



Product Catalogue

Aquaculture

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Complete solutions for aquaculture use

Aquaculture continues to be the fastest-growing animal food producing sector in the world. With global capture fishery production at maximum yields and faced with a growing population, aquaculture is perceived as the only viable option to increase the global production of seafood. Fish farming has become the most popular form of aquaculture and there are an increasing number of fish farms around the world. As unmarked these fish farms pose a threat to marine traffic and farm structures can be damaged by vessels causing the release of augmented salmon to the wild.

Carmanah/Sabik's marine lanterns have proven their durability for over 30 years as navigation aids in the marine industry and are well suited for aquaculture use. Carmanah/Sabik has developed different solutions to mark fish farms visibly.

Carmanah/Sabik's high performance lanterns together with e.g. AIS offer flexible and customizable solutions to protect your fish farm and make it more visible. Carmanah/Sabik have several sizes of lanterns and solutions available to suit different locations and different sizes of farms fulfilling the regulatory requirements.

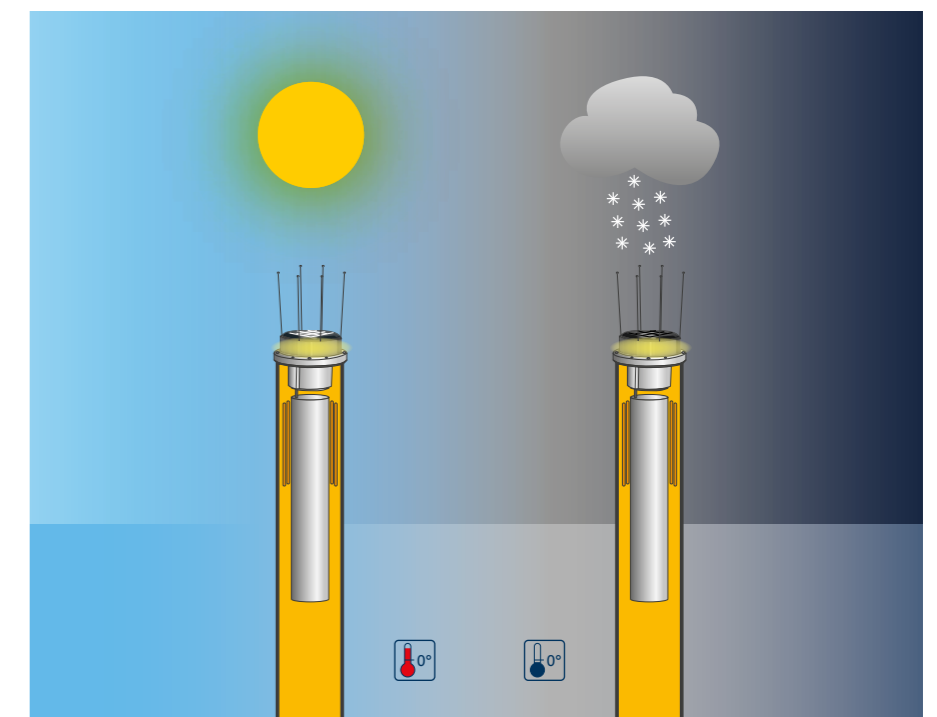


Carmanah/Sabik lanterns – high performance for harsh conditions

The main solution for aquaculture farms includes SBFL 160, M550 and M650H lanterns. SBFL 160 marker light with a primary alkaline battery is especially designed for aquaculture use. It can be ordered with special attachments designed for harsh open sea conditions.

Sabik offers also a unique hybrid model SBFH 160 with both solar powered energy system and an alkaline battery. Both SBFL 160 and SBFH 160 are equipped with integrated radar reflectors and external light reflectors. SBF lights can be programmed and controlled with Bluetooth programming available for android and IOS mobile phones. With Bluetooth you can program and control your lantern up to a 50 meter radius.

M550 and M650H are both economical high quality solar lanterns, M550 for short range and M650H for medium range use. If you require remote monitoring, a medium sized versatile lantern SC 110 can be installed with GSM and GPS monitoring. You can also choose the larger M860 lantern with remote satellite monitoring.

