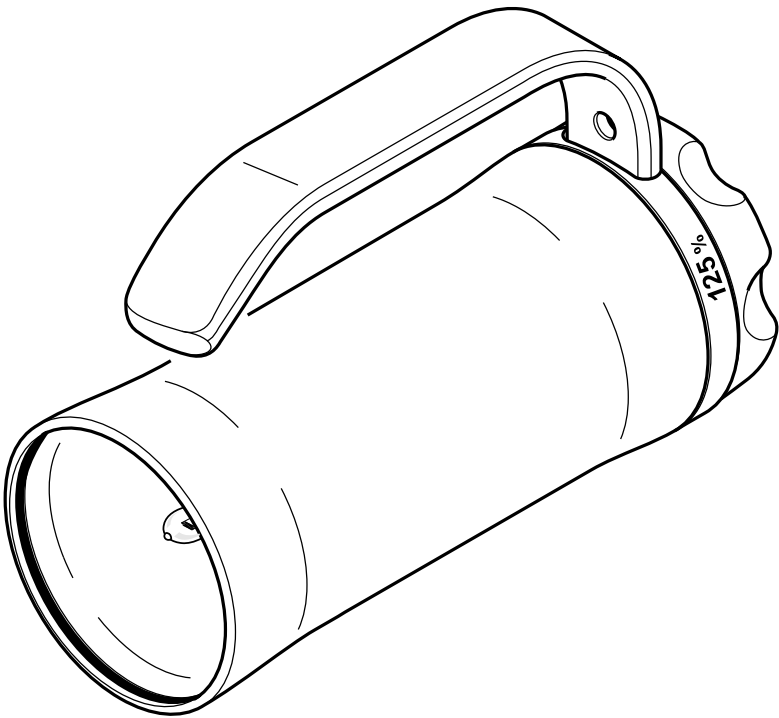


Instructions for use

Hartenberger

Underwater Hand Lamp



mini compact

CONTENTS

| | |
|--|----|
| WARNING SIGNS..... | 2 |
| SAFETY WARNING..... | 2 |
| GUARANTEE..... | 3 |
| APPLICATIONS..... | 3 |
| ARTICLE DESCRIPTION..... | 4 |
| TECHNICAL SPECIFICATIONS..... | 6 |
| REAR SCREW FITTING..... | 7 |
| POWER PACK..... | 8 |
| PREPARATION FOR USE..... | 9 |
| USING THE UNDERWATER LAMP..... | 9 |
| AFTER EACH USE..... | 11 |
| TRANSPORT..... | 11 |
| STORAGE..... | 12 |
| CHARGING..... | 12 |
| CHARGER MINI COMPACT..... | 13 |
| CHARGER OFF-SHORE I/6..... | 14 |
| CHARGER OFF-SHORE II..... | 15 |
| CARE AND MAINTENANCE..... | 16 |
| FAULT DIAGNOSIS..... | 17 |
| SPARE PARTS..... | 18 |
| ACCESSORIES..... | 18 |
| LITHIUM - MANGANESE - CELL - PACK..... | 19 |

WARNING SIGNS

If not adhered to the parts of this instruction for use, which are marked with the above warning sign, there is a danger of property damages, physical damages or death.



Warning !

If not adhered to the parts of this instruction for use, which are marked with the addition “Warning”, there is a great danger of property damages, physical damages or death.

**SAFETY WARNING**

Before attempting to use the underwater lamp, carefully read and adhere to these instructions for use.

The use of the underwater lamp *mini compact* calls for the same amount of care and conscientiousness as is necessary in order to practice diving in a safe manner. If the instructions are not followed, there is a great danger of personal injury as well as injury to property (danger of explosion).

GUARANTEE

When these instructions for use and the care and maintenance guidelines are adhered to, we will guarantee all mechanical parts made from steel, aluminium, glass and plastic for a period of 5 years against manufacturers defects and material failure. All electronic parts are guaranteed for a period of 2 year. The rechargeable cells have a guarantee against manufacturers defects and material failure for 6 months. Halogen bulbs and O-Ring seals are expendable items and are therefore not covered by the guarantee. Any unauthorised work on the lamp, i.e. the removal or tightening of screws, or the removal of the guarantee seals, will make the guarantee invalid.

Warning !

The manufacturer's warranty expires if the these instructions for use are not followed and strictly adhered to. If the lamp is tampered with or dismantled in part or full by an unauthorised workshop or technician, the warranty automatically expires, such tampering includes but is not limited to; loosening and/or tightening screws, the removal/damage of original seals. When purchasing the lamp make sure that the original manufacturer's seals are intact (1x housing electronics, 1 x cell-pack electronics, charger off-shore II).

Warning !

If the lamp is tampered with and/or if unauthorised (from the manufacturer) parts/components (e.g. cells, electronics components, non-original chargers,) are used or installed in the lamp, this results in a change of original design and the warranty is automatically invalid. The manufacturer is also released from any product liability.

APPLICATIONS



The *mini compact* underwater lamps are for use in underwater lighting applications.

Using the lamp in an environment other than water can lead to an overheating and consequently to a danger of explosion.

In special cases please ask the manufacturer for release.

