USER MANUAL

Under water lights

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1 Safety

1.1 Luminaire and glass

Always control that the luminaire is complete and free of any damage before it is used. The luminaire must be fully submerged in water prior to ignition.

1.2 Cable

The cable must be free from any damages when connected to power. The cable must not have any bends, tears or breaks after installation.

The cable is not designed to lift the luminaire. This applies to handling on land and after the luminaire has been installed.

1.3 Injuries

Never lighten the luminaire in surface position, and never look straight at a lightened luminaire. This can be damaging to your eyes.

Overheated glass can start to crack if exposed to rapid cooling.

Never look straight at a lightened luminaire. This can be damaging to your eyes.

1.4 Relevant standards

1.1.1 General standards

Mandate for electric equipment published by the Product and el-safety inspection (NO: Forskrift om elektrisk utstyr utgitt av Produkt- og elektrisitetstilsynet) (ISBN 82-91057-17-0).

1.1.2 Safety standards

EN 60598-2-1 (Luminaires part 2: Particular requirements Section 1 – Fixed General Purpose Luminaries)

EN 60598-1+A1 (Luminaires, General requirements and tests)

1.1.3 EMC standards

EN 55015 (Limits and methods of radio disturbance characteristics of electrical lighting and similar equipment)

EN 61000-3-2 (Limits for harmonic current emissions (equipment input current <16A per phase))

EN 61000-3-3 (Limits, Limitation of voltage changes, voltage fluctuations and flicker in public low voltage supply systems, for equipment with rated current $3L 16 A per phase and not subject to conditional connection.)

EN 61547 (Specification for equipment for general lighting purposes, EMC immunity requirements)

1.5 Oil (BlueLED 100W and 400W)

Please note that the luminaire is filled with silicon oil.

2 Introduction

This user manual is part of the equipment delivered with Idema Underwater Lights. Preserve the manual for as long as the equipment is used, and make sure that all changes done to the equipment are being noted in this manual.

Thank you for choosing AKVA group ASA as supplier for your under water light. Do not hesitate contacting us if you need any more information regarding use or maintenance for your product.

With four main brands, AKVA group ASA is a world leading supplier of technical aquaculture equipment. Since 1980 we have developed and produced fish farming equipment, both for cages at sea and for land based hatcheries. AKVA represents an industrial standard, which is presumed to be the key to the future. Research, project management, fast deliveries and customer follow-up have been our focus to ensure that we contribute to a positive development within the aquaculture industry. Our goal is to deliver the best possible and most cost efficient equipment in order to keep preserving sustainable farming.

We have a wide variety of products, for example: plastic and steel cages, high pressure washers, net washers, boats, feed barges, feeding systems, cameras, sensor systems, under water lighting, software for fish farming and recycling systems.

We practice continuous product development to improve the equipment's safety, functions, manner of operation and working reliability. This User Manual enables the user to install, use and maintain the Idema Under Water Lights in a safe and economically way.

All of our lights are pre-installed, tested and delivered from our own production department. Our production staff consists of people with great expertise and enthusiasm to produce the best possible products for you.

Having our own production site gives you excellent service in case something should go wrong, or if you are in need of any assistance. We hold most of the parts for your equipment in stock, and our service staff is available on the telephone or on location in order to assist you if necessary.

Safety – both for the user and for the equipment, is our main focus while developing products.

The safety chapter must be read and understood before commencing any work on the equipment.

Prior to operating, repairing, performing maintenance or any other operations related to the lights and its components, we recommend that the personnel attend proper training by AKVA group ASA.

This manual must be read and maintenance must be performed as described to ensure reliable operation. This user manual will give answers to most of the day to day question and operating procedures.

2.1 Contact information

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3 Information

The correct use of underwater lights for many aquaculture species ensures reduced fish maturation. In addition it results in faster growth and more effective feed utilization. The Idema Underwater Lights series are adapted for smolt and juveniles in small tanks, as well as for salmon, cod and other fast growing species that require light in larger cage farms. The high quality underwater lights have excellent light distribution, which allows for easy bulb replacement, functional design and a rugged construction.

