

OPERATION MANUAL

Device type	HELIO-STROB tripLED
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1. GENERAL INFORMATION

1.1 Use

1.1.1 Appropriate use

The *HELIO-STROB tripLED* is a stroboscope (strobe light) for industrial applications. This device is used to produce snapshots of sequences which, due to the rapidity with which they proceed, are not perceivable by the human eye.

- Appropriate use also includes reading and understanding these operating instructions and complying with the information given in them, especially the safety information. This also includes carrying out all the inspection and maintenance work at the specified intervals.
- The operation of stroboscopes may cause failure or interference of nearby radio devices or radio service. In this case, suspend the operation of the device. As a basic principle, keep the operation of the device as short as possible.
- Any work with the *HELIO-STROB tripLED* may be only performed by adequately instructed personnel that meet the requirements for a proper and intended use of the device.
- Safe operation cannot be assured if the *HELIO-STROB tripLED* is not used in accordance with the above definition of appropriate use.

1.1.2 Inappropriate use

- Any use other than what is described in the section “Appropriate use” is considered inappropriate use!
- The user, not the producer, shall assume any liability related to any personal injury or material damage resulting from the inappropriate use of the device!



Operating the device in explosion-prone environments is prohibited.

1.2 Technical terms used

1.2.1 Explanations of terms



The following explanations of terms are provided for a better understanding of the functionality of the *HELIO-STROB tripLED*.

Term	Explanation
triggering	trigger impulses for the flash rate (internal / external)
rising edge	The flash tube flashes at a change in the trigger signal from "0" to "1".
falling edge	The flash tube flashes at a change in the trigger signal from "1" to "0".
flash rate	number of flashes per time unit
display	display for indication of set values
fpm	flashes per minute (revolution speed per minute of the observed object)
fps	flashes per second (frequency per second of the observed object)
phase shift	positioning of the observed object (e.g. marking) to any observation point (0° - 540°)
slow motion	constantly changing phase shift
transformation ratio	factor by which an external trigger signal is divided or multiplied
touch panel	screen surface operated by touch

1.2.2 Definitions

Term	Explanation
electrical hazard	risk of possible severe injury or the impairment of health due to electrical energy
electrically skilled person	person with suitable technical training, knowledge and experience to be able to identify and avoid the hazards that can be associated with electricity
qualified person	person with suitable technical training, knowledge and experience to be able to identify and avoid hazards
electrically instructed person	person who has received adequate instruction from electrically skilled persons to be able to avoid hazards associated with electricity
instructed person	person who has received adequate instruction from qualified persons to be able to avoid hazards
supervisor	person appointed to bear direct responsibility for the completion of the work – this responsibility can be transferred in part to other persons when required

1.3 Design

Special emphasis was placed on safety in the course of developing the *HELIO-STROB tripLED* devices.

The devices are built according to the recognised European safety-related rules and correspond to the state of the art at the time of delivery.

The basic construction of the *HELIO-STROB tripLED* includes the following components:

Housing	full metal housing with tripod connection and handle	
Power supply	rechargeable battery (permanently installed) / AC adapter	
Operation	twist knob and touch panel	
Display	LCD display	
Connection	7-pin jack	(power supply)
	5-pin jack	(triggering IN / OUT)
	USB jack type B	(serial interface)



To exclude electrical hazards, any changes to the device may only be made by trained electrically skilled persons authorised by the manufacturer.

Take special care when opening the device, since it is possible to touch parts carrying a voltage that is considerably higher than the supply voltage.

Working on the device is only permitted after waiting 2 or more minutes after shutting it off. In case of mains operation, the device also has to be disconnected from the mains network. This is due to the hazards of possible residual charges in electronic components.

1.4 Functional description

A stroboscope is a device that emits very short flashes of light (usually in ranges around a few μs) at a consistent time interval and in the selected number per second (frequency in Hz).

Fast, periodically recurrent movements such as rotation, oscillation or pressure processes that cannot be clearly perceived by the naked eye can be observed, optically stopped or measured through manual or external synchronisation of the repetition frequency with the flash rate of the stroboscope. Thus, the repetition frequency can be determined.

Through special functions, the sequence of movements can be optically slowed down (slow motion) or the observed point in time of a periodical movement process can be determined precisely (phase shift).

It can be used separately or also in combination with cameras or other light-sensitive devices / sensors.

1.5 Performance characteristics

The *HELIO-STROB tripLED* device type features the following performance characteristics:

- Internal / external triggering
- Phase shift
- Slow motion function
- Transformation ratio
- Display of system errors
- Serial interface

1.6 Applied standards

All *HELIO-STROB tripLED* devices are subject to extensive device safety and EMC testing, and bear the CE marking.

They meet the requirements of the following regulations and directives:

- Directive 2004/108/EC (EMC)

1.6.1 Declaration of conformity

DECLARATION OF CONFORMITY

ELMED Dr. Ing. Mense GmbH
Weilenburgstr. 39
D-42579 Heiligenhaus
Germany

hereby declares that the product

Device type **Stroboscope**

Type designation **HELIO-STROB tripLED**

complies with the regulations of the following European directives:

Directive 2004/108/EC - EMC

Further information about compliance with this directive is found in the attachments.

Comments:

The test reports can be reviewed by request.

ELMED Dr. Ing Mense GmbH

Heiligenhaus, 01.12.2015

CEO / Managing Director



Claudia Mense

The attachments are part of this declaration.

This declaration confirms compliance with the named directives,
but does not include any warranties of characteristics in a legal sense.

The safety information in the supplied product documentation must be observed.

1.6.2 Attachment to the declaration of conformity

Attachment to the declaration of conformity

The final digits of the year in which the CE marking was applied:

16

Attachment to the declaration of conformity (EMC)

Compliance of the named product with the regulations of Directive 2004/108/EC is proven by full compliance with the following standards:

Harmonised European standards:

DIN EN 61000-6-1

DIN EN 61000-6-3

1.7 Modifications

Modifications by the device operator without consulting the manufacturer are prohibited in principle. Modifying the device without consulting the manufacturer voids the warranty. The device operator assumes full liability for the consequences of unauthorised modifications. Design engineering modifications that have such significant effects on the technical specifications and appropriate use defined in this operation manual so as to change the device considerably void the declaration of conformity!

1.8 Measurement units

The following thread standards are used in all technical documentation and drawings:

- Metric system (ISO)
- UNC (Unified Thread Standard)

1.9 Packaging / Transportation / Storage / Delivery

1.9.1 Packaging

To prevent transportation damage, all components are packaged and supplied in sturdy transport packaging (plastic case/carton). The transport packaging is designed for air freight and lorry transportation.

