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# PRODUCT DESCRIPTION

## 1. Proper Use

The HELIO-STROB turbo 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.

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 environments is strictly forbidden.

## 2. Design

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

Case (control unit)	metal case with tripod connector
Power supply	mains / rechargeable battery (depending on version)
Light source	flash tube, pluggable
Operation	twist knob / button
Measured value display	digital display

## 3. Functional Description

The latest circuit technology with simple operation enables the following functions:

- control of the flash rate by twist knob
- display in Hz / min<sup>-1</sup>,  
digital 5-digit 7-segment display
- phase shift up to 540°
- external triggering

## 4. Technical Data

### Frequency range (internal and external)

Standard: 1 – 435 Hz / 60 – 26100 min<sup>-1</sup>,  
resolution 0.01 Hz / 1 min<sup>-1</sup>  
turbo 800: 1 – 800 Hz / 60 – 48000 min<sup>-1</sup>,  
resolution 0.02 Hz / 2 min<sup>-1</sup>

### Measurement duration (external)

0.33 s (min. 1 period)

### Phase shift

0.0° to 540.0°, resolution 0.1°

### Clock input

diode socket for external trigger or other clock sources

### Input level

+3 V to +20 V, positive edge

### Input resistance

100 kΩ for voltages between 0 and 5 V. Outside this voltage range the input resistance is reduced to min. 10 kΩ

### Operating voltage

12 to 24 VDC

### Current consumption

2.5 A max. at 12 VDC

1.25 A max. at 24 VDC

### Power consumption

approx. 32 W

### Light output

Standard: 0.05 – 0.13 Ws

turbo 800: 0.03 – 0.08 Ws

### Light intensity

Standard: 600 Lux max. (at a distance of 50 cm)

turbo 800: 300 Lux max. (at a distance of 50 cm)

### Dimensions

195 x 80 x 56 (mm)

### Weight

approx. 0.6 kg

### Operating temperature

0 ... +40° C

### Storage temperature

-20° ... +60° C

### Air humidity

max. 80 % relative air humidity at 30° C

## 5. General Features

The HELIO-STROB turbo is characterised by the following features:

This unit ...

- ... attains its very high, very constant brightness by modern switching power supply technology.
- ... can be operated while powered by the mains or independently of mains power. The battery operation in particular offers the further advantage of being able to use the device even in places where no power socket is nearby.
- ... achieves the high precision of its frequency and phase shifting due to the applied microprocessor technology.
- ... ensures safe operation by an integrated monitoring function.
- ... allows the user to work rationally with its convenient and simple operation.
- ... allows use in numerous applications due to the internal and external triggering.
- ... bear the CE symbol.

### Typical Fields of Application:

- snapshots of frequencies 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 turbo

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 harmonised standards have been used.

DIN EN 61000-6-1

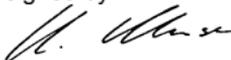
DIN EN 61000-6-3

**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<sup>th</sup> October 2011

# GENERAL SAFETY INSTRUCTIONS

## 1. User's Due Diligence

The HELIO-STROB turbo 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 turbo 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 turbo is used properly (see Chapter Product Description).
- the instruments are operated only if in perfect, fully functional condition.
- the operating 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.

## 2. Special Hazards



**In case of users with a neurological proneness to epileptic seizures**, the light effects produced by a stroboscope may cause photoinduced 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 and 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.

#### 4. 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.



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



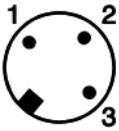
# OPERATING INSTRUCTIONS

## 1. Power Supply

### 1.1 External power supply

The HELIO-STROB turbo can be directly connected to a power supply system. For this purpose, a DC voltage source 12 - 24 VDC / 32 W is necessary.

#### Wiring diagram of the socket "POWER 12-24VDC"

socket	pin	description
	1 2/3	0 V (ground) +12 - 24 VDC

### 1.2 Mains operation (optional)

The power supply unit (type TRG30R240) is used for direct mains operation of the HELIO-STROB turbo. Connect the male plug of the mains adapter (type TRG30R240) connection cable to the matching female connector "POWER 12-24 VDC" of the HELIO-STROB turbo and lock it by the bayonet joint.

#### Replacing the mains adapter (optional)

For replacing the supplied mains adapter, press the release button on the back of the power supply unit. Lift the unlocked mains adapter and replace it by a new mains adapter. Insert the new adapter with gentle pressure and simultaneously pressing the release button in the provided opening until it clicks.