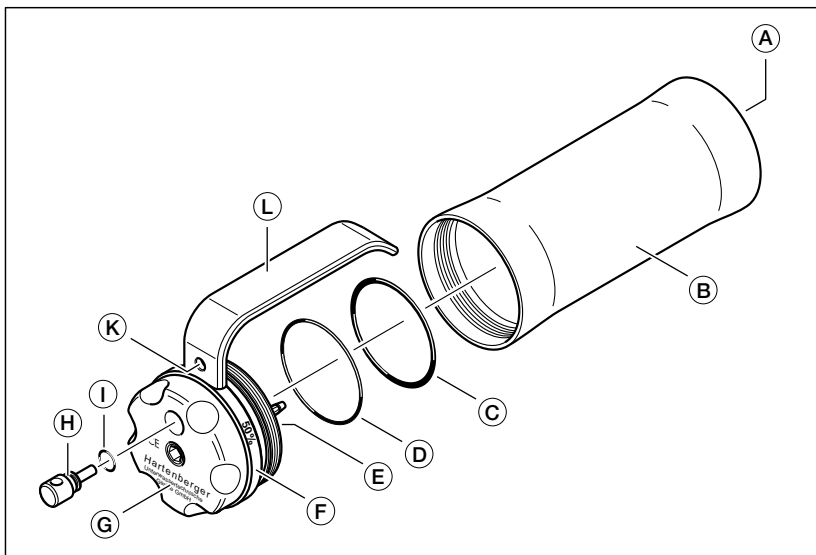
ARTICLE DESCRIPTION**HOUSING MINI COMPACT**

Abb. 1: housing

- Ⓐ **FRONT SEAL / FRONTGLASS PLATE**
The front glass plate with the O-Ring (56x3,0) is pressed into the housing during the assembly by the manufacturer. It can only be opened by an authorised workshop.
- Ⓑ **HOUSING / BODY**
The housing / body is sealed with the glass plate and the rear screw fitting.
- Ⓒ Ⓓ **O-RINGS**
48x3,0 and 48x1,6 50° hardness
- Ⓔ **PLUG-IN CONNECTION**
The plug in connection serves as an electrical and mechanical connection between the power pack and the electronic control panel
- Ⓕ **REAR SCREW FITTING**
The rear screw fitting must be unscrewed to access the rechargeable cell pack for charging and/or to replace the halogen bulb.
- Ⓖ **MAGNETIC SWITCH**
The magnetic switch controls all the electronic functions that each lamp has to offer. The mini compact hand lamp can be used at the power settings 50%-75%-100%-125%. Each version also has a distress signal function according to the Morse alphabet; SOS (3 x dot, 3 x dash, 3 x dot).

- Ⓜ① **TRANSPORT SAFETY PIN (with O-ring 7x1.8 50° hardness)**
The transport safety pin can only be fitted when the lamp is turned to the OFF position. With the safety pin inserted, the switch is prevented from rotating and the lamp cannot be turned on accidentally.
- Ⓜ **HOLE FOR A LANYARD**
The hole in the handle provides an attachment point for a lanyard for better security during use and may prevent loss of the lamp.
- Ⓜ **HANDLE**
The handle provides a good hold on the lamp, even when wearing thick neoprene gloves or mittens. If required for video mounting, the handle can be drilled and an M8 thread cut for mounting to video rigs.

POWER PACK MINI COMPACT

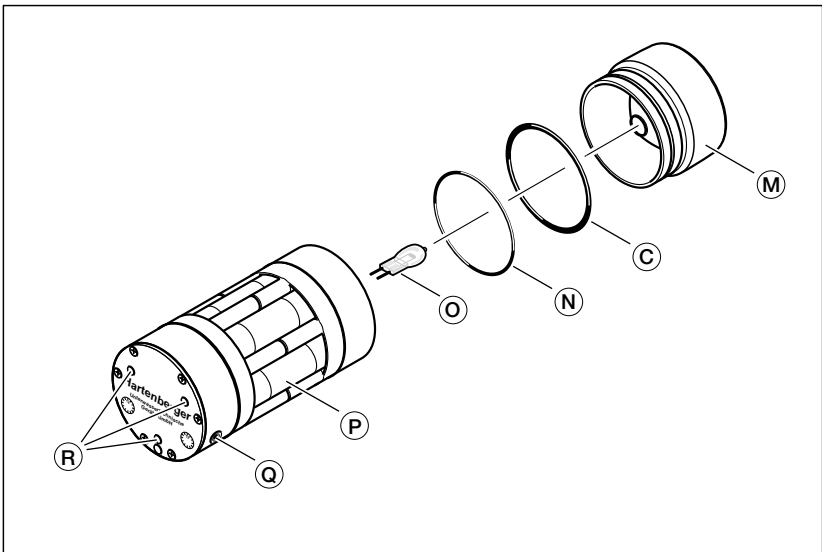


Abb. 2: power pack

- Ⓜ **REFLECTOR MODULE**
The reflector module is located on the power pack. Flood for video / Spot for illumination.
- Ⓜ **SPARE O-RING**
Spare O ring (48x3 50° hardness) for the rear screw fitting stowed under the reflector module.
- Ⓜ **O-RING**
O ring (37x1,6 50° hardness) to fix the reflector module.
- Ⓜ **HALOGEN BULB**
The halogen bulb is pushed into a standard socket (Type G4) and can easily be replaced.