The following ambient conditions apply for transportation:

- Temperature range -20 °C ... +50 °C
- Air humidity no condensation
- Thermal time constant < 10 K/h

Attention:

Extreme impacts and vibrations can cause damage!

The transport packaging must be protected against direct contact with water and high air humidity!

All of the packaging materials used correspond to the regulations of the destination country and can be disposed of according to the applicable regulations and laws.

1.9.2 Storage

Until putting into operation, the transport packaging can be used for storage. The transport packaging must be protected against direct contact with water and high air humidity. If you have questions about transportation or storage, please contact the manufacturer.

The following ambient conditions must be met for storage:

- Temperature range -20 °C ... +50 °C
- Air humidity no condensation
- Thermal time constant < 10 K/h

1.9.3 Delivery

Immediately upon receipt, the delivery has to be inspected for integrity and completeness.

Scope of delivery:

The type and scope of delivery is documented on the enclosed delivery note. The standard scope of delivery consists of the following components:

- *HELIO-STROB tripLED* hand-held stroboscope
- Mains unit / charger
- Operation manual
- 5-pin male jack, triggering IN / OUT
- Transport box

Receiving inspection:

Complaints regarding the type and scope of delivery have to be submitted to the manufacturer immediately after delivery, no later than within 5 days.

Damages:

Contact the final carrier immediately in case of transportation damage!
Keep the transportation packaging until the completeness and integrity of the delivery have been verified.

2. SAFETY-RELATED INFORMATION

2.1 General safety instructions



Read the following safety instructions prior to putting into operation.

Do not put the device into operation if you have concerns about safety.

Contact the manufacturer if you have questions about safety.

2.2 User's due diligence

All *HELIO-STROB tripLED* devices were designed and built with due consideration of a hazard analysis and according to the carefully selected applicable harmonised standards, as well as other technical specifications. They meet the requirements of the Equipment Safety Act, which means they are state-of-the-art and guarantee the highest safety standards.

In operational practice however, this safety can only be achieved if all necessary measures have been taken. Planning and implementing these measures as well as verifying proper compliance falls under the user's due diligence.

In particular, the operator is required to ensure that:

- the *HELIO-STROB tripLED* is only used as intended.
- devices are operated only in proper, fully functional condition.
- the operation manual, legible and complete, is available at the operating site of the devices at all times.
- the devices are operated only by adequately qualified and authorised personnel which is regularly trained in all aspects related to occupational health and safety; the personnel is familiar with and follows the operation manual, especially the relevant safety information contained therein.
- all safety and warning labels are clearly legible and none of them are removed from the device.

2.3 Safety symbols and their meaning

Safety symbols impart safety information through a combination of:

- geometric shape
- colour
- graphical symbol / text

They are used both on the device and in the operation manual to point out situations with a possible hazard potential quickly and clearly.

All safety-related passages in this operation manual are highlighted with one of the following safety symbols. Provide all persons working with the device with the safety information.

Special symbols indicate important information that must be strictly observed.

The following symbols are used in this operation manual:



This symbol indicates a hazardous situation which, if it is not avoided, can lead to serious injuries or death.



This symbol indicates a warning of hazardous electrical voltage.



This symbol indicates important information in the operation manual that must be strictly observed.



This symbol warns the user against staring into the light source.



This symbol indicates information provided for improving the understanding of processes.

2.4 Basic safety measures

The fundamental safety directives and regulations of the Employer's Liability Insurance Association and national authorities apply for the operation of the devices.

Before the initial start-up, the stroboscope and all accessories have to be inspected for proper and functional condition, and accepted and released by a supervisor.



In commercial operations the employer / entrepreneur has to inform the employees / insured persons about possible hazards related to their work and the safety precautions to be applied.



- Do not look into the flash tube directly and unprotected as this could be dangerous for the eyes – especially over longer periods of time.
- Due to the dazzle effects caused by looking into the LEDs at short distances, the ability to see may be disturbed in such manner as to make orientation impossible.
- LED rays must not be aimed at the eyes of persons or animals.
- Using strongly focussing optical instruments to view the beam of light is not permitted.



Ultra-bright LEDs radiate similar bundled light as lasers. Accordingly, the same regulations shall apply for LEDs – especially at distances of less than one metre. However, due to the general large radiation divergence and the laminar source expansion, performance LEDs do not have a similar hazard potential as bundled laser radiation.

2.5 Requirements concerning the operating personnel

The devices may only be operated by persons who have been instructed and authorised accordingly. These persons must have read and understood the operation manual, in particular the section “SAFETY-RELATED INFORMATION”, and then act accordingly.

They must have been instructed in the basic principles of health and safety at work and accident prevention.

2.6 Help with safety-related questions

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2.7 Specific warnings



The persons listed below have to be informed of the hazards described in the following.

2.7.1 Wearers of active implants



Safety information for wearers of active implants

When using stroboscopes, an influence on active implants (e.g. pacemakers) cannot be completely excluded. For safety reasons we recommend that people wearing active implants are excluded from working with stroboscopes. Persons wearing active implants have to be expressively instructed in this regard.

2.7.2 Epileptics



In case of users with a neurological proneness to epileptic seizures, the light effects produced by a stroboscope may cause photo-induced epilepsy. Users with such predisposition must not use stroboscopes!

3. TECHNICAL DATA / INPUTS & OUTPUTS

3.1 Technical data

Power supply	12.4 VDC (nominal voltage)
Power consumption	max. 14 W (without charging module)
Dimensions of the case	182.5 x 117 x 117 mm ³ (handle not included)
Weight	ca. 1.2 kg
Light source	15 CREE high-performance LEDs
Internal control of the flash rate	twist knob and touch panel
External control of the flash rate	pos. impulses 5 to 30 V (triggering edge individually adjustable)
Signal propagation delay for external triggering	approx. 51 µs
Internal flash rate in Hz / fpm	1 - 840 Hz / 60 - 50400 fpm
External flash rate in Hz / fpm	1 - 8000 Hz / 60 - 480000 fpm, incoming flash rates > 845 Hz are split integrally.
Measurement duration	0.33 s (min. 1 period)
Measuring value display	LCD screen, height of digits 8.5 mm
Display in	fps / fpm
Display resolution	up to 0.01 Hz / 0.1 fpm
Phase shifting in	degree / ms
Range degree / ms	0° - 540° / 0 - 999.99 ms
Resolution degree / ms	0.1° / 0.001 - 0.01 ms
Slow motion	fps / fpm
Resolution fps / fpm	-5 fps - +5 fps / -300 fpm - +300 fpm
Resolution slow motion	0.01 Hz / 0.1 fpm
Variable transformation ratio (external triggering)	1:10 - 10:1
Resolution variable transformation ratio	0.001
Flash duration	< 100 Hz: 1 - 100 µs (adjustable) > 100 Hz: 1 µs – max. 1 % of the period duration of the configured flash rate
Light output	max. 0.17 Ws
Light intensity	max. 5500 Lux (distance: 50 cm)
Accuracy	0.01 % ± 1 digit
Operating temperature	0° ... +40° C
Storage temperature	-20° ... +50° C
Air humidity	80% relative air humidity at 30° C