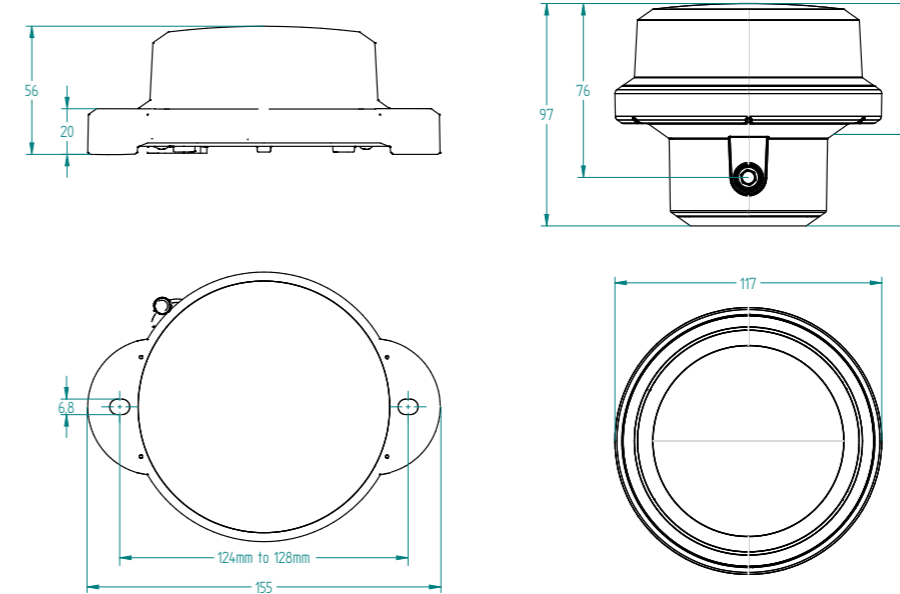


M550

Solar Powered Short Range LED Lantern 1 to 3 NM Range

This economical solar powered lantern is for marking fish farms. The lantern has replaceable, recyclable batteries and therefore provides excellent value and reliable operation over the long term. Battery life expectancy is up to five years.

- 40 user-adjustable flash patterns and programmable intensities
- Replaceable, recyclable, high-temperature-rated NiMH AA batteries
- Automatic Light Control (ALC) to achieve optimal intensities throughout the year
- Premium grade, UV resistant polycarbonate body and lens material
- IP 68 rated
- Ventilated battery compartment
- IR Controller: Check battery status, change flash code, adjust light intensity and turn lantern off with optional mini IR (Infrared) programmer
- Optional external ON/OFF switch
- Stainless steel bird deterrent available as an accessory. Fits up to four per lantern
- Lantern with pole mount can easily be adjusted to 2 3/8 or 1 7/8 in pole dimensions



Weight Flange Mount: 0.37 kg, (0.8 lbs), Pole Mount: 0.40 kg (0.9 lbs)
Installation 2 x M6 on 128 mm dia

Optical performance

Maximum fixed intensity >8° (FWHM)	Vertical divergence			
18 cd	23 cd	29 cd	25 cd	8 cd

NOTE: Peak IALA intensity dependent on location. To view performance in your installation location visit www.carmanahmarine.com/selector.

Order Overview M550

Option matrix

M550 Flange Mount - Switched	2-bolt mount with ON/OFF switch
M550 Flange Mount - Unswitched	2-bolt mount. No ON/OFF switch
M550 Pole Mount	Pole mount. No ON/OFF switch

Accessories

69935	Pole Mount Replacement/Conversion Kit
70937	Switched Kit (compatible with Flange Mount only)
70955	Replacement NiMH batteries
69934	Bird Deterrent (single)