Under water lights are easy to install to permanent depths and correct positions by using buoys and ropes.

The power is connected to the underwater light through a standard IP67 plug, enabling simple installation. The standard cable lengths are 35 or 55 meters. Idema Underwater Lights are the ideal tools to help improve yield and profits.

- Quality is always profitable!

3.1 Our under water lights

3.1.1 BlueLed

This light has blue light rays, the highest penetration in seawater, and therefore the greatest efficiency. LED (Light Emitting Diode) is often called "eternity light" and is the most cost effective light solution on the market – and a perfect match to a diesel generator. The light diodes have extremely long duration with a predicted service life of up to 70.000 hours, and after 100.000h the effect has decreased only 10%!
This means; no bulb changing for many years ahead.

Recommended use: Tanks and smaller cages.

3.1.2 BlueLed 400W

This is a light with blue light rays is our newly developed luminaire for the sea cages. This Nemco approved luminaire is utilizing the newest High Intensity LED technology with eight times more effective light source than the BlueLED 100W.
The blue color has proven to be the most efficient when it comes to effect on biology in the fish. LED luminaires can provide more effective output from each luminaire compared to other lamp technologies. It saves cost on power generators, less power use and uses less copper in the installations. All this in addition to a long service life of the luminaire and the fact that after 100.000h the effect of LED has decreased only 10%!

Recommended use: Medium and large cages.

3.1.3 SubLite Integra 250/400

The smallest member of the SubLite family. The light can be offered in two luminosities for smolt, juvenile and smaller locations. This model is often used in cod farming with lights placed at various depths for a smooth distribution of light all over the cage. The light bulb and the electronic control device are integrated in the housing compartment and have a service time in the region of 5.000 hours.

Recommended use: Tanks, smaller and medium cages.

3.1.4 SubLite Integra 1000 W

Our bestselling light for salmon farms and the most rugged light unit in the market. It is placed at various depths and the powerful light ensures an excellent spread. The light bulb and the electronic control device are integrated in the housing and are easy to install. This unit also has a service life in the region of 5.000 hours.

Recommended use: Medium and large cages.

3.1.5 Standard 2000 W

The most powerful solution we offer. It provides extra strong lighting in large cages where there is a need for strong light conditions without using a lot of separate units. It features solid construction with a separate connection box and a service life in the region of 5.000 hours.

Recommended use: Large cages.

3.2 Technical information

3.2.1 Blue light

Specifications	BlueLed 100W	BlueLed 400W
Operating Voltage	230 VAC/50Hz (24DC)	230 VAC/50Hz (60DC)
Starting current 0,5 second	1,0A (230W)	1,8A (400W)
Starting current 1 second	2,5A (115W)	1,8A (400W)
Operating current (2 minutes)	0,5A (106W)	2,15A (480W)
Total efficiency	115W	480W
Service life with even color	appr. 70.000 hours	appr. 70.000 hours
Light source	1080 LED	184 LED
Color temperature	20.000 K	20.000 K (480 nm Blue)
Luminosity	-	-
Weight, light housing	8,5kg	11kg
Weight with cable	14kg (appr.2L oil)	19kg (appr.2L oil)
Weight connection box	-	-
Size, length + Ø	641mm + 120mm	641mm + 120mm
Material in the main housing, density	Aluminum 6082 T6 2,7g/cm3	Aluminum 6082 T6 2,7g/cm3
Material in connection box	-	-
Pyro Borocilicate glass 3.3	ISO 3585-2,23g/cm3	ISO 3585-2,23g/cm3
Cable, standard length	PUR 3G1,5 35m or 55m	PUR 3G1,5 35m or 55m
Cooling fluid	Silicone fluid	Silicone fluid
Recommended use	Tanks/smaller cages	Medium and large cage