Power Supply – battery mode

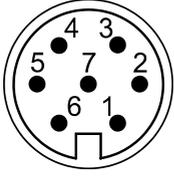
Battery type	lithium-ion battery
Output voltage	10.8 V
Capacity	2900 mAh
Charging cycles	approx. 200 - 300
Battery life (performance-related)	approx. 8 Std. (at 50 Hz / 50 μ s flash duration)
Charging time	approx. 3 hours

Mains unit / charger

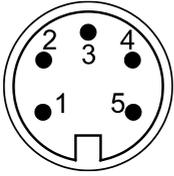
Input voltage	100 - 240 VAC / 50 - 60 Hz
Output voltage	12.4 VDC 0 - 1.2 A (without charging module)
Operating temperature	0° C ... +40° C
Storage temperature	-20° C ... +50° C
Dimensions	105 x 82 x 42 (mm)
Weight	approx. 200 g

3.2 Inputs / Outputs

3.2.1 Connector pin assignment POWER jack

Jack	Pin	Description
	1	BATT -
	2	NTC
	3	BATT +
	4	nc
	5	AUX +
	6	AUX -
	7	nc

3.2.2 Connector pin assignment IN/OUT jack

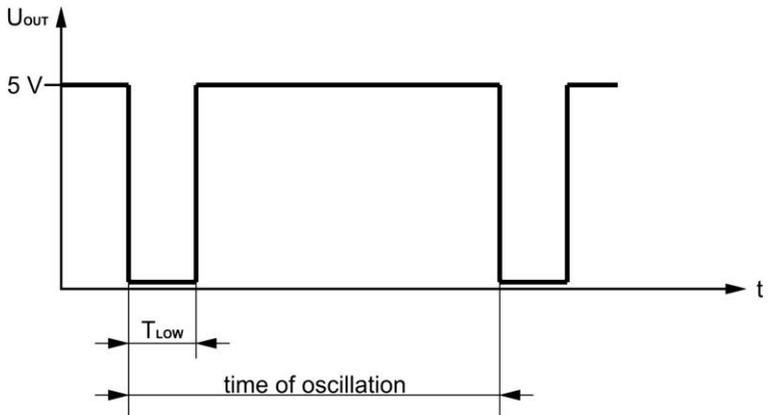
Jack	Pin	Description
	1	0 V (ground)
	2	+5 VDC (output)
	3	+12 VDC (output)
	4	Trigger OUT
	5	Trigger IN

3.2.3 Trigger output



The *HELIO STROB tripLED* is equipped with a trigger output (Trigger OUT), for example to control other devices. The signal on the IN/OUT jack depends on the TTL level. The period duration depends on the flash rate; T_{LOW} is constant (200 μ s). If the stroboscope is controlled by an external signal, the output frequency corresponds to the input frequency up to 845 Hz. For frequencies > 845 Hz up to 8000 Hz a signal that is divided in integer numbers is supplied to the trigger output. The undivided frequency of the external signal source is shown on the display.

Signal sequence:



4. INITIAL STARTUP

4.1 General information for putting into operation

In order to avoid damage to the device or injuries during putting into operation, observing the following points is essential:



- The initial startup may only be performed by qualified persons under observation of the operation manual and the safety information.
- Switching on the device is only permitted after verifying that proper and safe operation is ensured.

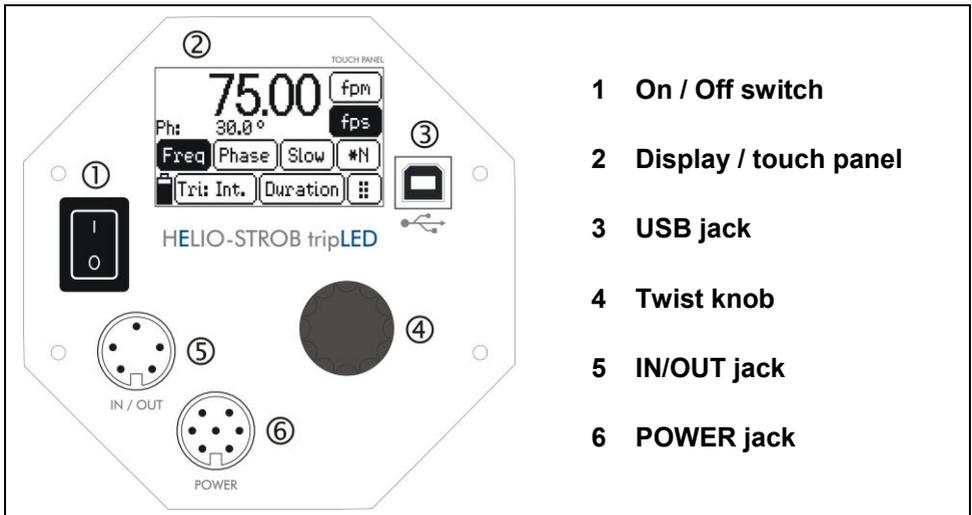


If defects are found in the course of inspection, these have to be properly rectified prior to putting the device into operation. The device may only be put into operation after all noted defects have been rectified.



Do not use any parts that have been damaged!

4.2 Electrical initial startup



4.3 Operation



Battery operation

Switch on the stroboscope. The last settings (frequency / revolution speed etc.) are automatically loaded. New devices are generally delivered with a partly charged battery. Charge the battery for extended use.

Mains operation:

Switch off the stroboscope before connecting the mains unit / charger to the stroboscope ("POWER" jack).

The mains unit / charger is connected to the mains voltage and the POWER jack on the stroboscope. Allowable input voltage 100 – 240 VAC. Verify that the mains voltage corresponds to the information on the type plate. Switch on the device. The last settings (frequency / revolution speed etc.) are automatically loaded.

