimal selectors have been set in the following way:

PULSE DURATION	FREQUENCY	TRAIN DURATION	INTERVAL
0010	00010	01,00	002,0
Duration	Frequency (p.p.s.)	Duration (s)	Interval (s)
			

9.1.1. Pulse Single Button

When the **Pulse Single**  button is pressed, a single pulse in the output will be obtained. The duration of this pulse is given by

the switch labelled $\mu\text{s}/\text{ms}$  and by the decimal selector labelled **Pulse Duration**

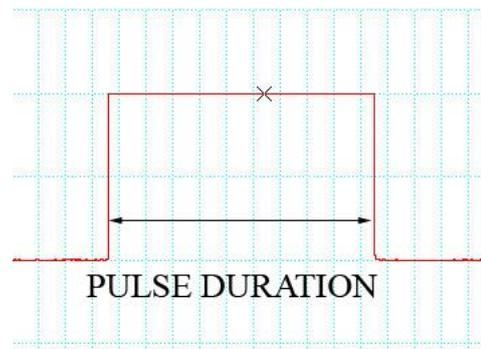
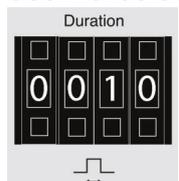


Figure 12. Single pulse.

In this example it will be $10\mu\text{s}$ or 10ms depending on the switch position.

9.1.2. Pulse Repeat Button

When the **Pulse Repeat**  button is pressed, the following is obtained:

- A repetitive pulse at the selected frequency with the selected pulse duration, if the Period is longer than Pulse duration. To exit from this state press the **Off** button.

- Error**
 , if the period is shorter than pulse duration.

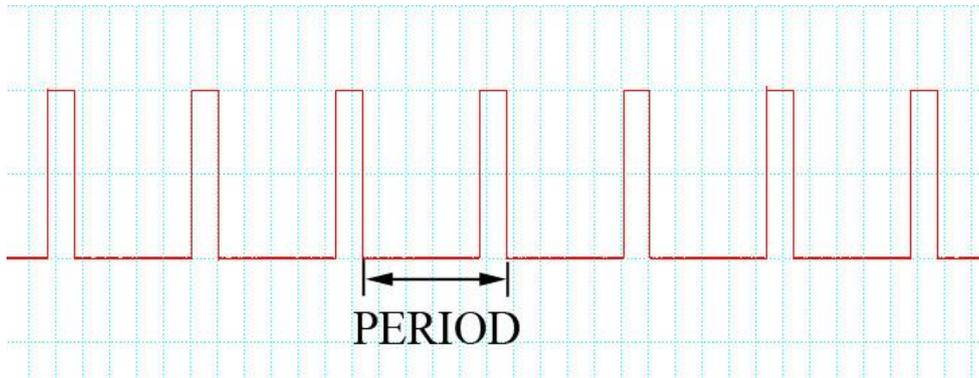


Figure 13. Repetitive Pulse.

Period is the inverse of frequency ($T=1/f$).

In this example, 10Hz pulses with duration of 10 μ s or 10ms will be obtained depending on the switch.

9.1.3. Single Train Button

When the **Single Train** button is pressed, the following is obtained:

- a) A train of pulses during the time selected in **Train Duration** with the selected **Frequency** and with the selected **Pulse Duration**, if all parameters are correct.

- Error**
 , if period is shorter than pulse duration.

- Error**
 , if train duration is shorter than period.

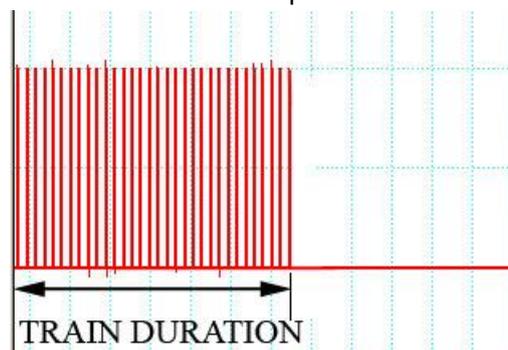


Figure 14. Train of Pulses.

To exit from this state, press button or wait until the time ends, as this button only gives a single train of pulses.

In this example, a train of pulses will be obtained over 1 second at 10Hz with a pulse duration of 10 μ s or 10ms depending on the switch.