**Technical data**  
**Power supply unit**  
**(type TRG30R240)**

Power Supply:  
100 - 240 VAC, 47 - 63 Hz (0.8 A)  
Output voltage:  
24 VDC, 0 - 1.25 A

Operation temperature: 0°C....+40°C  
Storage temperature: -20°C....+60°C

Dimensions: 108 x 58 x 34 (mm)  
(without connectors and cables)  
Weight: approx. 300 g

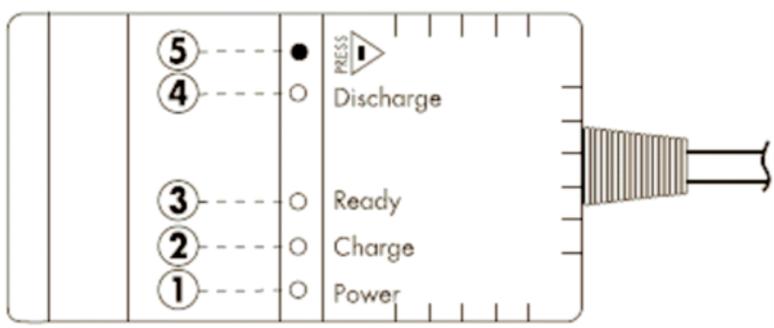


Do not attempt to open the power supply unit. Keep the device in a dry place (indoor use only). In order to avoid the risk of fire and / or electric shock, the power supply unit must be protected against high humidity and water. Do not use the device if there are any signs of damage to the housing, mains pins cables or connectors. If the safety instructions are not followed, this may lead to damage to the power supply unit and the stroboscope or even to serious injury to the user!

### 1.3 Operation independent of the mains (optional)

The charger / discharger (Ansmann ACS110) is suited for nickel cadmium (NiCd) and nickel metal hydride (NiMH) battery packs (1.2 - 12.0 V) with a capacity of 800 - 7.200 mAh.

#### How to charge the battery pack:



#### Connect charger to the mains:

With the exchangeable primary plug set and the electronic power supply (100 - 240 VAC) the charger can be used world-wide. To change the primary plug, unlock the mechanism on the back of the unit towards the arrow. Attach the right primary plug to the unit until it is clicked in place. Once the charger is connected to the mains, the "power" indicator ① lights and the charger is ready for use.

#### Connect battery pack to the charger:

Connect the male plug of the battery to the matching female connector of the charger connection cable and lock it by the bayonet joint.

### Charging process:

The red LED "Charge" ② lights and indicates the charging process. During the testing cycle the green LED "Ready" ③ flashes also but goes off after around 1 minute when the test phase is over. After termination of the charge the charger switches automatically to pulse trickle charge. The red LED "Charge" ② is off and the green LED "Ready" ③ is constantly on for approx. 2 minutes. After around 2 minutes the indicator changes to green flashing. The battery pack can be removed at this time or left connected to keep topped up until use.



If the green LED "Ready" ③ flashes immediately after connecting the battery pack and the red LED "Charge" ② lights up sporadically, the battery pack is defective and cannot be recharged at all. In this case the pack has to be replaced.

### Discharging procedure:

The optional discharging procedure can be started by pressing the button for discharging ⑤ for about 2 seconds. The yellow LED "Discharge" ④ lights and indicates the discharging procedure. During the first minute the green LED "Ready" ③ flashes but should turn off after the test phase. After discharging, which can in some cases last for several hours, the charger automatically switches over to the charging process.

## Technical data

### Charger (Ansmann ACS110)

Power supply:  
110 - 240 VAC, 50 - 60 Hz (17 VA)  
Output voltage:  
1.45 - 14.5 VDC  
Charging current:  
max. 800 mA (9.6 VA)

Protection class: IP20  
Operation temperature: 0°C....+25°C  
Storage temperature: -20°C....+60°C

Dimensions: 118 x 62 x 48 (mm)  
(without connectors and cables)  
Weight: approx. 280 g