4.4 Functions

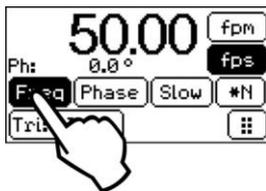


Select the functions by touching the corresponding buttons on the touch panel. Active functions and options are shown **inverted** on the display. To enter or change a value in the top row (large numbers), use the twist knob or alternatively the numeric keypad following selection on the touch panel (see below).

Twist knob: Turning quickly results in changes in large increments, turning slowly results in changes in small increments.

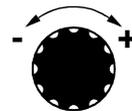
An additional value in smaller numbers is shown on the bottom row of the display – when adjusting the frequency for example, the current phase shift value is shown in addition.

Touch panel



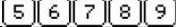
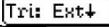
Touch

Twist knob

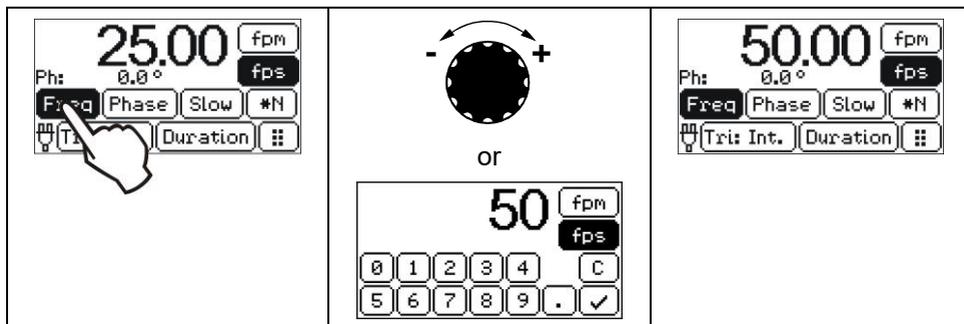


Turn

4.4.1 Buttons of the touch panel

	Flash rate
	Phase shift
	Slow motion
	Multiplier
	Transformation ratio
	Duration (flash duration)
	Display in flashes per minute
	Display in flashes per second
	Display in milliseconds in “Phase” mode
	Display in degrees in “Phase” / “Duration” mode
	Display in microseconds in “Duration” mode
	Show numeric keypad
	Numeric keypad
	
	Division ratio input
	Decimal point
	Leading sign, slow motion value
	Correct / delete
	Confirm input / accept determined frequencies
	Cancel
	Return to original frequency
	Reduce multiplier
	Increase multiplier
	Trigger mode selection: Internal status
	Trigger mode selection: External status, rising edge
	Trigger mode selection: External status, falling edge
	Internal triggering
	External triggering, rising edge
	External triggering, falling edge
	Battery operation / battery charge level
	Mains operation / battery charging
	Twist knob

4.4.2 Adjusting the frequency

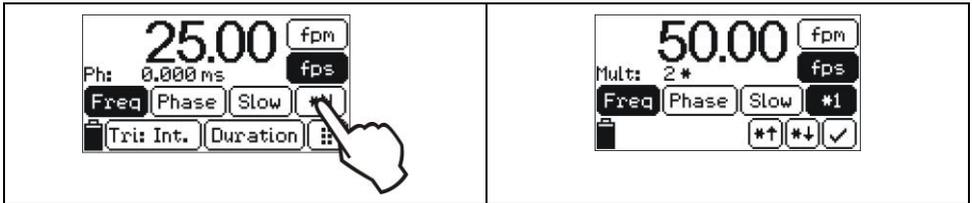


	Selecting the flash rate mode
	Display in [fpm] - flashes per minute
	Display in [fps] - flashes per second
	Adjust value fpm / fps
	Show numeric keypad
	Direct input as decimal number fpm / fps
	Decimal point
	Correct / delete
	Confirm input
	Cancel



To determine revolution speeds or frequencies, begin with the maximum value (flashes) and slowly reduce the frequency until the test object being observed appears to stand still. ATTENTION: When starting with the lowest frequency, there is a risk of determining a low frequency. This is because the test object appears to stand still even at an integral fraction of (for example half) the frequency.

For checking the determined value in the INTERNAL trigger mode use the function by means of which the flash rate can be multiplied in integer numbers:

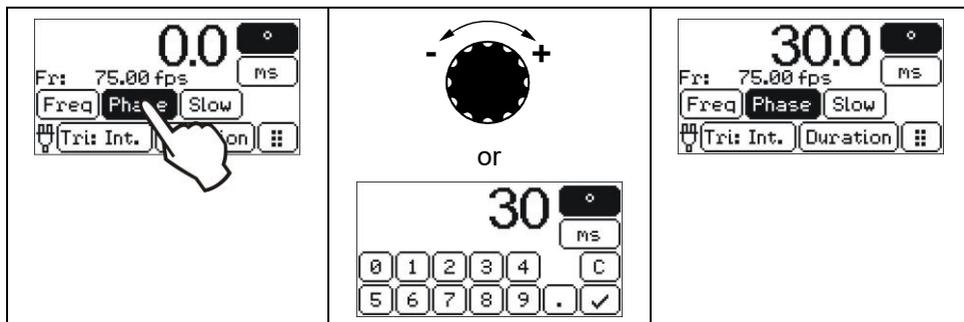


<input type="checkbox"/> *N	Verify and double the flash rate
<input type="checkbox"/> **↑	Factor to increase the flash rate (max. 10 times)
<input type="checkbox"/> **↓	Factor to reduce the flash rate
<input type="checkbox"/> *1	Return to original frequency
<input checked="" type="checkbox"/>	Accept determined frequency



(max) in the second row of the display indicates that you cannot further increase the frequency using the multiplier (**↑).

4.4.3 Phase shift

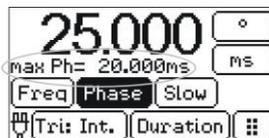


	Phase shift mode selection
	Display in degrees
	Display in milliseconds
	Set value degrees / millisecond
	Show numeric keypad
	Direct input as decimal number
	degrees / millisecond
	Decimal point
	Correct / delete
	Confirm input
	Cancel

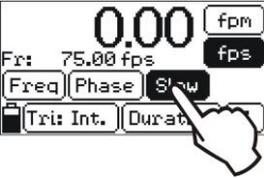
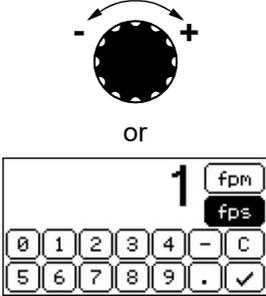
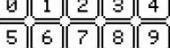


The phase shift causes a delay between the trigger signal and the flash. This makes it possible to observe specific movement states in case of periodic movements of the test object. With the setting in degrees, the object being observed is always seen in the same position regardless of the revolution speed.

