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## PRODUCT DESCRIPTION

### 1. Proper Use

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



Please note that operating the instrument in explosion-hazardous environments is strictly forbidden.

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 instrument. As a basic principle, keep the operation of the instrument as short as possible.

To avoid personal injury or damage to the equipment, only qualified, trained and authorised personnel should operate the HELIO-STROB compact.

Safe operation cannot be assured if the HELIO-STROB compact is not used in accordance with the above definition of appropriate use.

The user, not the producer, shall assume any liability related to any personal injury or material damage resulted from the inadequate use of the instrument.

## 2. Scope of Delivery / Design

### 2.1 Scope of Delivery

The standard scope of supply consists of the following components:

- hand-held stroboscope incl. flash tube
- power supply unit
- Allen wrench 2,5 mm
- operation manual
- 6-pole plug (triggering IN / OUT)
- transport box

### 2.2 Design

The instruments are designed and manufactured according to acknowledged safety rules and the current state of the art.

The basic design of HELIO-STROB compact consists of the following components:

Case (control unit)	Full-metal case with tripod mount and handle
Power supply	20 – 28 VDC
Operation	Turning knob and touch panel
Display	LC-display
Connection	3-pole plug (power supply) 6-pole plug (triggering IN / OUT)



To avoid personal injury and damage to the equipment, repairs must be only performed by professionally trained technicians authorised by ELMED. Take special care when opening the device and/or the hand lamp, since it is possible to touch parts carrying a voltage that is considerably higher than the supply voltage.

### 3. Technical Data

#### HELIO-STROB compact

Power supply	20 - 28 VDC
Power consumption	25 VA
Dimensions of the case	182,5 x 117 x 117 mm <sup>3</sup> (handle not included)
Weight	1.6 kg
Light source	installed flash tube, pluggable
Internal control of the flash rate	turning knob and touch panel
External control of the flash rate	pos. impulse 5 to 30 V, triggering edge individually adjustable
Internal flash rate in Hz / fpm	1 - 125 Hz / 60 - 7500 fpm
External flash rate in Hz / fpm	1 - 8000 Hz / 60 - 480000 fpm, incoming flash rates > 135 Hz are split integrally.
Measurement duration	0.33 s (min. 1 period)
Measuring value display	LC-display, height of digits 8,5 mm
Display in	Hz / fpm
Display resolution	up to 0.01 Hz / 0.1 fpm
Phase shifting in	degree / ms
Phase shifting	0° - 540° / 0 - 999,99 ms
Resolution degree / ms	0.1° / 0.001 - 0.01 ms
Slow motion	Hz / fpm
Resolution Hz / fpm	-5 Hz - +5 Hz / -300 fpm - +300 fpm
Display resolution (slow motion)	0.01 Hz / 0.1 fpm
Variable transformation ratio (external triggering)	1:10 – 10:1
Resolution variable transformation ratio	0.001
Light output	max. 0.17 Ws
Light intensity	max. 2300 Lux (distance: 50 cm)
Precision	0.01 % ± 1 digit
Operating temperature	0°...+40°C
Storage temperature	-20° ... +60°C
Air humidity	80% relative air humidity at 30°C

#### Power supply unit

Input voltage	100 - 240 VAC / 47 - 63 Hz
Output voltage	24 VDC 0 – 1.25 A
Operating temperature	0°C...+40°C
Storage temperature	-25°C...+60°C
Dimensions	108 x 58 x 39 (mm)
Weight	approx. 300 g

## EC DECLARATION OF CONFORMITY

It is herewith confirmed that the product listed below

HELIO-STROB compact

meets the safety requirements within the scope of the conformity evaluation procedure of the related competent authority, which are defined in the regulation 2004/108/EG of the European Council for the approximation of laws of the member states with respect to electromagnetic compatibility.

The same applies to the provisions of the law on electromagnetic compatibility of instruments (EMVG) as of 9 November 1992.

This declaration applies to all units that are manufactured in accordance with the appropriate manufacturing documentation which is part of this declaration.

For the evaluation of products regarding the electromagnetic compatibility relevant harmonized standards have been used.