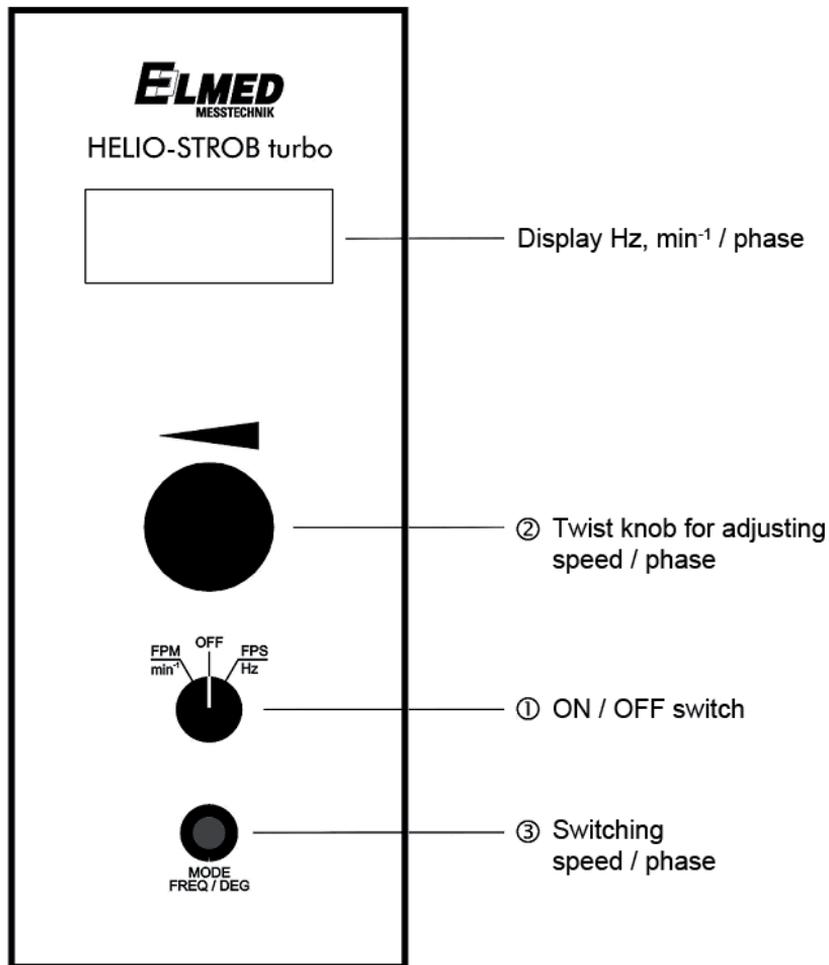
Charge only nickel/cadmium (NiCd) or nickel/metal-hydride (NiMH) battery packs! Danger of explosion if other types of batteries are inserted!



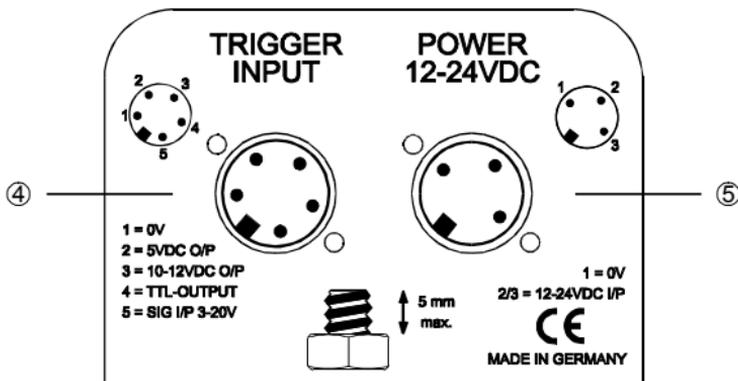
Do not attempt to open the charger. Keep the device in a dry place (indoor use only). In order to avoid the risk of fire and / or electric shock, the charger must be protected against high humidity and water. Do not use the device if there are any signs of damage to the housing, mains pin cables or connectors. If the safety instructions are not followed, this may lead to damage to the charger, the battery pack and the stroboscope or even to serious injury to the user!

## 2. Control Elements

### 2.1 Control Elements – Front Panel



## 2.2 Control Elements – Rear Panel



Wiring diagram “TRIGGER-INPUT” ⑤

socket	pin	description
	1	0 V (ground)
	2	+5 VDC O/P
	3	+10-12 VDC O/P
	4	TTL-OUTPUT
	5	SIG I/P 3-20 V

### 3. Initial Start-up

- Set the switch ① to the OFF position.
- Connect the power source. Connect the DIN-connector on the cable of the external power supply / power supply unit / battery pack to the “POWER” jack and lock it by means of the bayonet lock.  
Important! Only use the supplied power supply unit (see. 1. Power Supply)
- Switch on the device (see 4.1 Switching on), after a self-test, the device is ready for operation.