If a delay in milliseconds is set, corresponding to a phase shift greater than 540°, a corresponding notice appears in the second line of the display alternating with the standard message (see illustration).



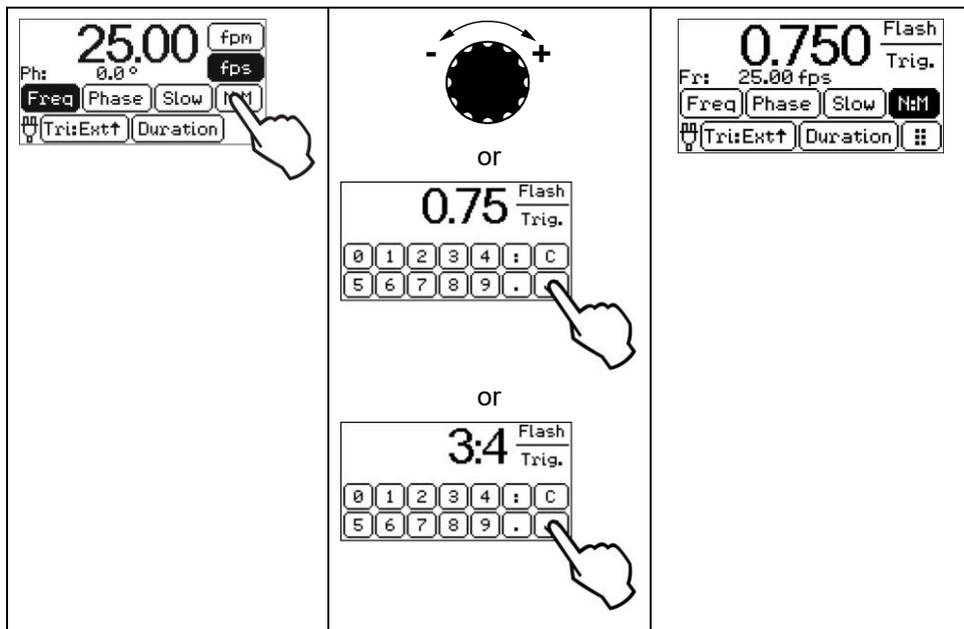
4.4.4 Slow motion

		
	Select slow motion mode	
	Display in [fpm] - flashes per minute	
	Display in [fps] - flashes per second	
	Adjust value fpm / fps	
	Show numeric keypad	
	Direct input as decimal number fpm / fps	
	Decimal point	
	Leading sign, slow motion value	
	Correct / delete	
	Confirm input	
	Cancel	



The entire periodic movement sequence of a test object can be observed with the help of slow motion. It creates the impression that the object is moving slowly and continuously. Select the speed and movement direction between +5 Hz and -5 Hz (beat frequency).

4.4.5 Transformation ratio

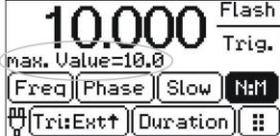
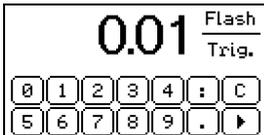
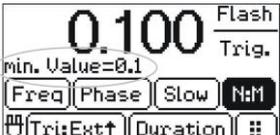


	Select "Transformation Ratio" mode
	Set the ratio as a decimal number
	Show numeric keypad
	Direct input of the ratio as a decimal number / ratio
	Numeric input of the ratio
	Decimal point
	Correct / delete
	Confirm input
	Cancel



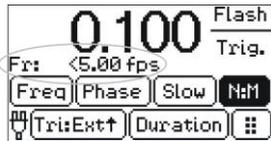
This function can only be activated with "external triggering". The ratio between the flash and the trigger frequency can be entered in the range of 0.100 to 10.00 (decimal) or as a ratio (such as 3:4). With the "Transformation Ratio" function it is for example possible to use the trigger signal of a transducer on the motor axis in order to obtain a still image of a shaft connected via a transmission.

Notes on entering the “transformation ratio”

	<p>Exceeding the allowable range of 0.100 to 10.00</p>	
	<p>Falling below the allowable range of 0.100 to 10.00</p>	



If the entered ratio exceeds or falls below the allowable range of 0.100 to 10.00, a corresponding message is shown on the display for 4 seconds. The smallest possible ratio (0.100) is automatically set if the value is too low, and the largest possible ratio (10.00) is set if the value is too high.



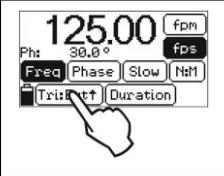
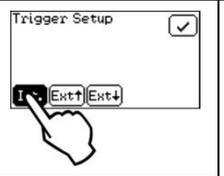
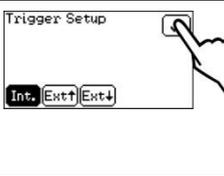
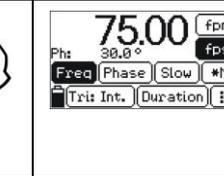
If the flash rate resulting from the configured ratio falls below the allowable range (< 1 Hz), a “<” character is shown before the frequency. If the resulting flash rate exceeds the allowable range (> 845 Hz), there is no warning and the frequency is automatically divided integrally.

4.4.6 Triggering

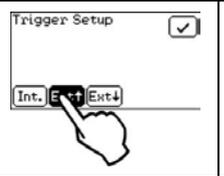
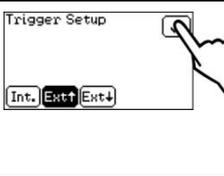
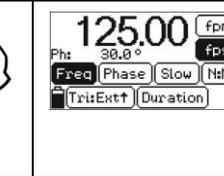


Supplying the external trigger signal via the IN / OUT jack. If no external trigger signal is applied or the frequency of the external trigger source is less than 1 Hz in “external triggering” mode, the display shows “.-.”. With external signals > 0 Hz, the stroboscope flashes at the external clock. Frequencies > 845 Hz to 8000 Hz are integrally divided. The undivided frequency of the external clock is shown on the display.