Product codes

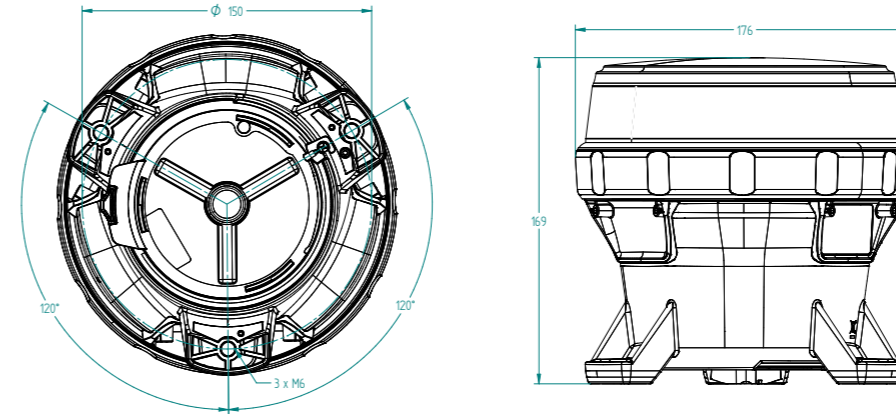
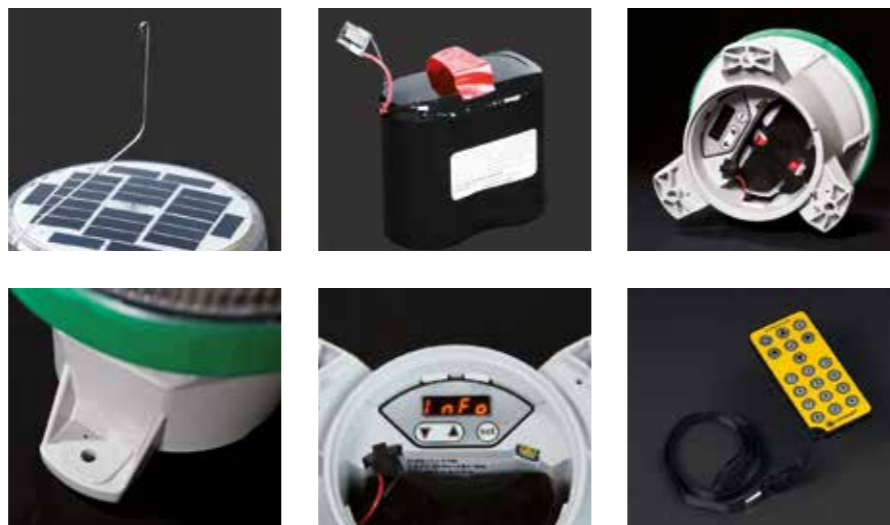
Colour	M550 Flange unswitched	M550 Flange switched	M550 Pole
red	M550RF	M550RF-S	M550RP
green	M550GF	M550GF-S	M550GP
white	M550WF	M550WF-S	M550WP
yellow	M550YF	M550YF-S	M550YP
blue	M550BF	M550BF-S	M550BP

M650H

Self-contained Medium Range LED light for fish farms from 2 to 4+ NM Range

The M650H is a high-performance, low-maintenance and easy-to-install solar LED lantern for aquaculture farms. It can be fixed directly on the farms, on marker buoys and feeding stations. The M650H features a replaceable battery pack that extends the service life beyond five years, reducing the total cost of ownership.

- High-efficiency solar cells with bypass and blocking diode function. Maximum power point tracking (MPPT) for optimal energy collection
- Premium grade UV resistant, polycarbonate/polysiloxane co-polymer body and lens material
- IP 68 rated. Double O-ring sealing with waterproof vent
- Sealed Lead Acid battery
- Ventilated battery compartment
- Programmable with On-Board User Interface, USB port, or optional wireless IR-Programmer
- Optional ON/OFF switch and external charger
- Optionally integrated GPS synchronization available
- IR Controller: Check battery status, change flash code, adjust light intensity and turn lantern off with optional mini IR (Infrared) programmer
- One stainless steel bird deterrent included



Weight: 1.58 kg, Installation 2 x M6 on 128 mm dia
Supports installation on structure using 3 x M6 bolts on a 150 mm diameter.

Optical performance

Maximum fixed intensity >8° (FWHM)		Vertical divergence		
31 cd	45 cd	60 cd	52 cd	15 cd

NOTE: Peak IALA intensity dependent on location. To view performance in your installation location visit www.carmanahmarine.com/selector.

Order Overview M650H

Option matrix

M650H Switched	ON/OFF switch
M650H Unswitched	No ON/OFF switch
M650H Switched GPS	Includes GPS synchronization & ON/OFF switch
M650H Unswitched GPS	Includes GPS synchronization (no ON/OFF switch)
57003	650 Bird Deterrent – Additional (1 ships with each lantern)
57392	650 Bottom Cover Replacement Pack Switched
57393	650 Bottom Cover Replacement Pack Unswitched
59198	650 Bottom Cover Removal Tool
72835	650 Battery Replacement Pack
59188	650 International Wall Charger Assembly
57394	650 USB Cable
69899	IR (Infrared) Programmer