## 4. Operation

### 4.1 Switching on

The on / off switch ① is combined with the range selector switch. The stroboscope is switched on by twisting the switch to the left or right, simultaneously selecting the frequency in r.p.m. ( $\text{min}^{-1}$ , FPM) or in Hertz (Hz, FPS) respectively. After switching on, a brief self-test is conducted. The last adjusted values of the speed and phase angle are then loaded. The speed is indicated on the display.

### 4.2 Adjusting the frequency / speed (internal clock)

The desired frequency / speed can be adjusted with the knob ②. The internal microprocessor controls the function of the knob according to the speed of rotation:

rapid rotation:	rapid change in large steps
slow rotation:	fine adjustment in small steps

### 4.3 Adjusting the phase shift

The stroboscope is equipped with phase shifting in degrees for internal and external clock. The value of the phase shift can be adjusted by briefly pressing key ③. The text  $|P|H|A|$  appears briefly on the display. The phase angle can then be adjusted with knob ② in steps of  $0.1^\circ$ . The change of the phase angle is also dependent on the speed of rotation. When key ③ is pressed again,  $|F|P|S|$  or  $|F|P|_|6|0|$  (depending on the position of the on / off switch ①) appears briefly on the display. Subsequently the frequency / speed is displayed in Hz or  $\text{min}^{-1}$ .

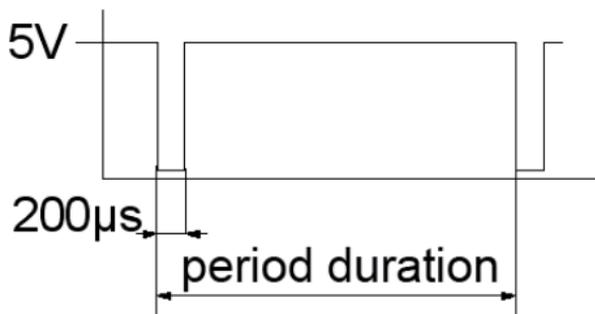
#### 4.4 Control by an external clock

An external trigger signal can be supplied at the “TRIGGER-INPUT” socket ④, with a frequency at which the stroboscope is to flash. It must be ensured that the trigger level and frequency of the external trigger signal do **not** fall below or rise above the permissible limits of the HELIO-STROB turbo. If the permissible limits are maintained, the stroboscope will follow the external signal. When the external trigger signal is disconnected and knob ② is then operated, the stroboscope switches back to internal operation. Please observe also the ADDITIONAL INFORMATION, item 1. Problems and Remedies as well as the PRODUCT DESCRIPTION, item 4. Technical Data.

#### 4.5 TTL-Output

The HELIO-STROB turbo is equipped with a trigger output in order to control different devices. The signal between pin 4 and pin 1 of the socket “TRIGGER INPUT” corresponds to the TTL level. The period duration depends on the flash rate,  $T_{\text{LOW}}$  is constant ( $200\ \mu\text{s}$ ).

Signal:



## 5. Correct measuring with a stroboscope

To measure a frequency / speed with a stroboscope, begin at the highest possible speed in the upper range. Then **reduce** the speed until the observed object or the marking appear stationary.



**With a reverse procedure (increasing the flash frequency), measuring errors can occur because still-standing images are also produced at half (one third, one quarter, ...) of the flashing frequency of the stroboscope.**

## MAINTENANCE

### 1. Storage

If the HELIO-STROB turbo is not used more than four weeks, please make sure that the following measures are taken:

- Protect the instrument from damage by properly storing it in a dry room.
- To avoid condensation see that the storage temperature is kept.  
Storage temperature:  $-20^{\circ}\text{C} \dots +70^{\circ}\text{C}$   
(warming time constant  $> 10\text{ K/h}$ )

### 2. Maintenance

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

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

### 3. Replacing the Flash Tube

The flash tube is a wearing part that must be replaced sooner or later depending on the intensity of the usage. To replace the flash tube, please proceed as follows:



- Switch off the stroboscope.
- Pull out the power plug from the mains socket.
- Wait at least 5 minutes so that the flash tube can cool down.
- Remove the surrounding edge protection and loosen the four mounting screws using appropriate tools.
- Remove the protective glass.
- Take out the flash tube from the reflector.
- Take the new flash tube out of its packing. Avoid touching the lamp jackets with the fingers. (Please use a clean cloth)
- Insert the flash tube in the socket behind the reflector
- **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!**
- Remount the protection glass properly. It does not serve only as protection for the material, but it also protects you against involuntary contact during operation!