DIN EN 61000-6-1

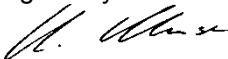
DIN EN 61000-6-3

**Design-engineering modifications that have such significant effects on the technical specifications and the proper use defined in this operation manual so as to change the instrument considerably shall nullify this declaration of conformity.**

This declaration shall be legally binding for the manufacturer.

ELMED Dr. Ing. Mense GmbH, Heiligenhaus

signed by



Claudia Mense

Managing Director

Heiligenhaus, 11.03.2013

## GENERAL SAFETY INSTRUCTIONS

### 1. Explanation of Safety Symbols being used in this Manual

The following symbols are used in these operating instructions:

- Safety symbols indicate the presence of adjacent safety notes.
- Special symbols indicate important information that should strictly be observed.

This symbol indicates that the relevant action imposes a hazard for life and limb.



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



## 2. User's Due Diligence


The HELIO-STROB compact has been developed and manufactured in consideration of hazard analyses and in compliance with the relevant harmonised standards as well as the additional technical specifications.


Therefore, the HELIO-STROB compact is a state-of-the-art instrument and offers a maximum of safety. This safety can be achieved only if all required safety precautions have been taken. Subject to due diligence, the user of this instrument shall plan such precautions and supervise their execution.

The user shall particularly ensure that



- the HELIO-STROB compact is used properly (see Chapter "PRODUCT DESCRIPTION")
- the instruments are operated only if in perfect, fully functional condition
- the operation manual of the instruments is at all times legible and complete on the site of operation.
- the instruments are operated only by adequately qualified and authorised personnel which is regularly trained in all aspects related to occupational health and safety; this personnel knows and follows the operation instructions, especially the relevant safety regulations contained therein
- all safety and warning labels are clearly legible and none of them are removed from the instrument.

## 3. Special Hazards

	<p><b>In case of users with a neurological proneness to epileptic seizures</b>, the light effects produced by a stroboscope may cause photo-induced epilepsy. Users with such predisposition must not use stroboscopes!</p>
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	<p><b>Safety Guidelines for people wearing active implants</b> When using stroboscopes, an influence of 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 expressively to be instructed in this regard.</p>
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## 4. Basic Rules on Safety Precautions


	Within professional organisations the employer / entrepreneur has to inform the employees / insured workers about the possible hazards related to their work and the safety precautions to be applied. This shall include the current findings regarding hazard avoiding procedures and eyelid protective reflexes.
	

- 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 the flashlight at short distances, the ability to see may be disturbed in such manner as to make orientation impossible.
- Flashlight shall not be directed to the eyes of other persons.

## 5. Basic Safety Measures

The basic safety guidelines and regulations of the corresponding professional associations and organisations shall apply.

Before starting up the HELIO-STROB compact, the user must check that the stroboscope, the connection cables and the plugs are undamaged and in perfect working order.

	Take special care when changing the flash tube. The flash tube gets very hot in use – <b>danger of burns!</b> Before touching the flash tube to change it, let it cool down and take the following safety measures: <ul style="list-style-type: none"><li>- switch off the stroboscope</li><li>- disconnect the controller from the mains (by pulling out the mains power cable)</li><li>- let the flash tube cool down for at least 5 minutes before removing the reflector housing</li></ul>
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## 6. Requirements Concerning the Operating Personnel

The HELIO-STROB compact may only be used by persons who have suitably been instructed and authorised. These persons must have read and understood the operating instructions, in particular the section “GENERAL SAFETY INSTRUCTIONS” (pages 6 – 8), and then act accordingly. They must have been instructed in the basic principles of health and safety at work and accident prevention.



## INITIAL STARTUP

In order to prevent injury or damage when starting up the HELIO-STROB compact, it is essential to comply with the following points:

The device may only be started up by suitably qualified persons and with due regard for the safety information given here.



Do not use any parts that have been damaged!