Product codes

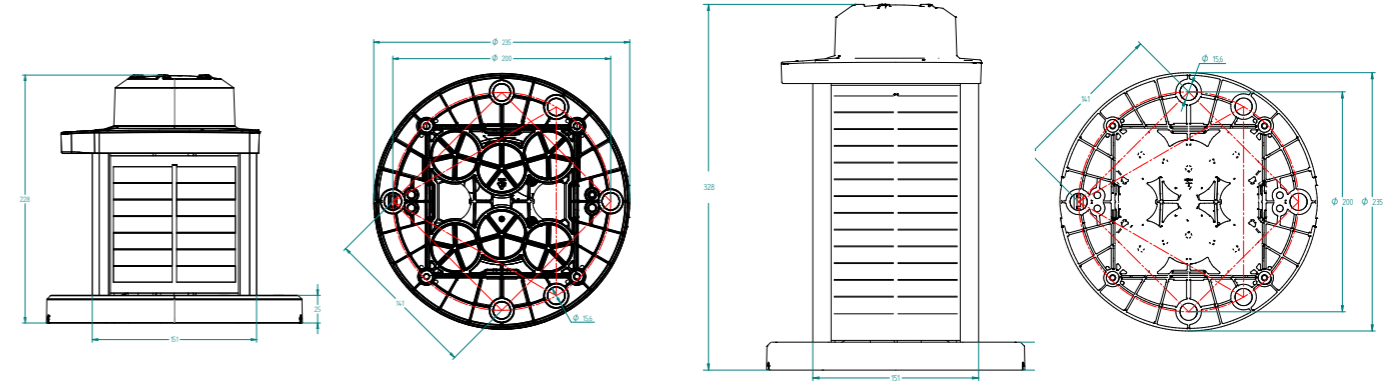
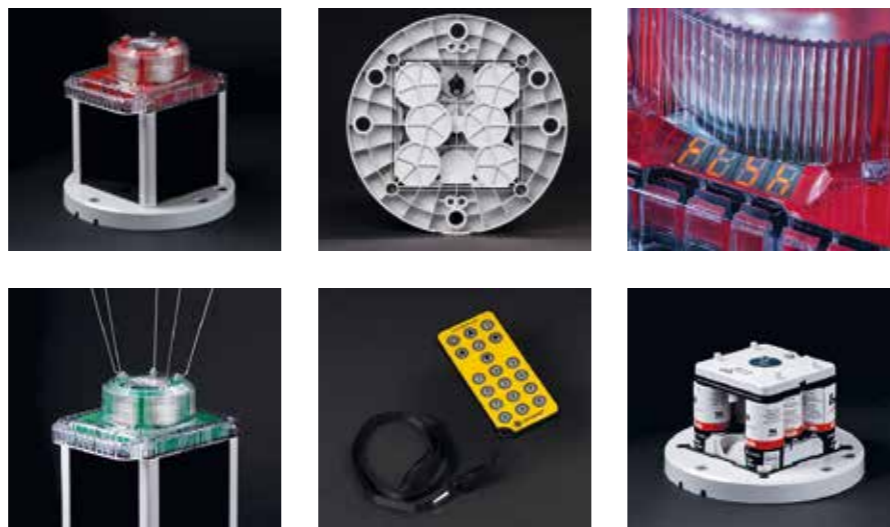
Colour	M650H unswitched	M650H switched	M650H unswitched GPS	M650H switched GPS
red	M650HR	M650HR-S	M650HR-GPS	M650HR-SGPS
green	M650HG	M650HG-S	M650HG-GPS	M650HG-SGPS
white	M650HW	M650HW-S	M650HW-GPS	M650HW-SGPS
yellow	M650HY	M650HY-S	M650HY-GPS	M650HY-SGPS
blue	M650HB	M650HB-S	M650HB-GPS	M650HB-SGPS

M850 & M860

Solar Powered LED Marine Lantern for 3 to 7+ NM Range

The M800 series lanterns combine a compact, high-efficiency solar engine with premium components and a rugged design for best-in-class performance at an optimal price. These lanterns are suitable for use in most solar locations.

- **Built-in calendar function for automatic de-activation during off-season months**
- **Top-mounted 4-character LED display with simple »tap to activate« functionality**
- **Premium grade, UV resistant polycarbonate lens material**
- **Environmentally friendly, super durable powdercoated aluminium chassis**
- **Adjustable intensity and range**
- **IP 68 rated**
- **GPS synchronized flash option**
- **Infrared programmer:** check battery state of charge, program flash codes, set intensities and more
- **Scalable Battery Pack:** Multiple replaceable, recyclable battery pack options for reliable, cost-effective performance in a variety of installation locations



Weight: 4.5 kg M850 60X, 5.3 kg M850 96E, 6.4 kg M860 96E, 10.2 kg M860 200 BC
 Installation 3,4 or 5 x M12 on 200 mm dia

Optical performance

Maximum fixed intensity M850/M860	Vertical divergence	8° (FWHM)
M850/M860 239 cd 290 cd	445 cd	320 cd

NOTE: Peak IALA intensity dependent on location. To view performance in your installation location visit www.carmanahmarine.com/selector.