- Ⓟ CELL PACK
The cell pack is a plug in unit and can be replaced within seconds with a second unit.
- Ⓞ CHARGING SOCKET
The plug from the charger is plugged into the charging socket for charging purposes.
- Ⓡ PLUG-IN CONNECTION
The plug in connection serves as an electrical and mechanical connection between the power pack and the electronic control panel

TECHNICAL SPECIFICATIONS

APPROX. BURN TIME INCL. WARNING BLINKS IN MINUTES WITH
NICKEL-METAL-HYDRIDE CELL PACK 7,2V / 4,5AH

| Illuminant 6v G4 | Halogen 10W | Halogen 20W | Halogen 30W | LED 2x3,5W |
|---------------------|-------------|-------------|-------------|------------|
| Time of use at 50% | 320 | 160 | 105 | 350 |
| Time of use at 75% | 240 | 120 | 80 | 260 |
| Time of use at 100% | 170 | 85 | 55 | 190 |
| Time of use at 125% | 140 | 70 | 45 | 155 |

The heavily printed figures represent the burn times with the standard bulbs as delivered.

Warning !

The burn time of a lamp is dependant upon water temperature, state of cell charge and the type of bulb.

New NMH Cells only reach their full capacity after 2 -3 charging cycles.

The water temperature greatly affects the burn time. For example, in water temperatures of between 4 and 6 °C, (40 - 45 °F) the burn time will be at best 90% of the stated capacity.

An annual drop in capacity of 5%-10% is normal wear and tear.

Halogen bulbs available in retail outlets often need up to 10% more power as stated. The stated burn times will therefore be hortened.

DIMENSIONS/WEIGHT/PRESSURE PROOF

| Length & Diameter | weight on land | weight in water | Resistance to water Pressure |
|-----------------------------------|------------------------|-------------------|------------------------------|
| 180mm x 69mm (8 ¼ in x 2 ¾ in) | 1.0 kg (2 lbs 2 oz) | 0.2 kg (10 oz) | 200 meters (650 feet) |

FRONT GLASS PLATE

The mini compact lamps have a tempered hardglass plate as standard. This glass plate has a temperature shock resistance of 150°C, (300°F). It is therefore possible to use the lamps above and under water. A rapid cooling of a heated front glass is no problem (for example if used temporarily above water in order to orientate oneself on the surface of the water).

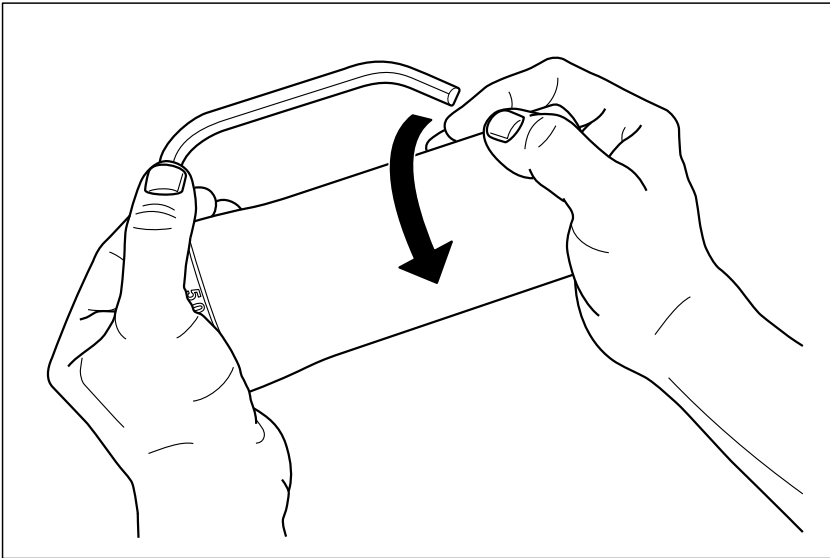
REAR SCREW FITTING

Abb. 3: Opening the screw fitting

OPENING THE SCREW FITTING

The housing is opened by unscrewing the fitting anti-clockwise, (thread length approx. 10 mm [3/8"]). Whilst opening the housing, it should be held in an upright position, thus preventing the power pack from inadvertently falling out.

CLOSING THE HOUSING

Before closing the housing, all threads, sealing surfaces and seals must be checked for integrity and cleanliness. Should the sealing surfaces and/or components be contaminated, then the O-Rings (48x3,0 and 48x1,6) and its groove should be thoroughly cleaned. Should these sealing surfaces and/or components be damaged, then all damaged parts should be replaced. If the O-Ring is removed, care must be taken not to damage the groove in which the O-Ring sits. A soft blunt tool should be used for the removal of the O-Ring, i.e. a wooden tooth pick. Before the components are refitted it is recommended that a thin coating of silicone grease is applied as lubrication. It is recommended that after such work has been carried out, that the seal/integrity of the housing is first checked underwater without the power pack fitted. The housing is then closed by screwing the components clockwise together. The screw fitting should be tightened by hand only until the parts are mated together.