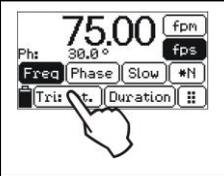
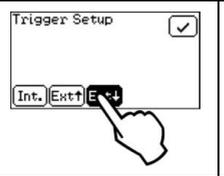
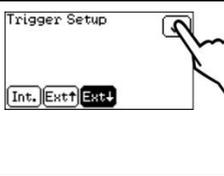
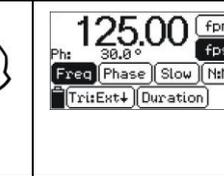
4.4.6.1 Internal triggering

			
<input type="text" value="Tri: Int."/>	Select the triggering mode		
<input type="text" value="Int."/>	Select the option "Internal Triggering"		
<input checked="" type="checkbox"/>	Confirm input		

4.4.6.2 External triggering, rising edge

			
<input type="text" value="Tri: Int."/>	Select the triggering mode		
<input type="text" value="Ext+"/>	Select the option "External triggering, rising edge"		
<input checked="" type="checkbox"/>	Confirm input		

4.4.6.3 External triggering, falling edge

			
<input type="text" value="Tri: Int."/>	Select the triggering mode		
<input type="text" value="Ext+"/>	Select the option "External triggering, falling edge"		
<input checked="" type="checkbox"/>	Confirm input		

4.4.7 Flash duration (button “Duration”)



The LED technology offers the opportunity to vary the flash duration (the on-time of the light source), either in “ μs ” (microseconds) or in “ $^\circ$ ” (degrees). Hereby the following features can be varied:

- the contour sharpness of a test object and simultaneously
- the output brightness of the device

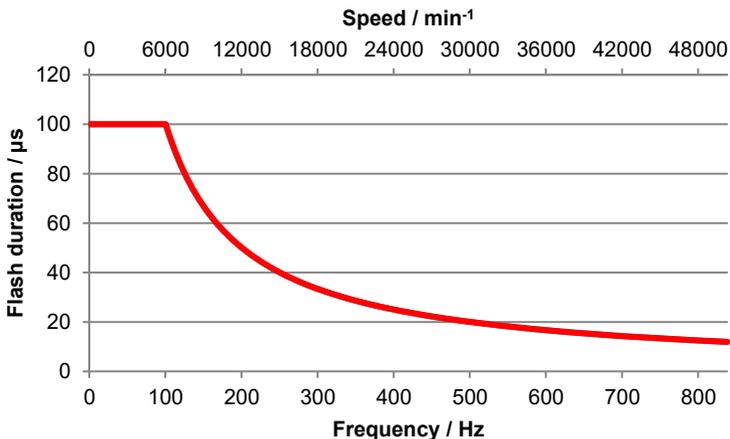
A shorter flash duration improves the contour sharpness. At the same time, the brightness decreases. Depending on the application, the optimum combination of contour sharpness and brightness can be found. With the setting in “ $^\circ$ ” (degrees), the flash duration changes depending on the flash rate. The ratio of the flash duration to the period duration remains constant.

If the option “ μs ” (microsecond) is chosen, it stays the same length for any flash rate (within limits). This means a maximum *flash duration* of 100 microseconds can be set up to 100 Hz.

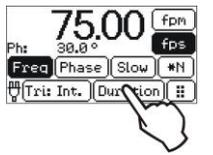
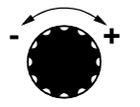
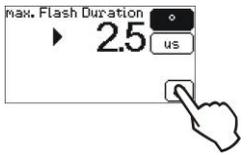
The flash duration can also be set to max 1 % of the period duration for the currently selected flash rate.

Since the two modes work independently of each other, the active (selected) mode is shown **inverted**.

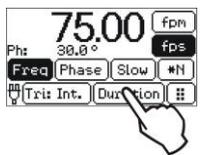
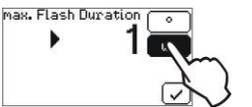
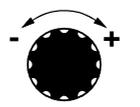
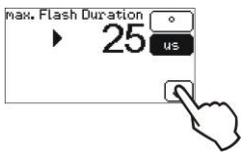
Max. flash duration depending on the frequency



4.4.7.1 Flash duration, degrees

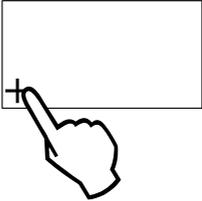
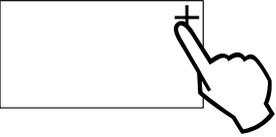
			
<input type="text" value="Duration"/>	Select Duration mode (flash duration)		
<input type="text" value="°"/>	Select the option "Degrees"		
	Set value		
<input checked="" type="checkbox"/>	Confirm input		

4.4.7.2 Flash duration, microsecond

			
<input type="text" value="Duration"/>	Select Duration mode (flash duration)		
<input type="text" value="us"/>	Select the option "Microsecond"		
	Set value		
<input checked="" type="checkbox"/>	Confirm input		

4.5 Touch panel calibration

Recalibration of the touch panel may be necessary, e.g. due to ageing of the panel or failure to recognise contact. To calibrate the touch panel, please proceed as follows:

		
After turning on the stroboscope, touch the home screen on the display for about 5 seconds.	Touch the cross that appears in the bottom left corner.	Touch the cross that appears in the upper right corner. Finished!

4.6 Serial interface

Via the serial interface, the *HELIO-STROB tripLED* can be computer-controlled. It is also possible to update the firmware via the serial interface. Further information on controlling via PC and firmware updating can be found on our Internet service page.

URL: <http://support.elmed.eu/helio/>
Username: helio
Password: 8yBMJoDQ

4.7 Power supply



The *HELIO-STROB tripLED* is equipped with a lithium-ion battery. The required charging technology is integrated in the supplied mains unit / charger. Therefore the supplied mains unit / charger **cannot** be replaced by a conventional mains adapter!

4.7.1 Battery operation

The *HELIO-STROB tripLED* is equipped with a long-life lithium-ion battery. The battery operating time depends on the configured flash rate and duration. At a flash rate of 50 Hz and a flash duration of 50 μ s, the *HELIO-STROB tripLED* can be operated on battery for approximately 8 hours. Continuing to use the stroboscope is possible even when the battery is drained. In order to do so, the supplied mains unit / charger is connected to the mains network and to the POWER jack on the stroboscope.

4.7.2 Mains operation

With the mains unit / charger included in the scope of delivery, the *HELIO-STROB tripLED* can be operated using mains voltage. The mains unit / charger is connected to the mains voltage and the POWER jack on the stroboscope. Allowable input voltage 100 – 240 VAC. Verify that the mains voltage corresponds to the information on the type plate. During mains operation of the stroboscope, the battery is charged in parallel.