#### 4. 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.

Description	Part-no.
Calibration - HELIO-STROB turbo incl. certificate	0940010100

#### 5. 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.



If the unit is disposed of by the user, the applicable legal restrictions are to be observed.

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.

## ADDITIONAL INFORMATION

### 1. Problems and Remedies

<b>Problem:</b> No display, no flashing	
Possible cause/effect	Possible remedy
No power supply	Make connection
Unit not switched on	Switch unit on

<b>Problem:</b> Unit operates briefly and then switches off	
Possible cause/effect	Possible remedy
Poor contact (loose connection)	Check cable/plug
Battery pack discharged	Charge battery pack
Use of unsuitable products for the energy supply	Use original accessories (see MAINTENANCE, item 5. Repairs / Disposal)
Flash tube defective	Replace flash tube (see MAINTENANCE, item 3. Replacing the flash tube)
Flash tube in contact with the reflector	Insert flash tube centrally in the reflector

<b>Problem:</b> No flashing, display and frequency adjustment in operation	
Possible cause/effect	Possible remedy
Flash tube defective	Replace flash tube (see MAINTENANCE, item 3. Replacing the flash tube)

<b>Problem:</b> Flash sequence not periodic (intermittent ignition)	
Possible cause/effect	Possible remedy
Flash tube shows signs of ageing due to long period of use	Replace flash tube (see MAINTENANCE, item 3. Replacing the flash tube)

<b>Problem:</b> Results of measurement do not conform with the expected results	
Possible cause/effect	Possible remedy
Measured object behaves not as expected	Check the object
Operation error	Repeat the measurement (see OPERATING INSTRUCTIONS, item 4. Operation & 5. Correct measuring with a stroboscope)

<b>Problem:</b> Storage of the values for speed and phase angle in the memory does not work	
Possible cause/effect	Possible remedy
The unit is switched off too quickly after the values have been adjusted	Allow two seconds to expire between adjusting the values and switching off

<b>Problem:</b> Display blinks and indicates minimum speed, flash tube flashes	
Possible cause/effect	
External clock is lower than the lower limit of the range, the speed cannot be displayed, the stroboscope flashes with the external clock	

<b>Problem:</b> Display blinks and indicates maximum speed, flash tube does NOT flash	
Possible cause/effect	Possible remedy
External clock is higher than the upper limit of the range	Reduce frequency of the external trigger signal
	Change ranges

<b>Problem:</b> Despite the supply of an external trigger signal, the unit does not switch to the external clock, the unit flashes with the internally generated clock	
Possible cause/effect	Possible remedy
External signal is not detected	Check cable/plug
	Compare the pin assignment of the plug with the "TRIGGER INPUT" socket (see OPERATION INSTRUCTIONS, item 2.2)
Signal level too low	Raise the input level; if impossible, check whether a trigger adapter can be used (see ADDITIONAL INFORMATION, item 2. Accessories / Spare Parts

**Problem:** When an external signal has been disconnected, no flashing with internal clock

Possible remedy
The unit must be switched back to the internal clock by operating knob ②

**Problem:** Despite connected external trigger signal, the unit is to flash with internal clock

Possible cause/effect
This mode is not implemented. When an external clock is connected, switching to internal mode is impossible

## 2. Accessories / Spare Parts

<b>Description</b>	<b>Part-No.</b>
Accu-Set for HELIO-STROB turbo (incl. charging accessories 12-24 VDC)	0310210100
Power supply unit for HELIO-STROB turbo 100-240 VAC	0310210010
Leather case for HELIO-STROB turbo (240 x 95 x 155 mm)	0310150010
Plastic Carrying Case for HELIO-STROB turbo (495 x 225 x 365 mm)	0310250020
Telescopic Stand	0310350010
Handle for HELIO-STROB turbo	0310210050
Flash tube for HELIO-STROB turbo (standard), pluggable	0320200010
Flash tube for HELIO-STROB turbo 800, pluggable	0320700050
3-Pin Male Jack - external power supply - for HELIO-STROB turbo	0310210015
5-Pin Male Jack - external triggering - for HELIO-STROB turbo	0310100040
5-Pin Trigger Adapter for HELIO-STROB turbo (encoder connection: BNC)	0310100030
Induction Transmitter for synchronising with an object without electrical connection	0310100020
Reflection pads (25 x 75 mm), set of 5 pcs	0310000010

Further accessories & spare parts on request.

Revisions in the course of technical progress reserved.