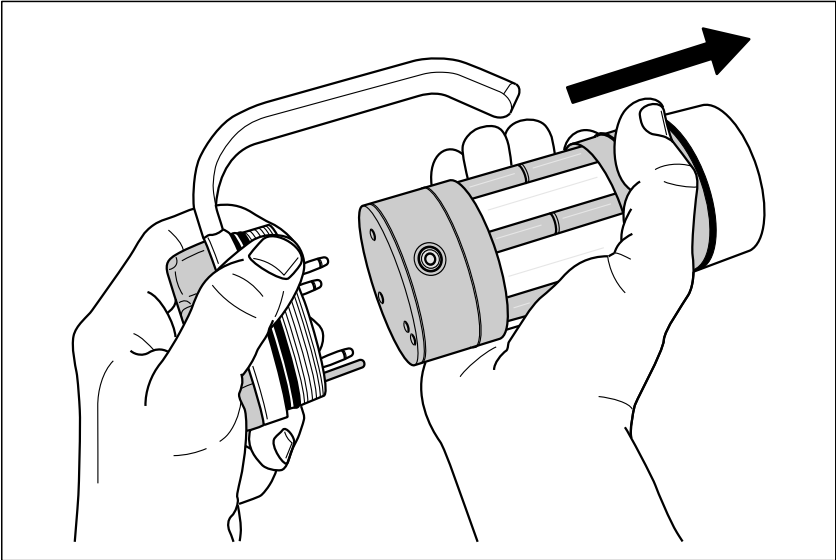
POWER PACK

Abb. 4: Removal of the power pack

REMOVAL OF THE POWER PACK

The power pack consists of the cell pack and the reflector. After unscrewing the housing from the rear screw fitting, the power pack can then be unplugged by simply pulling it away from the rear screw fitting. The 3 pins serve as a mechanical and electrical connection for the components.

REFITTING THE POWER PACK

Hold the rear screw fitting with the pins pointing upwards. The power pack can then be plugged onto the fitting. Make sure that the locating pin (located next to one of the connecting pins), will be correctly located in the orifice of the power pack base. This ensures that the power pack cannot be incorrectly connected.

REFLECTOR MODULE

The reflector module can simply be pulled off the front end of the power pack. Caution must be taken to ensure that the reflector unit is not removed skew. This may result in damage to the halogen or gas discharge bulb. The O -Ring (48x3,0) located on the reflector module can be used as spare O-Rings for the housing.

POWER PACK

On the front end of the power pack, there is the socket for the halogen bulb. The charging socket is located behind an opening on the outside of the power pack. On the rear side of the power pack are the 3 contact plugs for the electronic module.

REMOVAL / REFITTING THE BULB



Danger to be seriously burned !

After using the lamp, the bulb and the reflektor modul remains hot for some time after the lamp has been turned off.

Do not touch the halogen bulb with your bare fingers. Residue on your fingers can remain on the glass during normal use may form carbon. This will reduce the efficiency of the bulb. Use a clean cloth or tissue to remove the bulb from the socket. When refitting or replacing the bulb, ensure that it is located all the way into the socket. To produce an even illumination, it is imperative to ensure that the bulb sits upright in the socket. Assemble the lamp and check for correct operation.

PREPARATION FOR USE

BEFORE THE LAMP IS USED FOR THE FIRST TIME

Before the first use, the cells must be charged (See page 12) Hartenberger underwater lamps are manufactured to a high degree of precision and each lamp is tested to a water pressure of 10 bars. The condition of the lamp and in particular the housing and sealing rings should however be checked before the first use (See page 7).

Warning !



Due to damage during transportation or hidden material defects, leakage can occur (not the fault of the manufacturer). To check if the housing is pressure tight, the first dive should be carried out without the housing insert, i.e. empty.

BEFORE EACH USE

The rechargeable NMH cells will slowly discharge naturally when not in use, (depending on the ambient temperature up to 60 % discharge in one month!).

We recommend therefore that the cells are charged one day before each use.

Before each use, the front threads, sealing surfaces and O -Ring must be checked for integrity and cleanliness. (See Closing the housing Page 7). If the bulb has been removed for transport, it should be refitted into the socket.

The transport safety pin should be removed from the magnetic switch immediately before the lamp is used.

USING THE UNDERWATER LAMP



Warning !

Water inside the housing (especially sea water) can have fatal consequences after some reaction time. Therefore, during the use of the lamp please check repeatedly, whether water has found its way inside.

Do this by holding the lamp on the slant pointing down, thus the ray of light pointing away from the body. Then look at the front glass from the side.

If there is water inside the housing, bring the dive to an end by following the diving rules and open the housing as soon as possible (see page 17).

ELECTRONIC CONTROL

The electronic control is activated by turning the magnetic switch. The magnetic switch can be rotated into one of 5 positions. The orifice of the transport safety pin indicates the present setting of the switch:

Below are the settings of the switch from 0 rotating to the right:

OFF - 50% - 75% - 100% - 125% - OFF.

The use of the lamp with reduced power settings saves power and will extend the burn time. The amount of light is represented approximately by the settings on the scale of the decal. If the lamp is used constantly at a reduced setting (50%), the bulb may develop a grey shadow on the glass of the bulb. If a reduced power setting is constantly required, it is recommended that a bulb be fitted with less wattage.