## 1. Operating




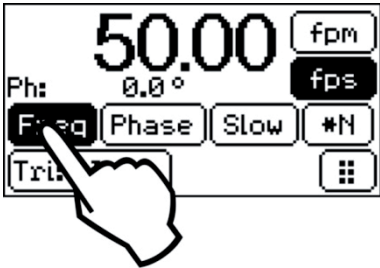
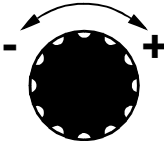
Before connecting to power supply, make sure that the supply voltage corresponds to the voltage indicated on the label. Switch off the stroboscope before connecting the power supply unit to the stroboscope ("power"- socket). Switch on the device. The last settings (frequency / revolution speed) are automatically loaded.

## 2. Functions

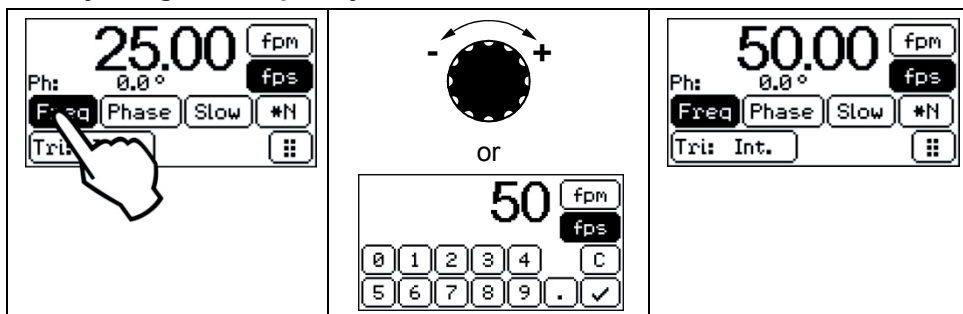
Buttons of the touch panel

	flash frequency
	phase shift
	slow motion
	multiplier
	display in "flashes per minute"
	display in "flashes per second"
	display in milliseconds - phase
	display in degree - phase
	display keypad
	keypad
	entry of division ratio
	decimal point
	sign of slow motion value
	edit / delete
	confirmation of entry / data transfer of measured frequency
	abort
	return to initial frequency
	decrease multiplier
	increase multiplier

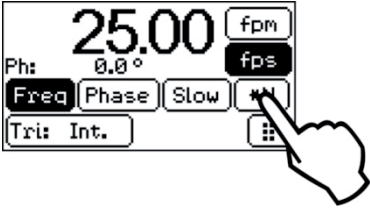


Tri: Int.	setting the trigger mode: internal mode
Tri: Ext↑	setting the trigger mode: external mode, positive edge
Tri: Ext↓	setting the trigger mode: external mode, negative edge
Int.	internal triggering
Ext↑	external triggering, positive edge
Ext↓	external triggering, negative edge

	<p>All functions are selected by touching the relevant buttons on the touch panel. Active functions and options are <b>invertedly</b> displayed. Any value in the first line (large numbers) can be entered or changed via the <u>turning knob</u> or alternatively by means of the <u>keypad</u> on the touch panel (selection of the keypad see below).          Rapid rotation of the turning knob: the value is changed in large steps          Slow rotation of the turning knob: the value is adjusted in small steps (fine adjustment).          In the lower line of the display a further value is displayed in smaller characters – i.e. when setting the frequency the current value of the phase shift is also indicated.</p>	
	touch panel	turning knob
		