9.1.4. **Repeat Train Button**

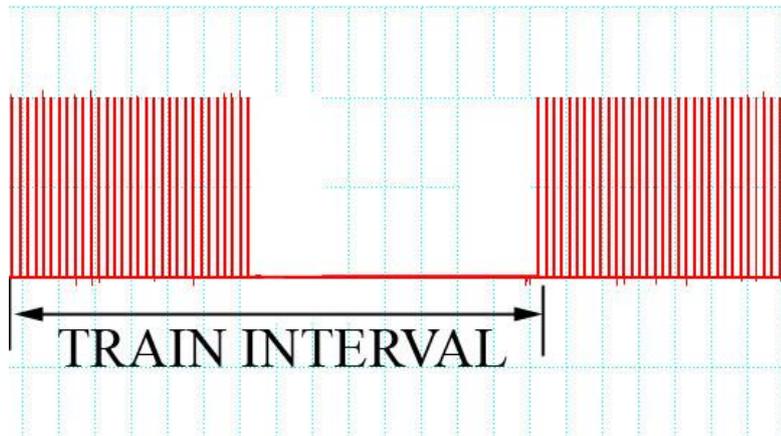


Figure 15. Repetitive Train of Pulses.



Pressing the **Repeat Train** makes it possible to obtain:

- a) A repetitive Train of Pulses every **Train Interval** time with the selected **Train duration** at the selected frequency with the selected pulse duration if all parameters are correct.

Error

- b)  , if period is shorter than pulse duration.

Error

- c)  , if train duration is shorter than period.

Error

- d)  , if Train interval is shorter than train duration.

When the system works correctly, exit from this state by pressing the  button.

In the example, a repetitive train of pulses every 2 seconds will be obtained. The train duration will be 1 second and will have 10Hz frequency with a pulse duration of 10 μ s or 10ms depending on the switch.

9.2. POWER MODULE

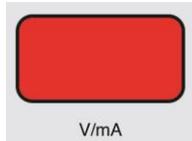
There are controls in the power module to select the kind of output (voltage or

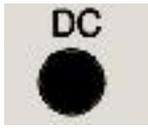
current) and the amplitude of pulses. With the  **V/mA** switch, choose voltage or current output.



With the  potentiometer you can select the amplitude of pulses from 0V to 100V in voltage mode or 0 mA to 500 mA in current mode. The value of the amplitude

can be seen on the display



There are two buttons labelled  on the rear panel. Each button is used to obtain a continuous output while it remains pressed in its respective power module.

9.3. ELECTRODES CLEANING

After each experiment the electrodes must be cleaned to remove traces of salts attached to them, to clean them you can dip them in distilled water and with a soft brush remove residual salts attached to them being careful in order not to damage the terminals of the electrodes.

You can also use an ultrasonic bath to remove salts remaining attached to the electrodes.

10. FREQUENCY LOWER THAN 1Hz

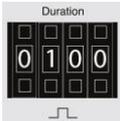
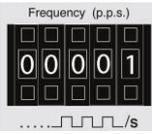
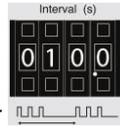
The minimum value in **Frequency** decimal selector is 1Hz. However, lower frequencies can be obtained by adjusting the train of pulses.

To do so, set the parameters as follows:

PULSE DURATION	FREQUENCY	TRAIN DURATION	INTERVAL
X	00001	01.00	T

- Pulse duration: Select the necessary value. The maximum value you can select is 999ms, if you select 1000ms you will obtain a continuous voltage, but if you select a value higher than 1000ms the equipment will give error because the pulse duration is higher than the period of the value selected in **Frequency** selector.
- Frequency: Select 1Hz.
- Train Duration: Select 1 second. This means a train of pulses of only 1 pulse duration will be obtained.
- Interval: Select the period for the frequency. The necessary condition is that T be greater than 1 second.

For example, if we wish to obtain 100ms pulses every 10 seconds (0,1Hz), We will proceed as follows:

1. Set the selector  in **ms** position.
2. Set to 0100 the pulse duration selector .
3. Set to 00001 the Frequency decimal selector .
4. Set to 01.00 the train duration decimal selector .
5. Set to 010.0 the train interval decimal selector .
6. Press **Train Repeat**  button in order to activate pulses.
7. Press **OFF**  button in order to stop pulses.

Using this technique, frequencies between 1Hz and 0.001001Hz can be obtained. Remember that period is the inverse of frequency $T=1/f$.

11. TROUBLESHOOTING

This table features instructions to solve the most frequent problems.