OVER-VOLTAGE / DIMMER

The HLX bulbs which we use have a much greater efficiency than standard halogen bulbs. Using a 6 cell power pack, we have a power supply of 7,2 volts. This allows the 12v bulb to be operated continually with an overvoltage of approx. 6,8 volts. The electronics switch the bulb on slowly thus preventing the coil in the bulb from burning out. The resulting increase in brightness is approx. 30% more than the stated power. The micro controller can accurately monitor the energy dissipation to the bulb and ensures a continuous colour temperature over the entire discharge process and operation. The life expectancy of the bulb of approx. 100 hours, is reduced because of the over-voltage to approx. 70 hours. Using the lamp at reduced power settings saves energy and extends the burning time in a single charge cycle. Permanently operating the lamp at reduced power settings will however produce a grey coating on the bulb's glass. If reduced brightness is required on an extended basis, then a lower power halogen bulb is recommended.

SOS DISTRESS SIGNAL

The electronic control allows the lamp to generate an SOS distress signal in the form of Morse alphabet flashes. To activate the SOS distress signal, rotate the switch from the OFF position towards the right to the first setting, (50% and then immediately afterwards (within 1 second), back through the OFF position and on to the 125% setting. The distress signal mode can be exited by rotating the magnet switch to any other position.

The SOS distress signal will have a duration of approximately 3 times the duration of the lamp if it were to be operated at 125%. When the cells are virtually discharged, the flashes will reduce in intensity.

This feature should only be used in an emergency. Should you require the SOS distress signal in an emergency, we recommend that the signal is turned off when the intensity of the flashing reduces, and to turn the SOS signal back on should help be sighted.

LOW LEVEL CAPACITY WARNING

When the lamp blinks 3 times, the user is warned of the immanent end of the burn time of the lamp. When the lamp is being used with the standard 50 watt halogen bulb at 125% power, this will be approximately 3 minutes after the 3 blinks. If applicable, you should abort the dive as fast as possible and turn the lamp off (reduce the power setting).

Further use of the lamp will cause increase the wear and tear on the cells.



DISCHARGE WARNING**Warning !**

At the latest, the lamp should be turned off and no longer operated when it starts to blink continuously. Further use of the lamp will damage the cells and should only be practised in an emergency.

The duration of blinking with the standard halogen bulb set at 100% power is approx. 1 - 2 minutes. If the lamp is switched over to 50% power, then approx. 3 minutes of continuous light is available. After this, the light will go into a blinking mode once again.

DISCHARGE PROTECTION**Warning !**

The discharge protection will turn shut down the lamp after the continuous blinking. In the case of an emergency where light is necessary, the lamp (if possible after a short pause) can be reactivated and will automatically turn on at 50% power setting.

The cells are almost certainly damaged should this mode of operation be selected.

AFTER EACH USE**Warning !**

Check the lamp immediately after the dive for evidence of a possible flooding of the housing. Should the housing have flooded then refer to the problem diagnosis on page 17.

After use, the lamp must be thoroughly rinsed in clean fresh water. During the rinsing, the switches must be frequently operated to ensure contamination (salt water and/or sediment) is rinsed out of the mechanism.

The cells should be charged as soon as possible after use.

TRANSPORT**MAGNETIC SWITCH**

Before transporting the lamp, the magnetic switch must be secured in the OFF position. This is done simply by inserting the transport safety pin into the switch whilst it is in the OFF position. When the pin is removed, the switch can be rotated.

As an additional precaution, we recommend that the halogen bulb is removed from the socket.

The transport safety pin is held in the switch by an O-Ring. Should the O-Ring be defective, this may affect the correct function of the pin, and the O-Ring should be replaced.

The screw securing the magnetic switch is glued into position and no attempt should be made to remove it.

Warning !

During extended unattended periods of transportation, the halogen bulb must be removed from the socket.

STORAGE

The lamp should be stored in a fully charged condition with the housing closed securely. An ideal storage temperature is between 15 and 25°C, (60 and 75°F). Under no circumstances should the lamp be subjected to temperatures above 45°C (110°F). The rechargeable cells will slowly discharge when not in use, (depending on the ambient temperature up to 60% discharge in one month!).

We recommend therefore that the cells be charged approximately once a month when the lamp is not in use. For extended periods of storage, the power pack should be removed from the housing and stored separately in a suitable cool dry place, (see preparation for charging page 13).

Regularly check the cells for signs of corrosion or gas leakage, (the protective skin showing signs of bubbling, floury or white residue between the cells or in the housing, corrosion around the charging socket.) Should you discover signs of leakage or corrosion, return the lamp immediately to the manufacturer.



CHARGING

INTRODUCTION IN THE CHARGING OF NICKEL METAL HYDRIDE CELLS

Nickel Metal Hydride (NMH) cells are generally described as being gas tight cells. The position of the cells during the charging process is therefore irrelevant as no electrolyte can escape. There is however no supplier of cells that will guarantee this feature for the entire life of the cells! During the charging or discharging process, the NMH cells may produce an over pressure inside, opening the integrated over pressure relief valve. Should this occur, the electrolyte, or Hydrogen can escape from the cells. Because the electrolyte is a very aggressive acid, and additionally conducts electricity, this may lead to the galvanic corrosion of the cells, and a destruction as a result of the contact with the acid. The escaping hydrogen can combine with oxygen in the air and form a highly explosive gas. A single cell the size of a standard D cell battery can produce up to 25 litres, (1 cu ft) of gas! It is for this reason that nickel metal hydride cells should always be removed from a housing before they are recharged. Only then is the safe use and longest possible life of the cells guaranteed.