	press	turn

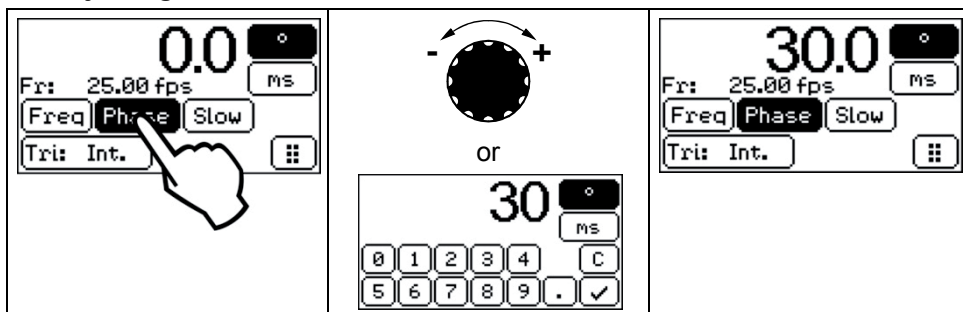
## 2.1 Adjusting the Frequency



	select flash frequency mode
	display in [fpm] – flashes per minute
	display in [fps] - flashes per second
	setting a value fpm /fps
	select keypad
	direct entry in decimal numbers fpm / fps
	decimal point
	edit / delete
	confirmation of entry
	abort
	<p>For the determination of revolution speeds or frequencies start with the maximum value (flashes) and then slowly reduce the frequency until the test object seems to stand still. <b>WARNING:</b> When you start with the lowest frequency you risk determining a frequency that is too low. The reason for this is that the test object already seems to stand still when the frequency is divided by an integer factor (i.e. by two). In order to check the measured value in the internal trigger mode please proceed as follows:</p>

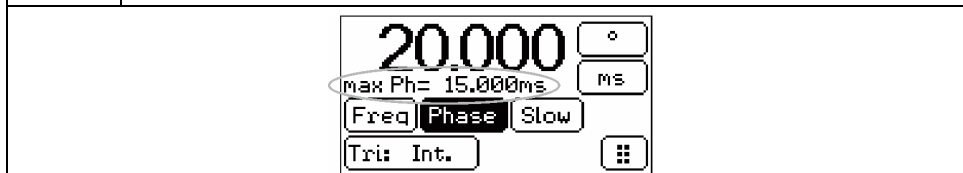
		
	<input type="checkbox"/> *N <input type="checkbox"/> *↑ <input type="checkbox"/> *↓ <input type="checkbox"/> *1 <input type="checkbox"/> ✓	control and doubling of flash frequency increase flash frequency (10 times max.) reduce flash frequency return to initial frequency adoption of the measured frequency
	The indication <b>(max)</b> in the second line on the display shows that the frequency cannot be further increased by means of the multiplier <input type="checkbox"/> *↑.	

## 2.2 Adjusting the Phase Shift



	select phase shift mode
	display in degree
	display in milliseconds
	setting a value degree / millisecond
	select keypad
	direct entry in decimal numbers
	degree / millisecond
	decimal point
	edit / delete
	confirmation of entry
	abort

**i** Using the phase shift a delay between the trigger signal and the flash can be set. This permits the observation of the test object in specific states of motion. Regardless of the speed frequency, the observed object always appears in the same position, when the setting is in degree.



**i** In case a delay is set in milliseconds corresponding to a phase shift greater than  $540^\circ$ , a respective message appears in the second line of the display, alternating with the standard display (s. picture).

## 2.3 Slow Motion

	select slow motion mode	
	display in [fpm] - flashes per minute	
	display in [fps] - flashes per second	
	setting a value fpm / fps	
	select keypad	
	direct entry in decimal numbers fpm / fps	
	decimal point	
	sign of slow motion value	
	edit / delete	
	confirmation of entry	
	abort	
	<p>By means of the slow motion function the complete motion sequence may be observed. You get the visual impression that the test object is continuously moving slowly. Select the speed and moving direction between +5 Hz and -5 Hz (beat frequency).</p>	


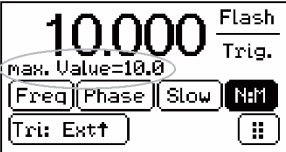

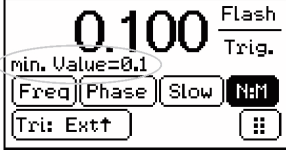

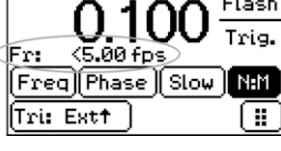
## 2.4 Variable Divider

The diagram illustrates the process of setting a variable divider in three stages:


- Initial State:** The display shows a frequency of 25.00. The unit is set to fpm (frames per minute). A hand points to the **N:M** button to enter variable divider mode.
- Decimal Entry:** The display shows 0.75. The unit is now fps (frames per second). A keypad is shown with a hand pointing to the decimal point button (**.**).
- Ratio Entry:** The display shows 3:4. A keypad is shown with a hand pointing to the decimal point button (**.**).

	select mode "variable divider"
	setting of divider in decimal numbers
	select keypad
	direct entry of divider in decimal numbers / division ratio
	entry of divider as ratio
	decimal point
	edit / delete
	confirmation of entry
	abort
	The external trigger frequency is modified by the divider. The factor can be entered as a decimal number in the range of 0.1 to 10.0 or as a division ratio (e.g. 12:60). The function "variable divider" permits to use e.g. the trigger signal of an encoder on a motor shaft in order to get a freeze image of a rotary shaft connected via a gear box.

## Instructions for entering “Variable Divider”

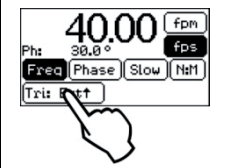
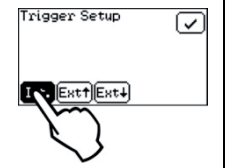
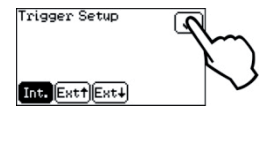

	<p>Exceeding the limiting value of 0.1 to 10.0</p>	
	<p>Falling below the limiting value of 0.1 to 10.0</p>	
	<p>If the entered factor exceeds or falls below the acceptable range, a corresponding message will appear during 4 seconds in the display. In case the factor is smaller than 0.1 or greater than 10.0, the smallest respectively greatest possible factor is automatically set.</p>	
	<p>In case the flash frequency - due to the set factor (&lt;1 Hz) - falls below the acceptable range, the symbol “&lt;” is added before the frequency. In case the resulting flash frequency exceeds the acceptable range (&gt; 135 Hz), there is no warning, but the frequency is automatically divided by integral numbers.</p>	

## 2.5 Triggering

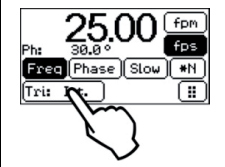
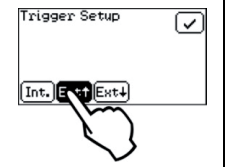
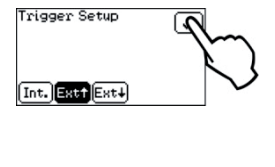
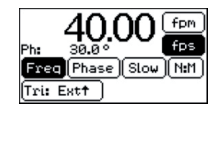
	<p>An external trigger signal can be connected via the socket IN / OUT. If there is no trigger signal in the mode “external triggering” or if the frequency of the external trigger is below 1 Hz, the message “-.-” is shown on the display. If the external signal is &gt; 0 Hz, the stroboscope flashes according to the external clock. Frequencies &gt; 135 Hz up to 8000 Hz are divided by integral numbers. The undivided frequency of the external clock is shown on the display.</p>
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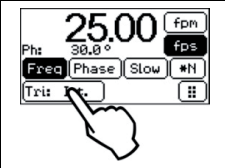
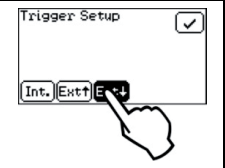
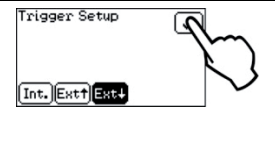
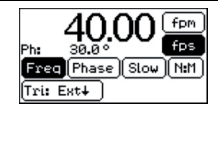
## 2.5.1 Internal Triggering

			
	Tri: Int.	select trigger mode	
	Int.	select option "internal triggering"	
	<input checked="" type="checkbox"/>	confirmation of entry	

## 2.5.2 External Triggering, positive edge

			
	Tri: Int.	select trigger mode	
	Ext+	select option "external triggering, positive edge"	
	<input checked="" type="checkbox"/>	confirmation of entry	