PROBLEM	SOLUTION
The equipment does not start up.	<ul style="list-style-type: none"> • Ensure that the voltage of mains is the same as that selected in the fuse holder. • Check the condition of the fuses.
Pressing the SINCLE PULSE button will not turn on the SINGLE led.	<ul style="list-style-type: none"> • Check that the selector PULSE DURATION is not set to 0000. • If the switch ms/μs is in μs and the value set of PULSE DURATION is low, led light can be as short as the human eye cannot appreciate.
Pressing REPEAT PULSE button the ERROR PULSE led is lit and there is no pulse output.	<ul style="list-style-type: none"> • Check that the period of time selected in the FREQUENCY selector is greater than the pulse duration selected PULSE DURATION.
Pressing the TRAIN DURATION button the ERROR TRAIN led lights and there is no pulse output.	<ul style="list-style-type: none"> • Check that the period of time selected in the FREQUENCY selector is greater than the pulse duration selected PULSE DURATION. • Ensure that the selected duration in DURATION TRAIN is greater than the selected duration in PULSE DURATION.
Pressing REPEAT TRAIN button the ERROR TRAIN led is lit and there is no pulse output.	<ul style="list-style-type: none"> • Check that the period of time selected in the FREQUENCY selector is greater than the pulse duration selected in PULSE DURATION. • Ensure that the selected duration in DURATION TRAIN is greater than the selected duration in PULSE DURATION. • Ensure that the selected duration in TRAIN INTERVAL is greater than the selected duration in DURATION TRAIN.
The LED ON is red and there are not power pulses.	<ul style="list-style-type: none"> • This occurs when there is an overload, a thermal switch to protect the circuit is triggered by cancelling the output. You must disconnect the load and wait a few minutes until the output transistor to cool sufficiently to reset the power module (the red LED turns off).

12. PREVENTIVE MAINTENANCE

	EXPERIMENT
ELECTRODES CLEANING	<input checked="" type="checkbox"/>
ELECTRODES CONNECTION CHECKING	<input checked="" type="checkbox"/>

13. TECHNICAL SPECIFICATIONS

<p>POWER SUPPLY Input voltage: Frequency: Fuse: Maximum Power: Conducted Noise:</p>	<p>115/230V~ 50 /60 Hz 2 fuses 5mm*20mm 2 A 250V Fast 70W EN55022 /CISPR22/CISPR16 class B</p>
<p>ENVIRONMENTAL CONDITIONS Operating temperature: Operating Relative Humidity: Storage temperature:</p>	<p>10°C to +40°C 0% to 85% RH, non-condensing 0°C to +50°C, non-condensing</p>
<p>TIME BASE Pulse Duration Range: Frequency Range: Train Duration Range: Train Interval Range:</p>	<p>0001µs to 9999µs 0001ms to 9999ms 00001Hz to 99999Hz 00.01s to 99.99s 000,1s to 999.9s</p>
<p>POWER MODULE: Voltage Range: Voltage mode overload Current Range: Output Power</p>	<p>0V to 100V 540mA 0mA to 500mA 50W maximum @ 3 minutes</p>
<p>DIMENSIONS Width x Height x Depth: Weight:</p>	<p>415mm x 190mm x 350 mm 11kg</p>

**DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITÉ**

Nombre del fabricante: **Panlab s.l.u.**
 Manufacturer's name: www.panlab.com
 Nom du fabricant: info@panlab.com

Dirección del fabricante: Energía, 112
 Manufacturer's address: 08940 Cornellà de Llobregat
 Adresse du fabricant: Barcelona SPAIN

Declara bajo su responsabilidad que el producto: **DIGITAL STIMULATOR**
 Declares under his responsibility that the product:
 Déclare sous sa responsabilité que le produit:

Marca / Brand / Marque: **PANLAB**

Modelo / Model / Modèle: **LE 12206**

Cumple los requisitos esenciales establecidos por la Unión Europea en las directivas siguientes:
 Fulfills the essential requirements established by The European Union in the following directives:
 Remplit les exigences essentielles établies pour l'Union Européenne selon les directives suivantes:

2006/95/EC	Directiva de baja tensión / Low Voltage / Basse tension
2004/108/EC	Directiva EMC / EMC Directive / Directive CEM
2012/19/EU	La Directiva de Residuos de Aparatos Eléctricos y Electrónicos (WEEE) / The Waste Electrical and Electronic Equipment Directive (WEEE) / Les déchets d'équipements électriques et électroniques (WEEE)
2011/65/EU	Restricción de ciertas Sustancias Peligrosas en aparatos eléctricos y electrónicos (ROHS) / Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (ROHS) / Restriction de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques (ROHS)
2006/42/EC	Directiva mecánica / Machinery directive / Directive mécanique

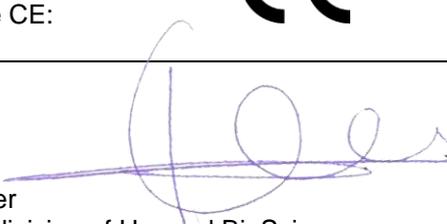
Para su evaluación se han aplicado las normas armonizadas siguientes:
 For its evaluation, the following harmonized standards were applied:
 Pour son évaluation, nous avons appliqué les normes harmonisées suivantes:

Seguridad / Safety / Sécurité:	EN61010-1:2011
EMC:	EN61326-1:2013 Class B
Safety of machinery:	EN ISO 12100:2010

En consecuencia, este producto puede incorporar el marcado CE:
 Consequently, this product can incorporate the CE marking:
 En conséquence, ce produit peut incorporer le marquage CE:



En representación del fabricante:
 Manufacturer's representative:
 En représentation du fabricant:


 Carme Canalís
 General Manager
 Panlab s.l.u., a division of Harvard BioScience

Cornellà de Llobregat, Spain
 30/04/2014

(GB) Note on environmental protection:



After the implementation of the European Directive 2002/96/EU in the national legal system, the following applies:

Electrical and electronic devices may not be disposed of with domestic waste. Consumers are obliged by law to return electrical and electronic devices at the end of their service lives to the public collecting points set up for this purpose or point of sale. Details to this are defined by the national law of the respective country. This symbol on the product, the instruction manual or the package indicates that a product is subject to these regulations. By recycling, reusing the materials or other forms of utilising old devices, you are making an important contribution to protecting our environment.

(E) Nota sobre la protección medioambiental:



Después de la puesta en marcha de la directiva Europea 2002/96/EU en el sistema legislativo nacional, Se aplicara lo siguiente:

Los aparatos eléctricos y electrónicos, así como pilas y baterías, no se deben tirar a la basura doméstica. El usuario está legalmente obligado a llevar los aparatos eléctricos y electrónicos, así como pilas y baterías, al final de su vida útil a los puntos de recogida municipales o devolverlos al lugar donde los adquirió. Los detalles quedaran definidos por la ley de cada país. El símbolo en el producto, en las instrucciones de uso o en el embalaje hace referencia a ello. Gracias al reciclaje, a la reutilización de materiales i a otras formas de reciclaje de aparatos usados, usted contribuirá de forma importante a la protección de nuestro medio ambiente.

(F) Remarques concernant la protection de l'environnement :



Conformément à la directive européenne 2002/96/CE, et afin d'atteindre un certain nombre d'objectifs en matière de protection de l'environnement, les règles suivantes doivent être appliquées.

Elles concernent les déchets d'équipement électriques et électroniques. Le pictogramme "picto" présent sur le produit, son manuel d'utilisation ou son emballage indique que le produit est soumis à cette réglementation. Le consommateur doit retourner le produit usager aux points de collecte prévus à cet effet. Il peut aussi le remettre à un revendeur. En permettant enfin le recyclage des produits, le consommateur contribuera à la protection de notre environnement. C'est un acte écologique.

(D) Hinweis zum Umweltschutz:



Ab dem Zeitpunkt der Umsetzung der europäischen Richtlinie 2002/96/EU in nationales Recht gilt folgendes:

Elektrische und elektronische Geräte dürfen nicht mit dem Hausmüll entsorgt werden. Der Verbraucher ist gesetzlich verpflichtet, elektrische und elektronische Geräte am Ende ihrer Lebensdauer an den dafür eingerichteten, öffentlichen Sammelstellen oder an die Verkaufsstelle zurückzugeben. Einzelheiten dazu regelt das jeweilige Landesrecht. Das Symbol auf dem Produkt, der Gebrauchsanleitung oder der Verpackung weist auf diese Bestimmungen hin. Mit der Wiederverwertung, der stofflichen Verwertung oder anderer Formen der Verwertung von Altgeräten leisten Sie einen wichtigen Beitrag zum Schutz unserer Umwelt.

(I) Informazioni per protezione ambientale:



Dopo l'implementazione della Direttiva Europea 2002/96/EU nel sistema legale nazionale, ci sono le seguenti applicazioni:

I dispositivi elettrici ed elettronici non devono essere considerati rifiuti domestici. I consumatori sono obbligati dalla legge a restituire i dispositivi elettrici ed elettronici alla fine della loro vita utile ai punti di raccolta collerici preposti per questo scopo o nei punti vendita. Dettagli di quanto riportato sono definiti dalle leggi nazionali di ogni stato. Questo simbolo sul prodotto, sul manuale d'istruzioni o sull'imballo indicano che questo prodotto è soggetto a queste regole. Dal riciclo, e re-utilizzo del material o altre forme di utilizzo di dispositivi obsoleti, voi renderete un importante contributo alla protezione dell'ambiente.

(P) Nota em Protecção Ambiental:



Após a implementação da directiva comunitária 2002/96/EU no sistema legal nacional, o seguinte aplica-se:

Todos os aparelhos eléctricos e electrónicos não podem ser despejados juntamente com o lixo doméstico. Consumidores estão obrigados por lei a colocar os aparelhos eléctricos e electrónicos sem uso em locais públicos específicos para este efeito ou no ponto de venda. Os detalhes para este processo são definidos por lei pelos respectivos países. Este símbolo no produto, o manual de instruções ou a embalagem indicam que o produto está sujeito a estes regulamentos. Reciclando, reutilizando os materiais dos seus velhos aparelhos, esta a fazer uma enorme contribuição para a protecção do ambiente.