3.2.2 Day light

Specifications	Integra 250/400W	Integra 1000W	Standard 2000W
Operating Voltage	230 VAC/50Hz	230 VAC/50Hz	230 VAC/50Hz
Starting current 0,5 second	2,45A (563W)/ 3,0A (690W)	8,0A (1840W)	13,0A (2990W)
Starting current 1 second	1,9A (437W)/ 2,0A (460W)	6,4A (1472W)	12,1A (2783W)
Operating current (2 minutes)	1,3A(299W)/ 1,8A (414W)	5A (1150W)	9,35A (2150W)
Total efficiency	275W/460W	1065W	2070W
Service life with even color	appr. 5.000 hours	appr. 5.000 hours	appr. 5.000 hours
Light source	HQI-T 250D/ HQI-T 400D	QI-T 1000D	HQI-T 2000D
Color temperature	5300K/6100K	6000K	4400K
Luminosity	20.000lm/ 35.000lm	85.000lm	190.000lm
Weight, light housing	7kg/10kg	21.6kg	11kg
Weight with cable	11kg/14kg	28kg	17kg
Weight connection box	-	-	19.2kg
Size, length + Ø	648mm + 140mm	818mm + 180mm	642mm + 140mm
Material in the main housing, density	POM 1,41g/cm3 DIN 53479 - L15	POM 1,41g/cm3 DIN 53479 - L15	POM 1,41g/cm3 DIN 53479 - L15
Material in connection box	-	-	Fire coated aluminum
Pyro Borocilicate glass 3.3	ISO 3585- 2,23g/cm3	ISO 3585- 2,23g/cm3	ISO 3585- 2,23g/cm3
Cable, standard length	PUR 3G1,5 35m or 55m	PUR 3G1,5 35m or 55m	PUR 3G1,5 35m or 55m
Cooling fluid	-	-	-
Recommended use	Tanks/medium and small cages	Medium and large cages	Large cages

3.3 Recommended light in Salmon cages

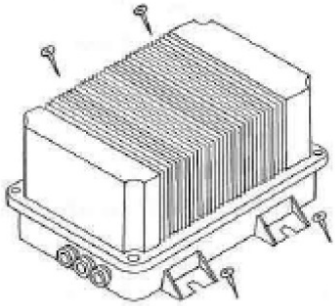
Size cage	Surface areal	Light by 3W/m2
90m cage	654m2	1935W - 2000W
120m cage	1146m2	3438w - 4000W
157m cage	1962m2	5886W - 6000W

4 Suspension of connection boxes

4.1 For SubLite Standard 2000W

Do not mount the SubLite Standard 200W connection box in sealed cabinets as this can cause overheating.

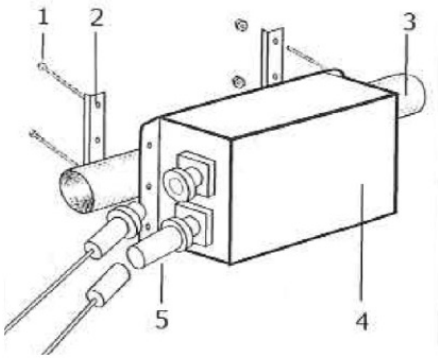
Due to its weight it is recommended that the connection box is mounted horizontally as shown in the figure:



4.2 For SubLite Integra 250W/400W/1000W

Can also be hung by the hand rail.

1 Insert the bolts from the back side
2 Mount brackets behind the pipe
3 Rail
4 Connection box
5 Under water light cable



5 Power connection SubLite

The Idema Under Water Lights should only be used with a 230 VAC 50 HZ power connection.

