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Product description

1. Proper use

The HELIO-STROB micro is a LED stroboscope (light flashing instrument) for industrial applications. This instrument is used to produce snap-shots of sequences which, due to the rapidness they proceed, are not perceivable by the human eye.

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.



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

2. Design

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

Metal case	ABS (UL 94 HB) RAL 9002
Power supply	2 x AA Alkaline
Light source	25 ultra bright LED (white)
Operation	Membrane keyboard
Measured value display	digital (7-segment display)

3. Function description

The combination of micro-processor control and innovative LED technology provides for the following functions:

- phase shifting up to 360°
- alternative display of Hz (fps) and RPM (fpm)
- frequency selection by fast search mode (auto repeat)
- frequency divider and multiplier
- memory function
- adjustable flash duration
- external triggering (optional)

4. Technical specifications

Power supply	3V (2 Mignon cells AA / LR6)
Power consumption	35 ... 125 mA depending on operation mode
Metal case dimensions	140 x 62.7 x 30.5 (mm)
Weight	174 g
Light source	25 ultra bright LEDs
Internal flash rate control	adjustable by membrane keyboard
External flash rate control, optional	3 – 10 V (TTL compatible)
Frequency range	1 – 2000 Hz / 60 – 99999 fpm
Measured value display	digital, 5-digit 7-segment display, character height 8 mm, red
Display in fpm / Hz	yes / yes
Measuring time	0.33 s (min 1 period)
Display resolution	up to 0.01 Hz / 0.1 fpm
Phase shifting	in degrees
Display in degrees / ms	yes / no
Degree range / ms	0 – 360° / ---
Degree resolution / ms	0.1° / ---
External triggering (optional)	adjustable positive / negative flank
Special functions	integral frequency multiplication / division (on internal trigger) automatic flash duration adjustment or set-up power save mode memory
Light intensity (20 cm)	max. 600 Lux
Operating temperature	0° ... +40°C
Storage temperature	-20° ... +60°C
Air humidity	80% relative air humidity at 30°C
Protection type	IP 41

5. Features

The HELIO-STROB micro has the following features:

- extremely long-lasting operation and product life by the innovative LED technology
- handy and light
- one-hand operation
- robust industrial quality
- flash frequencies up to 2000 Hz
- tachometer – mode (optional)

Typical fields of application:

- snap-shots of sequences which are not perceivable by the human eye due to their high speed
- vibration analysis
- revolution measurement of rotating objects without applying reflection pads

EC Declaration of Conformity

It is herewith confirmed that the product listed below

HELIO-STROB micro

meets the safety requirements within the scope of the conformity evaluation procedure of the related competent authority, which are defined in the regulation 89/336/EEG 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

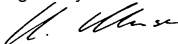
DIN EN 61000-6-3

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 October 2011

General safety instructions

1. User's due diligence

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

Therefore, the HELIO-STROB micro 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 micro is used properly (see Chapter Product description)
- the instruments are operated only if in perfect, fully functional condition
- the complete operating instructions are legible and available at the place where the instrument is used
- the instruments are operated only by adequately qualified and authorized 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.

2. Special hazards





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!






Safety Guidelines for people wearing active implants

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 expressly to be instructed in this regard.

3. Basic rules on safety precautions

 	<ul style="list-style-type: none">▪ Do not look into the LED-radiation 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 LED at short distances, the ability to see may be disturbed in such manner as to make orientation impossible.▪ LED-radiation shall not be directed to the eyes of other persons.▪ Do not use any strongly focussing optical devices to look at the light beam.
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 	<p>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.</p>
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	<p>Ultra bright LED radiate a similar bundled light as laser. Accordingly, the same regulations shall apply for LED – especially for distances below one meter – as for laser. However, due to the general large radiation divergence and the laminar source expansion, performance LED do not have similar potential for danger as the bundled laser radiation.</p>
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4. Explanation of safety symbols used in this manual

The following symbols are used in this manual:

- Safety symbols call attention to adjoining safety notes.
- Instruction symbols indicate important information that should be strictly observed.







This symbol indicates that non-observance could lead to dangers.













This symbol indicates information to be used for a better understanding of processes.















Operation

	<p>The functions shall be operated by pressing the keys of the membrane keyboard. Some of the keys have more functions. The diverse functions are differentiated by color.</p> <ul style="list-style-type: none">▪ The main functions are assigned blue marked areas. To activate main functions press the relevant key.▪ The set-up controls are assigned green symbols. To activate a set-up control press the relevant key and hold it pressed while switching on the instrument (by pressing the on / off key).▪ The special commands are assigned gray symbols. To activate a special command switch to the function mode by shortly pressing function key , subsequently press the relevant command key.
	<p>On / off key</p> <p>After switching on, the instrument flashes with the last set frequency. The current value will be taken over when switching off the instrument.</p>
	<p>30 s after switching on the instrument, the display light automatically dims for energy saving. It will take a quarter of the settable operating time until the display switches to the 'standby' - mode (display switch-off). The 'standby' - mode is indicated by a red dot flashing at the lower right corner as a "reminder". Reactivate the display by pressing any key (except for the on / off key). The time up to the complete automatic switch-off shall be selected by using the function  →  (see Mode 2).</p>

1. Main functions

	<p>Blue marked key areas e.g. </p> <p>The following functions can be executed:</p> <ul style="list-style-type: none">Change the flash frequency in small steps (+/- 1 – applied to the last indication position) and large steps (+/- 50 – applied to the penultimate indication position) <p>The absolute increment depends on the frequency range. If the selected key is kept pressed over longer time, the repeating function 'repeat' is activated.</p> <ul style="list-style-type: none">Read back stored frequencies
	Decrease flash frequency by 50 x increment
	Decrease flash frequency by 1 x increment
	Read back stored frequencies (max. 4) – by repeatedly pressing this key – in the storage sequence (see also  →  frequency entry)
	Increase flash frequency by 50 x increments
	Increase flash frequency by 1 x increment
	Display indication adjusts to selected flash frequency by the decimal point.