## 2.5.3 External Triggering, negative edge

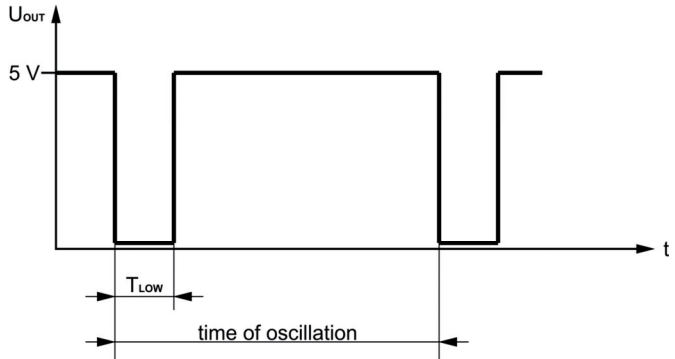
			
	Tri: Int.	select trigger mode	
	Ext+	select option "external triggering, negative edge"	
	<input checked="" type="checkbox"/>	confirmation of entry	

## 2.6 Trigger Output




The HELIO STROB is equipped with a trigger output to control different devices. The signal that is supplied to the IN / OUT sockets corresponds to the TTL level. The period duration depends on the flash rate,  $T_{Low}$  is constant ( $200\mu s$ ). If the stroboscope is controlled by an external signal, the stroboscope will flash according to this signal up to a frequency of 135 Hz. The frequency of the output signal corresponds to the frequency of the external signal. For frequencies  $>135$  Hz up to 8000 Hz a signal that is divided in integer numbers is supplied to the trigger output. This signal corresponds to the actual flash frequency of the stroboscope. The actual frequency of the external signal is shown on the display.


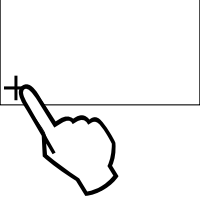
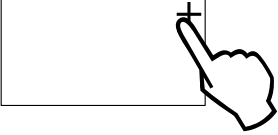
Signal sequence:



## 2.7 System Error

	<p>The message <b>**System Error*</b> in the display indicates impermissible operating conditions. The display switches automatically between German, English and French.</p>
<p><b>** System Error **</b> Flash Power Failure</p> <p>Cycle power to continue.</p> <p>Contact service if problem persists.</p>	<p>If an impermissible operating condition is detected during the continuous monitoring of the hardware and the supply voltage, the adjacent message is shown in the display. The message can be deleted by switching the instrument off and on again. In case the error occurs repeatedly please contact our technical service.</p>
<p><b>** System Error **</b> Electronics Overheat</p> <p>Please wait!</p>	<p>If – during the continuous monitoring – an excessively high thermal load is detected, the adjacent message will be shown in the display.</p>
<p><b>** System Error **</b> Flash Overheat</p> <p>Please wait!</p>	<p>After about 30 seconds the display changes as described below.</p>
<p>Cycle power or touch screen to continue.</p>	<p>The thermal load has decreased to the admissible value. The stroboscope can be restarted either by touching the touch panel or by switching off and on.</p>
<p><b>** System Error **</b> Flash Overheat</p> <p>Fatal Error ! System failed to cool down. Power off and contact service.</p>	<p>The thermal load has <b>not</b> decreased to the admissible value. Please switch off the instrument and contact our technical service.</p>

## 2.8 Calibration Touch Panel

A recalibration of the touch panel may be necessary, e.g. due to aging of the pads or failure to contact. For a recalibration please proceed as follows:		
		
After turning on the stroboscope touch 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. Recalibration done!

## 3. Serial Interface

Via the serial interface the HELIO-STROB compact can be computer-controlled. It is also possible to update the firmware via the serial interface. For this purpose the stroboscope is connected to the serial interface of a PC by an interface cable. 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

## SERVICE

### 1. Storage

- Protect the instrument from damage by properly storing it in a dry room.
- To avoid condensation see that the storage temperature is kept.  
Storage temp.: -20°C...+60°C (warming time constant >10K/h)

## 2. Maintenance

According to the design, the HELIO-STROB compact is not susceptible to disturbance. However, the following should be basically observed:

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

## 3. Inspection / Calibration

To maintain the reliability and the high quality standard of the HELIO-STROB compact over a long period of time, the instrument should be inspected by the manufacturer each year. During inspections, all the specific functions of the instrument are checked. A PTB (Physikalisch-Technische Bundesanstalt, the German Bureau of Standards) traceable manufacturer certificate is available on request. The results of inspections shall be documented in inspection sheets and stored in a database.