Order Overview M850 & M860

Accessories

69885	M800 Series AC/DC 12V-2.5A Charger, International Plug Adapters
69934	Bird Deterrent (single)
69954	M800 Series Battery Replacement Kit - 60 Wh
69955	M800 Series Battery Replacement Kit - 96 Wh
69956	M800 Series Battery Replacement Kit - 200 Wh
69899	Remote Control
Lens	Wide optical divergence 10° on request
M860 200PC	Light Guard Monitor Satellite Global Star

Product codes

Colour	M850 60X (with 60Wh battery)	M850 96E (with 96Wh battery)	M850 60X GPS (with 60Wh battery)	M850 96E GPS (with 96Wh battery)
red	M850R-60X	M850R-96E	M850R-60XGPS	M850R-96EGPS
green	M850G-60X	M850G-96E	M850G-60XGPS	M850G-96EGPS
white	M850W-60X	M850W-96E	M850W-60XGPS	M850W-96EGPS
yellow	M850Y-60X	M850Y-96E	M850Y-60XGPS	M850Y-96EGPS

Product codes

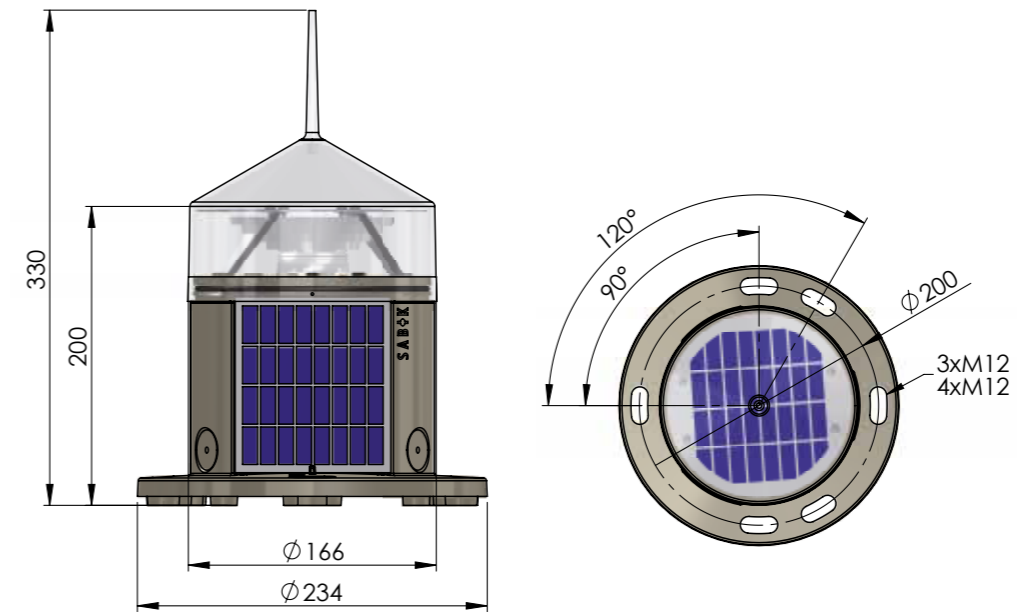
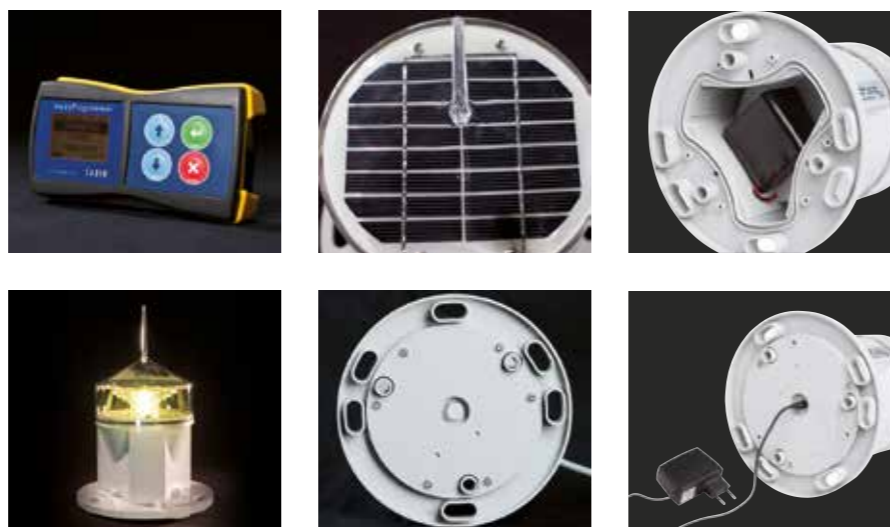
Colour	M860 96E (with 96Wh battery)	M860 200BC (with 200Wh battery)	M860 96E GPS (with 96Wh battery)	M860 200BC GPS (with 200Wh battery)
red	M860R-96E	M860R-200BC	M860R-96EGPS	M860R-200BCGPS
green	M860G-96E	M860G-200BC	M860G-96EGPS	M860G-200BCGPS
white	M860W-96E	M860W-200BC	M860W-96EGPS	M860W-200BCGPS
yellow	M860Y-96E	M860Y-200BC	M860Y-96EGPS	M860Y-200BCGPS