MEMORY EFFECT

The so called Memory Effect is the common term for the reduction in the capacity of the cells as a result of charging the cells in a partially discharged condition. (e.g. A wireless telephone hand set has a battery life of 24 hours, but is replaced on the station and therefore charged after 3 hours). The common technique for overcoming this is to fully discharge the cells before charging. We regard this as being more harmful for underwater lamps with 10 cells. The constant discharge down to the cut-off voltage limit can overload individual cells and disrupt the balance within the matched cell pack. This may result in an individual cell "dropping out". We recommend that for every 10 to 20 cycles where the cells are partially discharged, that the lamp is fully discharged until the Low Level Capacity Warning (when the lamp blinks 3 times).

The more often the cells are taken to their maximum capacity, the higher the strain on the individual cells.



PREPARATION FOR CHARGING



For the charging procedure you will need a clean, dry working area with a mains socket nearby. Charge the cells in an environment which is as dry and clean as possible, with a resistant work surface. (Sealed cells can also leak under poor conditions).



Warning !

The ambient temperature should not exceed 45°C (110°F). The power pack must be removed for charging. (See Page 8). If the area to be used for charging is contaminated with dust or dirt, then we recommend that the cell pack should be removed from the rear screw fitting, and that the housing is subsequently closed protecting the O -Rings and the sealing surfaces which would otherwise be exposed to possibly contamination. Stand the power pack in an upright position with the reflector down. This will avoid the collection of dirt and/or dust on the reflector and halogen bulb. The charging socket is located on the side of the power pack unit.



THE USE OF GENERIC CHARGERS

Warning !

Chargers other than those supplied by Hartenberger for use with this lamp must be checked by a qualified electrician for compatibility before attempting to use them. The guarantee will be lost due to improper use. Improper use may lead to the leakage of electrolyte and/or hydrogen gas. The guarantee will be lost due to improper use.

CHARGER MINI COMPACT

Check the compatibility of the charger with the power pack.

First insert the charging cable plug into the charging socket on the side of the power pack.

Do not use overdue force when fitting the plug into the socket. Avoid any chance of short circuiting the contacts of the plug or the power pack. Before attempting to plug the charger into the mains, check the voltage selector located on the lower side of the charger for the correct mains voltage. (115 / 230v)

The charger can be plugged into the mains. The charger will indicate a charging process by illuminating a red diode lamp (LED).

After the cells are fully charged, (approx. 8 - 9 hours), the charger will switch over automatically to a trickle charge and the LED will blink for approx. 10 seconds on and approx. 20 seconds off. If the charger is disconnected from the mains supply then internal timer will reset and the complete charging process will start again. Full or partially discharged cells can be recharged without any damage occurring. Any excess energy will then be converted into heat and because the cells are charged outside of the housing, this heat is dissipated into the environment.

The NMH cells have a natural discharge, which according to the ambient temperature can be up to 60% in one month! For this reason we recommend that the cells are charged at least once a month.



Warning !

Do not operate the lamp immediately after the charging cycle is completed.

Do not point the lamp at yourself or in the direction of other persons.

CHARGER OFF-SHORE I/6

This charger utilises the latest in electronic charger technology with a wide range input voltage (100v - 250v) with frequencies of between 45 - 65 Hz. (There is no need to manually select the input voltage). All Hartenberger power packs with 5 and 7 cells (Nickel Cadmium or Nickel Metal Hydride) will be automatically recognised by the charger, and charged as fast as possible.

The charging current can reach 1,1 amps.

Charging time approx. 4.5 hrs.

The charger cable should first be plugged into the charging socket. The charger is activated by plugging it into the mains supply. (There are adapters for the most common types of mains plugs which can be easily slotted onto the charger).

All the functions of the charger are monitored via a LED.

Signal from the LED:

| | |
|--------------------------------------|---|
| Red | Input voltage is present, the charger is functioning properly. |
| Blinks Red | The cells are fully charged and maintained with a trickle charge. |
| Blinks Red fast (3 x per seconds) | The cells are fully discharged ore broken. |
| Out | No mains voltage present. |

Do not use overdue force when fitting the plug into the socket. Avoid any chance of short circuiting the contacts of the plug or the power pack. The charger has an integrated mechanism protecting it against overheating and large fluctuations in mains voltage. Should the protection cut in, the charging process will be interrupted. After the mains plug has been removed from the mains socket for a few minutes, the charger will then be ready for use again. Care must be taken to achieve adequate cooling in extreme environments.

**Warning !**

Do not operate the lamp immediately after the charging cycle is completed.

Do not point the lamp at yourself or in the direction of other persons.

CHARGER OFF-SHORE II

This charger utilises the latest in electronic charger technology with a wide range input voltage (110v - 250v) with frequencies of between 45 - 65 Hz. (There is no need to manually select the input voltage). All Hartenberger power packs with between 5 and 12 cells will be automatically recognised by the charger, and charged as fast as possible.