## 4. Repairs / Disposal

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



To dispose of the old instrument according to legal rules and provisions, please send the HELIO-STROB compact to the manufacturer.

If your instrument requires inspection / repair or disposal, please send the unit DDU to:

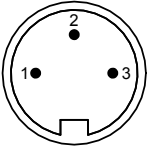
ELMED Dr. Ing. Mense GmbH  
Stroboscope-Service  
Weilenburgstr. 39  
D-42579 Heiligenhaus



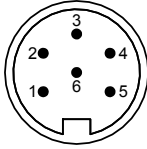
Proper execution of maintenance and repair is guaranteed only by the manufacturer or by qualified and authorised service centres.

## ANNEXE

### 1. Wiring Diagram of the “Power” Socket

socket	pin	description
	1 2 3	0 V (ground) nc + 20 - 28 VDC

### 2. Connector Pin Assignment IN / OUT

socket	pin	description
	1 2 3 4 5 6	0 V (ground) +5 VDC (output) +12 VDC (output) Trigger OUT Trigger IN + 20 - 28 VDC (output)

### 3. Replacing the Flash Tube



To avoid personal injury or damage to the equipment, install only approved flash tubes in this stroboscope. Unapproved flash tubes could cause a fire or explosion.

The flash tube is a wearing part that must be replaced sooner or later depending on the intensity of the usage. Unlike a glow lamp, in which a defect can easily be detected (burnout), the indication of a flash tube defect can be different:

- reduced brightness
- unsteady light (flickering)
- discoloured bulb jacket

To replace the flash tube, please proceed as follows:

- Switch off the stroboscope and pull out the power plug from the mains socket.
- If you have operated the flash tube before, you must wait for at least 5 minutes before executing the next steps for the flash tube to cool down.  
**Danger of burns!**
- Remove the surrounding edge protection and loosen the four mounting screws of the protective glass. Use the supplied Allen wrench. The protective glass can now be taken out along with the reflector. Caution: For safety against electric shocks, the reflector is connected to the housing by a grounding cable. This connection must not be undone!
- Remove the old flash tube from the socket by carefully pulling the flash tube on the bulb.
- Take the new flash tube out of the packing. Avoid touching the lamp jackets with the fingers. Insert the flash tube into the base. While inserting the flash tube, touch only the stud bolts or the installation ring. The connecting points are arranged such that wrong polarity of the flash tube can be ruled out completely. Insert the new flash tube completely into the base; otherwise there may be reduced brightness or lack of uniformity in the light intensity.
- Install the protective glass containing the reflector properly with the help of the four mounting screws. **Important!** Please check whether the flash tube is in the centre of the reflector cut-out. Under no circumstances should the flash tube have direct contact to the reflector, otherwise there can be **malfunctions!**
- Please also check the silicon ring in the reflector for damages; it provides protection against flashover between flash tube and reflector.
- Finally, replace the edge protection on the stroboscope housing.

## ADDITIONAL INFORMATION

### 1. Explanation of Terms

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	frequency per minute of the observed object
fps	frequency per second of the observed object
phase shift	positioning of the observed object to any observation point (0° - 540°)
slow motion	constantly changing phase shift
variable transformation ratio	factor by which an external trigger signal is multiplied

### 2. Spare Parts

Part-No.	Description
0320340000	flash tube for HELIO-STROB compact, pluggable
0365100012	protective glass for HELIO-STROB compact
0365100052	handle for HELIO-STROB compact
0310210045	3- pole plug (power supply)
0310210060	6- pole plug (triggering IN / OUT)
0310210035	power pack for HELIO-STROB compact