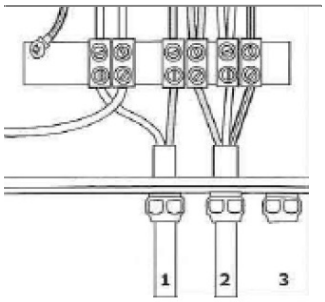
If the installation contains long cable stretches, make sure that the voltage is over 200 VAC where the luminaire is connected.

Pooled termination:

1 Out to light

2 230V AC in

3 Possible to continue transfer of 230 V



Please note that the luminaire must be connected to the armature contact on the connection box, not to the main power.

In the 2000W connection box, there is only termination inside the box.

Idema Underwater Lights are connected to power via one of two methods:

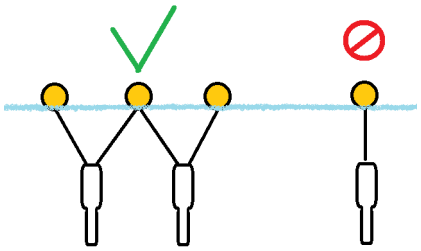
a directly from barge to cage, or
b from barge to closest cage, with distribution from cage to cage (three-phased)

All light power cables are made of PUR and can be delivered with 35 or 55 meter lengths.

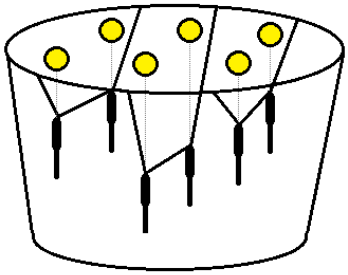
6 Luminaire suspensions

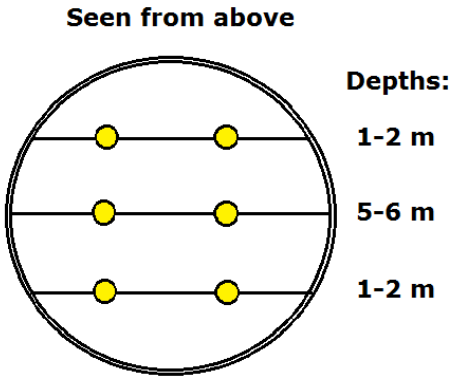
The luminaire must be suspended in a way that does not allow it to rotate around its own axis.

They can be suspended as a V:

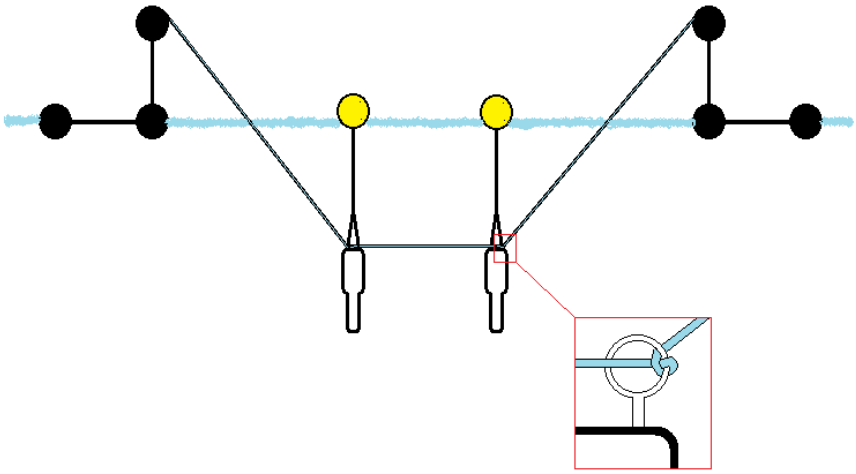


or stabilized with ropes:

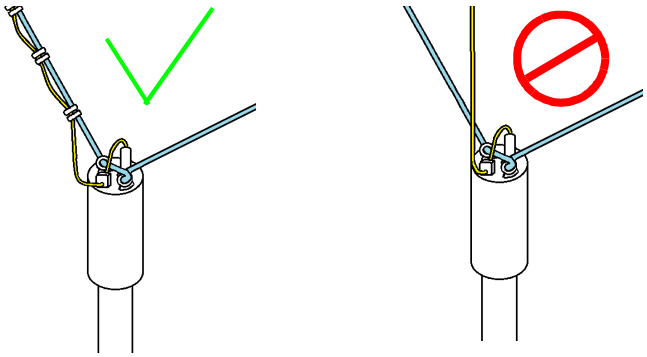




The rope must be fastened steadily to the lamp,
either with two ropes or with a stabilization rope that runs through both eye bolts off the lamp, stabilized with a knot:



Tape or strips the cable to the rope:



Make sure that the cable is not too tightly fastened, it needs to hang flexible to avoid strain caused by movement in the luminaire.
If the cable is fastened wrong, and the cable is pulled off the luminaire or the bushing nipple, a leak will appear.
This error will not give warranty rights.

Ensure that the cable does not get any cracks or breaks during mounting, as this can cause further damage to the cable and weaken the effect of the lamp and reduce its life span.

7 Service and maintenance

The choice of material and design is made to ensure easy maintenance of the product.

By ensuring correct suspension, connection and maintenance of the equipment it will provide you with the desired functions for years ahead.

To secure the best possible functionality and use of the product, regular external cleaning is recommended.

Use a scrub or a brush to remove fouling, shells and other fixed material on the outside of the luminaire and cable. Perform external maintenance regularly, we recommend taking out luminaries for checking and maintenance once a month, and more often during the warm seasons, when the sprout-growth is at its most.

The external parts (glass, POM and PUR) can be disinfected if moving to a new locality or after diseases in cages or tanks. We recommend that the parts are rinsed with fresh water after disinfecting.

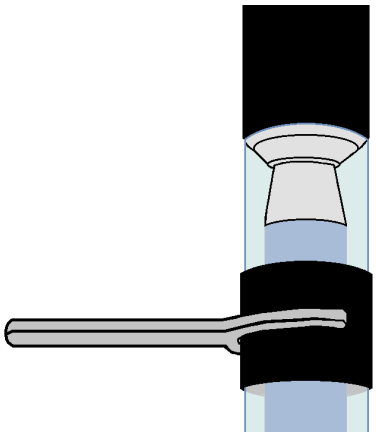
When changing bulb it can be beneficial also to change the O-rings (see chapter 7.1. Change light bulb).

For internal maintenance beyond changing bulb and O-rings, contact AKVA group for a consultation.