The charging current can reach 1,8 amps.

Charging time approx. 2.5 hrs.

The charger is activated by plugging it into the mains supply.

The function of the charger is monitored via 2 light emitting diodes (LED' s) with varying colours and flashes.

LED I :

Green Input voltage is present, the charger is functioning properly.

Red Input voltage is present, the charger is overloaded or defective

Out No input voltage present.

The charger cable should now be plugged into the charging socket in the power pack. Do not use overdue force when fitting the plug into the socket. Avoid any chance of short circuiting the contacts of the plug or the power pack.

LED II :

Red No Cells are connected (interruption).

Green blinking Rapid charge up to approx. 95% of capacity.

Green Trickle charge with a reduced current.

Out Maintenance charge, Cells are fully charged.

All the functions of the charger are monitored by a controller in the charger.

This monitoring has a time lag when the function of the charger changes, and may lead to a slight delay in the LED' s reacting, (1-5 seconds). The charger has an integrated mechanism protecting it against overheating and large fluctuations in mains voltage (LED I turns red). Should the protection cut in, the charging process will be interrupted. After the mains plug has been removed from the mains socket for a few minutes, the charger will then be ready for use again. Care must be taken to achieve adequate cooling in extreme environments.

Warning !



Do not operate the lamp immediately after the charging cycle is completed.

Do not point the lamp at yourself or in the direction of other persons.

FAULT DIAGNOSIS

| Problem | Cause | Action to be taken |
|--|---|--|
| Water enters the housing: 1. A few drops are present. 2. Housing is flooded with fresh water. 3. Housing is flooded with Saltwater. | Defective or contaminated O-Ring. | Abort the dive as soon as is safely possible. Open the lamp. 1. Dry the housing and the power pack with a clean cloth. 2. Dry the housing and the power pack and return it to the manufacturer 3. Rinse the housing and the power pack with ample fresh water. Dry the housing and the power pack and return it to the manufacturer. |
| Magnetic switch sticking | Sand or salt residue in the mechanism | Clean the magnetic switches with fresh water |
| Lamp does not illuminate. | 1. Cells are discharged 2. Bulb is defective | 1. Charge cells 2. Replace halogen bulb |
| Housing screw covers are hard to unscrew | 1. Housing cover threads/O Rings are contaminated 2. Threads damaged | 1. Clean and lubricate housing covers and/or O-Rings 2. Return lamp to manufacturer |
| LED does not illuminate. | 1. No Mains. 2. Charging cable not plugged in. 3. Bad contact on charging plug. | 1. Check mains supply 2. Plug in charging cable. 3. Check charging plug security |

CONDUCT RESET

If the magnetic switch has a problem or when the halogen bulb is removed, the entire electronic circuitry will turn over to a self protection mode. The lamp cannot be inadvertently activated or operated in this condition. The reset can be carried out using the following procedure:

Turn the magnetic switch to the OFF position, (the lamp will blink twice). Wait 3 seconds, after 3 seconds, (the lamp will blink once more), the lamp returns from the protection mode to the normal mode. Should the lamp continue not to function correctly, remove the cells from the rear screw fitting care should be taken not to twist the cells and cause damage to the contact pins. Wait for at least 1 minutes and then reconnect the components.

*** Warning ! Danger of explosion!**

If water got into the housing, it is possible that in the cause of oxidation the interior pressure is increased to a dangerous extent. If the rear screw fitting cannot be opened, puncture the 0-ring of the front glass plate with a needle or a small screwdriver and allow excess pressure to escape. Never look directly into the front glass! If the increase in pressure is too high, they can come flying out explosively.



SPARE PARTS

| O-Ring | Dimensions | Elasticity | Material |
|----------------|------------|-----------------|------------|
| Glass | 56 x 3,0 | 50° shore Härte | Viton blue |
| Screw Fitting | 48 x 3,0 | 50° shore Härte | Viton blue |
| Screw Fitting | 48 x 1,6 | 50° shore Härte | Viton blue |
| Reflector unit | 48 x 3,0 | 50° shore Härte | Viton blue |
| Reflector unit | 37 x 1,6 | 50° shore Härte | Viton blue |
| Transport Pin | 7 x 1,8 | 50° shore Härte | Viton blue |

| Bulb 6v | Power Output | Socket | Lifetime (hours) |
|-------------------|--------------|--------|------------------|
| Halogen Bulb | 10W | G 4 | ca. 100 |
| Halogen Bulb HLX | 20W | G 4 | ca. 100 |
| Halogen Bulb HLXo | 30W | G 4 | ca. 100 |

ACCESSORIES**NEOPRENE SLEEVES**

Neoprene sleeves for the housing offer protection and a reduction in weight in the water and are available in the colours yellow and black.

CARRYING BAG MINI COMPACT

Nylon bag for transporting the lamp and offering some protection in a dive bag.

CARRYING BAG CHARGER OFF-SHORE 1/6

Nylon bag for transporting the charger and offering some protection in a dive bag.