4.7.2.1 Charging the battery

To charge the battery, the supplied mains unit / charger is connected to the mains network and to the POWER jack on the stroboscope. Allowable input voltage 100 – 240 VAC. Verify that the mains voltage corresponds to the information on the type plate.

The green charging indicator on the mains unit / charger flashes during the charging process and lights up continuously once the battery is fully charged. It takes approximately 3 hours to charge a fully drained battery. When the stroboscope is on, the battery charge level is also shown on the display.

4.7.2.2 Replacing the battery

The battery has to be replaced by the manufacturer or by trained, electrically skilled persons authorised by the manufacturer. Only batteries specified by the manufacturer may be used as replacements.



Using non-specified batteries is associated with the following hazards:

- Electrical hazard
- Fire hazard
- Explosion hazard



Used batteries have to be disposed of according to the applicable legal regulations.

5. MAINTENANCE

5.1 Maintenance

According to the design, the *HELIO-STROB tripLED* is not susceptible to disturbance. However, the following should be generally observed:

- Do not throw the device or expose it to heavy impacts.
- Store the device protected from damage.
- Clean the device using only a soft, slightly moist cloth.
Use only mild detergents.

Maintenance schedule

	Before putting into operation	Daily	Weekly	Monthly	Annually	As needed
Inspect the <i>HELIO-STROB tripLED</i> for mechanical damage	X					X
Inspect the mains unit / charger for mechanical damage	X					X
Safety inspection					X	X

The time intervals specified in the maintenance plan are guidelines. The intervals have to be established by the customer and verified depending on the operating conditions.

5.2 Inspection / Calibration

To maintain the reliability and the high quality standard of the *HELIO-STROB tripLED* over a long period of time, the device should be inspected by the manufacturer on a regular basis. All device-specific functions are checked in the course of maintenance. A PTB-traceable (Physikalisch-Technische Bundesanstalt, the German Bureau for Standards) manufacturer certificate is issued by request. The result of maintenance work is documented in an inspection record and stored in a product database.

5.3 Repairs

Devices that are damaged or do not perform according to their specifications shall not be used any more. To provide a safe and functional device, only original spare parts shall be used for repair.



To dispose of the old device according to legal rules and provisions, please send the *HELIO-STROB tripLED* to the manufacturer.

For maintenance / repair or disposal, please send the *HELIO-STROB tripLED* free to the door addressed to:

ELMED Dr. Ing. Mense GmbH
Stroboscope Service
Weilenburgstr. 39
D-42579 Heiligenhaus
GERMANY



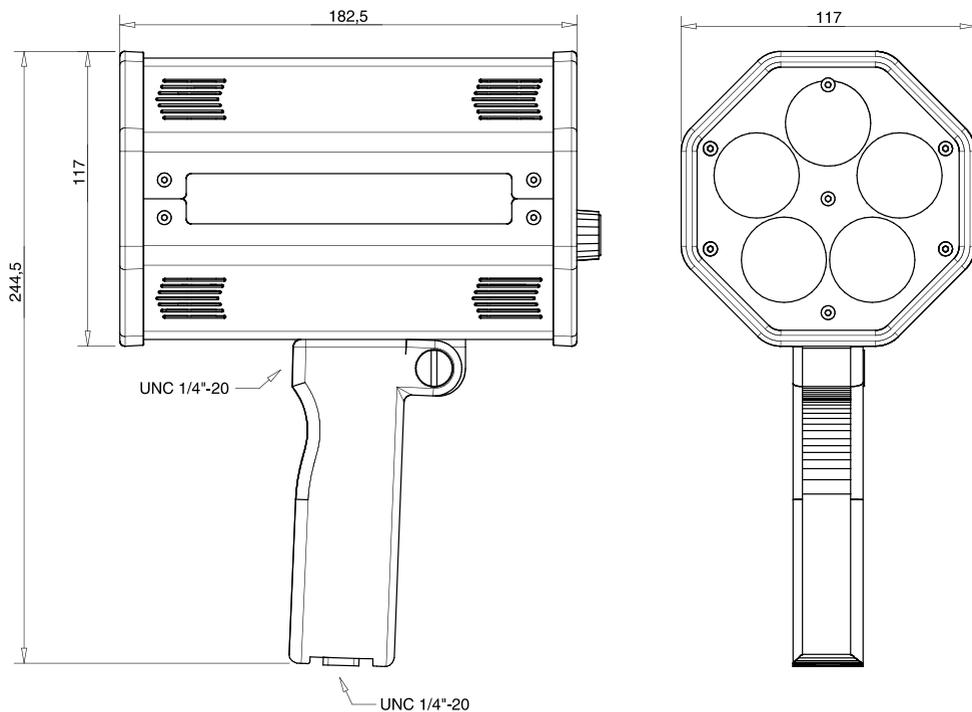
Proper execution of maintenance and repair is guaranteed only by the manufacturer or by qualified and authorised service centres.

5.4 Replacement parts / Accessories

Item no.	Designation
0365100052	Handle
0310610050	5-pin plug (triggering IN / OUT)
0310210012	Mains unit / charger for <i>HELIO-STROB tripLED</i>
0310210180	Replacement battery for <i>HELIO-STROB tripLED</i>
0310200070	USB connection cable, A/St – B/St, length 1.8 m
0310550020	Transport box

6. DRAWINGS

6.1 Markings on the housing



7. OPERATION MANUAL FOR MAINS UNIT / CHARGER

Read instruction manual before use!

Operation manual for
mains unit / charger EGSTON C2CFMW3 24W for lithium-ion batteries

7.1 Introduction

The mains unit / charger complies with the latest state-of-the-art technology. It is safety and EMC tested and is therefore in accordance with the valid International, European and National guidelines. The conformity has been proven; the relevant documentation is being kept at the manufacturer. In order to maintain this condition and to guarantee a safe use, you as a user have to pay attention to this manual! If you have any questions, please contact the manufacturer.

The switched mode EGSTON mains unit / charger is microprocessor controlled and **programmed to work with the *HELIO-STROB tripLED***.

7.2 Safety-related information

7.2.1 Safety symbols and their meaning

Safety symbols impart safety information through a combination of:

- geometric shape
- colour
- graphical symbol / text

They are used both on the device and in the operation manual to point out situations with a possible hazard potential quickly and clearly.

All safety-related passages in this operation manual are highlighted with one of the following safety symbols. Provide all persons working with the device with the safety information.