2. Set-up controls

	<p>Green symbols e.g.  on light-colored key areas The unit is switched off. To activate the unit press the relevant key (green symbol) – hold key pressed – while pressing the on / off key.</p>	
 + 	<p>Frequency indication (Hz)</p> <p>Indication [fps] – flashes per second Resolution: max. 2 decimal points (0.01 fps)</p>	 (red LED indication)
 + 	<p>Frequency indication (fpm)</p> <p>Indication [fpm] – flashes per minute Resolution: max. 1 decimal point (0.1 fpm)</p>	 (no red LED indication)
 + 	<p>In case of external triggering</p> <p>– trigger on rising flank</p>	<p>Optional: external triggering only</p>
 + 	<p>In case of external triggering</p> <p>– trigger on falling flank</p>	<p>Optional: external triggering only</p>



To activate the “key lock” the unit must be switched on.



Key lock















SAFE

Activate the same key sequence again to unlock keys and switch on.



The key lock prevents the unit from switching on accidentally. By activation of the key lock the instrument settings are saved and the HELIO-STROB micro is switched off. The unit may be switched on again only if you unlock the keys.

		<p>Any switch between  and  is possible, no intermediate steps required. The initial value remains the basic reference value. By repeated activation the respective division or multiplication factor is shortly displayed.</p>
	<p>The function to divide / multiply the flash frequency serves the following applications:</p> <ul style="list-style-type: none"> ▪ to find the appropriate frequency by the integral multiplication/ division of the initial frequency (*1) ▪ to reach quickly the target frequency in case of significant frequency changes or ranges. <p>(*1) Example:</p> <p>Multiplication  11 - 22 - 33 - 44 - 55 - 66 [fps] ...or</p> <p>Division  300 - 150 - 100 - 75 - 60 [fpm] ...or</p> <p>With switch  300 - 150 - 100  150 - 300 [fpm]</p>	
  	<p>Mode 1: Flash duration</p>	<p>Mode 1: Selection of the flash duration in μs (1 μs – 100 μs) alternatively: in degrees (0.5° – 3.0°)</p> <p>The alternatives are consecutively indicated within a minimal value of 0.5° and a maximal value of 100 μs.</p>

	<p>Mode 2: The time up to the complete switch-off</p> <p>Repeated activation of key combination  →  leads through Mode 1, Mode 2 back to the frequency indication.</p>	<p>Change duration by using the up and down keys (▲/▼).</p> <p>Store by switching off and on.</p> <p>Mode 2: operating time up to the complete automatic switch-off in minutes -- -- (no limitation) up to max. operating time of 30 min.</p> <p>Change switch-off time by using the up and down keys (▲/▼).</p> <p>Store by switching off and on.</p>
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Maintenance

1. Storage

If the HELIO-STROB micro is not used over more than four weeks, the following measures should be taken:

- Remove the battery from the instrument.
- Protect the instrument from damage by properly storing it in a dry room. The transportation box included in the scope of supply provides for the optimum protection of the instrument from damage.
- 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 micro is not susceptible to disturbance. However, the following should be basically observed:

- Do not throw the instrument and do not expose it to heavy shocks.
- Keep the instrument in the transportation box.
- 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 micro over a long period of time, the instrument should be inspected by the manufacturer each year. During inspections, all instrument specific functions 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 which are damaged or do not perform according to their specifications shall not be used anymore. To provide for a safe and functional instrument, only original spare parts shall be used for repair.



Batteries shall be disposed of according to relevant legal provisions. To dispose of the old instrument according to legal rules and provisions, please send the HELIO-STROB micro to the manufacturer.

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

ELMED Dr. Ing. Mense GmbH
Stroboskop-Service
Weilenburgstraße 39
D-42579 Heiligenhaus



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

Additional information

Definitions of terms

Terms	Explanation
LED	Light emitting diode
Flash duration	On-time of light emitting diodes The setting in μs does not depend on the frequency. The flash duration corresponds to the time set. If set in degrees, the flash duration depends on the frequency and changes proportionally to the frequency. The flash duration selected determines the sharpness of the picture. The shorter the flash duration, the sharper the contours of the object under observation.
Triggering	Trigger impulses for the flash sequence (internal / external)
Rising flank	Triggering occurs when trigger impulses change from "0" to "1"
Falling flank	Triggering occurs when trigger impulses change from "1" to "0"
Flash frequency	Number of light flashes per time unit
Display	Indication for the display of preset values
RPM / fpm	Number of revolutions per minute of the object under observation
Hz / fps	Repetition frequency per second of the object under observation
repeat – function	Automatic function repetition of the key being pressed longer
SAFE – mode	Instrument switch off and key lock activation
Phase shifting	Random positioning of the object under observation (0° – 360°)