CARABINER CLIPS WITH SPIRAL CABLE

For securing the lamp to a suitable point on the diving equipment with a spiral cable for additional security

SPOT REFLECTOR MODULE (STANDARD)

Reflector unit with a narrow beam for penetrating illumination

FLOOD REFLECTOR MODULE

For film or video use for an even illumination over the entire beam.

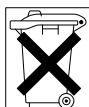
LED-MODULE (OPTIONAL)

LED-Module (2 x 3,5 Watt, spot), recommended for diving in fresh water.

SPARE CELL PACK

Cell pack mini compact for quick replacement of a discharged/defective cell pack. (7,2V/4,5Ah Nickel-Matal-Hydride / 7,2V/5,4Ah Lithium-Manganese)

Unserviceable cells/cell packs should not be thrown in the normal rubbish. These cells should be disposed of through the correct channels to prevent danger to the environment and/or injury. Do not throw the cells into a fire, there is a danger of explosion and/or injury.



OPTIONAL LITHIUM-MANGANESE-CELL-PACK 7,2V/5,4Ah

The Lithium-Manganese-Cell-Pack have a special micro controller monitoring electronic with five LED's on the backside. If you press the button on the backside, you can check the capacity of the cell-pack (each LED approx. 20%).

TECHNICAL SPECIFICATIONS

APPROX. BURN TIME IN MINUTES WITH LiMn-CELL PACK 7.2V/5.4Ah

| Illuminant 6V G4 | Halogen 10W | Halogen 20W | Halogen 30W | LED 2x3,5W |
|---------------------|-------------|-------------|-------------|------------|
| Time of use at 50% | 360 | 180 | 120 | 400 |
| Time of use at 75% | 250 | 125 | 95 | 275 |
| Time of use at 100% | 200 | 100 | 65 | 220 |
| Time of use at 125% | 150 | 75 | 50 | 165 |

STORAGE

For extended periods of storage, the cell pack should be removed, (the halogen lamp removed from the socket and stowed) and the housing should be closed. Place the cell pack on a suitable surface (non sensitive) and store in a dry environment between 10° - 20°C (50 – 68°F). Under no circumstances should the lamp be subjected to temperatures above 45°C (110°F). If a cell pack is continuously stored at full charge and increased temperatures, the cell pack will suffer from an irreversible reduction of capacity of more than 10% per year.

If the cell pack is to be stored for an extended period of time, the cell pack should be stored at a low temperature with a capacity of 50-60%.

The irreversible loss of capacity due to natural loss of capacity over time can be reduced to as little as 3% with good care and attention. The lithium manganese cells are subject to a very small natural discharge (depending on the ambient temperature this is approx. 4-8% per month, and the electronic in the lamp that monitor the conditions result in approx. 3% discharge per month).

If the cell pack is stored for extended periods of time, it should be recharged every 4-6 months.

A completely discharged cell pack is protected by the electronic monitoring that prevents further charging. In this case, return the cell pack to the manufacturer for evaluation.

The charging process of the *mini compact* with lithium manganese cells is monitored by the electronics in the cell pack. These electronics cut off the charging current when the cells are fully charged.

The LED signal from the charger shows no contact with the cell pack.

By way of example: **CHARGER OFF-SHORE II**

LED 2 functional display when charging Lithium Manganese cells:

Red No cell pack connected (pause).
 Cell pack is fully discharged
 Cell pack is 100% charged

Green blinks Fast charge until the cells reach 100%



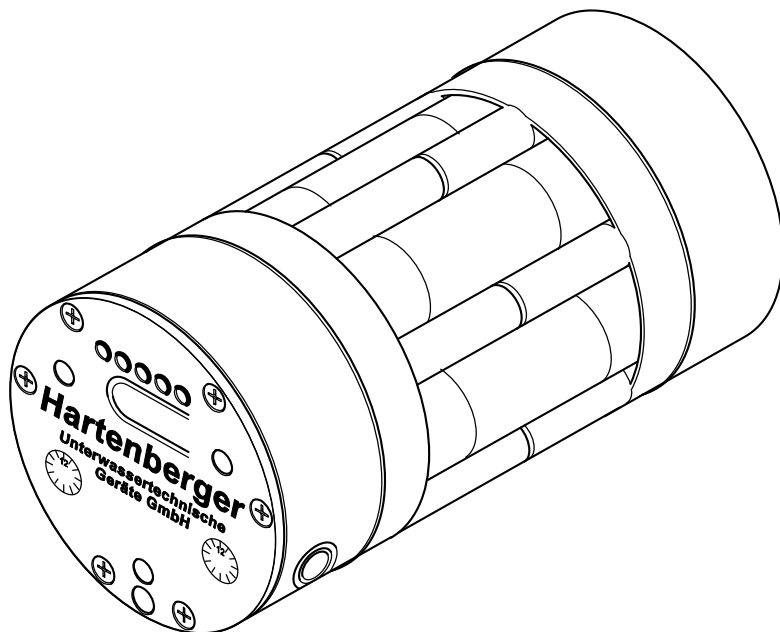
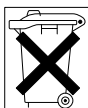


Abb. 5: Lithium-Manganese cell pack



Hartenberger

Unterwassertechnische Geräte GmbH

Rennebergstr. 19 D - 50939 Köln

Tel.: +49 221-415000

Fax.: +49 221-415050

info@hartenberger.de

www.hartenberger.de