Special symbols indicate important information that must be strictly observed.

The following symbols are used in this operation manual:



This symbol indicates a hazardous situation which, if it is not avoided, can lead to serious injuries or death.



This symbol indicates a warning of hazardous electrical voltage.



This symbol indicates important information in the operation manual that must be strictly observed.



This symbol indicates information provided for improving the understanding of processes.

7.2.2 Safety instructions

To ensure safe operation, the user must observe all safety instructions and warnings contained in this operation manual.



No liability is assumed for material or personal damage caused by inappropriate use or non-adherence to the safety instructions. In such cases any warranty claim is invalid.

Before use please check if the mains voltage is in accordance with the voltage stated on the Egston mains unit / charger.



Warming of the housing during operation is normal and harmless. While in operation the charger must not be covered or operated near radiators or in direct sun light.



- The mains unit / charger must only be used with the *HELIO-STROB tripLED*.
- The Egston mains unit / charger is intended to be used correctly oriented in a vertical or floor mount position.
- Operation is permitted only on sockets approved for max. 16 A.
- Protect against water.
- The equipment should be installed close to an easily accessible power outlet.
- For indoor use only.

This device conforms to safety class II. Please make sure that the insulation (of the housing and the output cable respectively) is neither damaged nor destroyed. The regulations for safety against accident valid at the time must be adhered to.



Explosive gases can develop while charging. Take care for sufficient ventilation when charging batteries. Avoid spark formation and other sources of ignition near the battery. The charger must not be covered during the charging process.

The unit may not be used by persons with limited physical, sensory or mental capabilities or persons with lack of experience and knowledge unless proper supervision or instruction for the safe use and resulting dangers is given. The mains unit / charger must only be stored and used out of reach of unauthorized persons. Use the mains unit / charger only when the housing is closed safely and screwed tightly.



Avoid operation under adverse environmental conditions. These will lead to damage of the sensitive electronics inside the charger thereby causing possible danger to the user.

Adverse environmental conditions are:

- high humidity level (> 95% relative humidity, condensing)
- moisture
- dust and flammable gases, vapours or solvents, gasoline fuel
- excessive ambient temperatures (> +40° C, > +104° F)

- When operating a charger inappropriately (excessive charging currents or wrong polarity) the battery can be over-charged or destroyed. In the worst case the battery can explode thus causing considerable damage.
- Keep radio transmitters (wireless phones, remote control transmitters for model toys) away from the mains unit / charger because the radio emissions can interfere with the charging cycle and lead to the destruction of the charger and/or to the destruction of the batteries.
- The electrical conducting parts of the connected user device are to be protected against direct contact.
- If it has to be assumed that safe operation is no longer possible, the device must be taken out of operation and protected against involuntary use. It can be assumed that safe operation is no longer possible when the device shows visible damage or the device no longer operates.
- Never connect the mains unit / charger immediately to the mains when it has been brought from a cold to a warm room. Under adverse conditions the condensing water can destroy the device. For that reason the mains unit / charger must heat up for at least 3 hours in the warm room before being connected to the mains.



- Take care for sufficient ventilation when charging batteries due to the possible creation of hydrogen gas. Never expose to open fire or flying sparks.
- It is normal that the batteries become warm when charging.
- By improper use (wrong polarity etc.) the battery can be over-charged (too hot) and will be destroyed. In the worst case the battery can explode and cause considerable damage.



- Please take care that defective / not chargeable and used up (old) batteries are hazardous waste material and that these must be disposed of according to national regulations.
- Please always consider the safety instructions.

7.3 Connection / Operation / Charging



Under no circumstances connect batteries other than the built-in battery of the *HELIO-STROB tripLED* to the Egston mains unit / charger. The Egston mains unit /charger is programmed according to the special requirements of the batteries of the *HELIO-STROB tripLED*. When charging other battery types, these batteries can be destroyed, overheat or in worst case explode.

- The connection must only be made to the original polarized output connector mounted on the Egston mains unit / charger.
- First connect the Egston mains unit / charger to a mains socket (100 – 240 VAC, 50 – 60 Hz).
- Then connect the polarized connecting cable with the *HELIO-STROB tripLED*.
- The charging begins immediately, visibly at the display at the top side of the Egston mains unit / charger. The automatic mains supply starts when the *HELIO-STROB tripLED* is switched on. At the same time the built-in battery is charged.
- If the display is not lit, the contacts are possibly oxidised, the connecting cable is interrupted or damaged, the battery is damaged or the mains supply is interrupted.
- The charging time depends on environmental temperature, the condition of the battery, the charging status of the battery etc. The device switches off automatically.
- If the mains unit / charger is disconnected from the mains, the battery must also be disconnected.

7.3.1 Operating display

Rapid Charge	LED flashes green
Charge Complete	LED lights up in green
Precharge	slow charging - LED flashes orange
Charge Pending	no charging since battery temperature is too low / high LED lights up in orange
Charge Failure	error in power pack - LED lights up in red
No AC	no input voltage on mains unit / charger (INPUT) LED does not light

7.4 Maintenance

- The Egston mains unit / charger is maintenance-free.
- Under no circumstances may the device be opened or modified.
- All warranty claims expire on opening or disassembling the mains unit / charger.
- For cleaning use a clean, dry, antistatic and fuss free cleaning cloth.
- The contacts of the mains unit / charger must always be kept clean.

7.5 Waste disposal



Dispose of the irreparable mains unit / charger according to the applicable legal regulations.

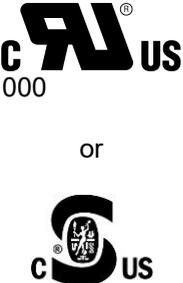
7.6 Technical data

INPUT: 100 – 240 V ~ / 50 – 60 Hz / 550 mA

OUTPUT: 12.4 V / 1.2 A

Jack	Pin	Description
	1	BATT -
	2	NTC
	3	BATT +
	4	nc
	5	AUX +
	6	AUX -
	7	nc

7.7 Description of symbols

	EU conformity mark with EU directive 93/42/EEC
	WEEE: This product must not be disposed of with normal domestic waste
	Caution: Follow the operating instructions
	Protection class II
	NRTL mark for USA and Canada

7.8 Final information

This operation manual conforms the current technical specification at the time of printing. Revisions in the course of technical progress reserved.

Manufacturer of the mains unit / charger:

EGSTON System Electronics Eggenburg GmbH

Grafenbergerstr. 37

A-3730 Eggenburg

Austria

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