7.1 Change light bulb

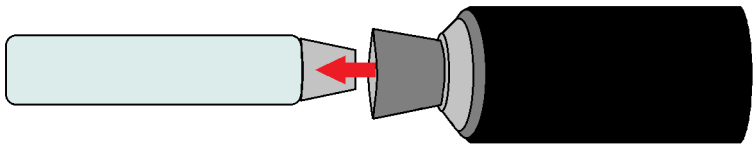
7.1.1 SubLite Standard 2000W

1 Place the hooked spanner in the holes of the tension nut. Hold the luminaire still and screw the tension nut off.

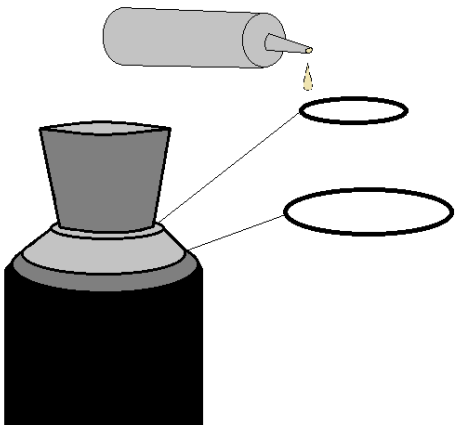


2 Pull the glass off.

3 Lay the luminaire flat and replace the bulb.

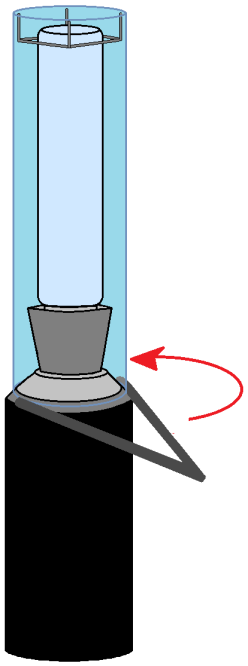


4 Lubricate the O-rings with Super Lube (or any other type of teflon grease)



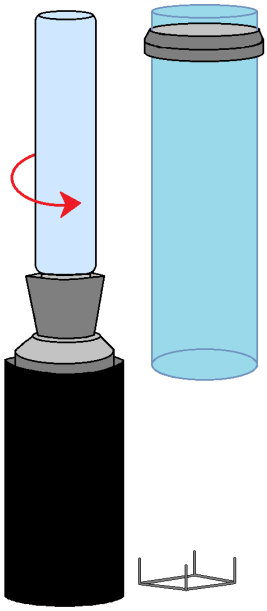
5 Carefully push the glass into the luminaire.
The bulb positioner must be placed in the bottom of the glass. Make sure that no impurities lies on the O-rings or on the glass, and ensure that the O-ring lies firmly against the glass all the way around. Hold the luminaire still and fasten the tension nut using the hooked spanner.

7.1.2 SubLite Integra 250W/4000W/1000W

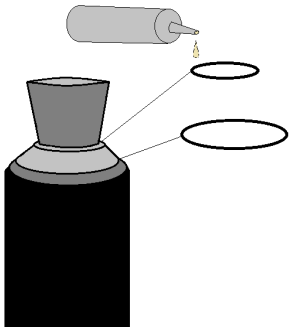


1 Place the taps of the hooked spanner in the holes of the tension nut. Carefully screw the tension nut counter-clockwise to open.

There might be gas/pressure inside the lamps glass, so make sure that the opening is never directed towards a person when opening the tension nut.



2 Lift off glass and tension nut and change the bulb.



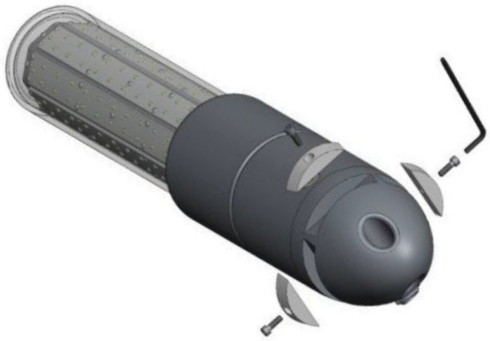
3 When changing the bulb you should also change O-rings. The O-rings must be lubricated with Super Lube (Teflon grease). Make sure that the glass and the O-rings are clean and free from any dirt prior to fastening the tension nut.

4 Before fastening the tension nut, also assure that it is correctly positioned in the threads, and that the bulb positioner is placed correctly between the glass and the bulb.

7.2 Change male contact BlueLED 100W and 400W

Replacement of the male contact must only be performed by an authorized electrician.

7.3 Change anodes – BlueLED 400W



Use a 5mm Unbraco key to release the screws, then remove and change the anodes. Refasten the screws.

7.4 Regular maintenance

Take a copy of this form before filling it out.

Date	Task performed	Signature

7.5 Record of changed luminaire and other parts

Take a copy of this form before filling it out.

Date	Part	Reason	Comment	Signature

8 Deviation form

Deviation no.:	

Unit:	**Producer:**	**Prod.no.:**	**Purchase year:**

Deviation description:
Follow up proposition:
Date and signature, declarer:

Follow up directed:
Status:
New action for deviation no.:
Date and signature, follow up:

Remember to make copies of this form before using it!

9 Notes