SC 110

Medium range self-contained LED light for aquaculture farms for 2 to 4 NM

SC 110 is especially suitable for fish farming due to its high optical performance and high quality components, fulfilling the strictest requirements. SC 110 is a medium range LED lantern built from polycarbonate including an integrated solar power system. The lantern is available in 2 and 4 Nm versions. It can be ordered either with Lithium-ion (LiFePO4) or NiMH batteries.

- Range up to 4 NM (Tc = 0.74)
- Standard IALA colours Red, Green, White, Yellow
- Internal calendar, light can be switched off for winter
- Programming with a wireless Sabik Easy Programmer, PDA Programmer or with PC/USB interface
- IP 67 rated
- Optionally integrated GPS synchronization and GSM monitoring
- Can be equipped with Light Guard monitoring system
- Lens: Bird deterred top design
- Storage charging with external charger



Weight: 2Nm 2.5 kg and 3 Nm 4.2 kg

Optical performance

Maximum fixed intensity				
SC 110	40 cd	40 cd	50 cd	45 cd

Order Overview SC 110

Option matrix

LightGuard GSM + GPS	Integrated GSM based monitoring with GSM/GPS antennas
GPS sync	Integrated GPS sync only unit with GPS antenna
Optical Feedback System	Integrated LED performance measurement
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

Product codes

SCN 110 2 NM self-contained with NiMH battery 8,6 Ah	SCL 110 2 NM self-contained with LiFePO4 battery 7,5 Ah	Colour (1 solar panel)
SCN 110.2 WW	SCL 110.2 WW	white
SCN 110.2 WR	SCL 110.2 WR	red
SCN 110.2 WG	SCL 110.2 WG	green
SCN 110.2 WY	SCL 110.2 WY	yellow

SCN 110 3 NM self-contained with NiMH battery 26 Ah	SCL 110 3 NM self-contained with LiFePO4 battery 22,5 Ah	Colour (4 solar panels)
SCN 110.3 WW	SCL 110.3 WW	white
SCN 110.3 WR	SCL 110.3 WR	red
SCN 110.3 WG	SCL 110.3 WG	green
SCN 110.3 WY	SCL 110.3 WY	yellow



SBFL 160

Marker Light for Aquaculture Farms

SBFL 160 is a marker light especially developed for aquaculture farms. The unit is designed to meet requirements regarding night and day time visibility as well as radar visibility. It can also be installed directly on floats for aquaculture farms.

The marker light consists of a yellow buoy tube with integrated alkaline battery, LED lantern, light reflectors as well as internal radar reflector. The partly integrated, robust lantern has very low power consumption and is equipped with GPS synchronization. LightGuard remote monitoring can be added as option. Advanced bluetooth programming app also available for android and IOS mobile phones.

- Adjustable intensity and range
- Standard range 3 NM at Tc = 0.74 (4,5 NM at Tc = 0,85)
- Standard IALA yellow colour light
- Equipped with internal radar reflector
- Energy sources: alkaline primary battery
- Vertical divergence 8° @ 50% (±1°) of peak intensity
- GPS synchronization as standard
- Optionally integrated GSM/GPS remote monitoring
- Mounting mechanism can be customized for different floats
- Sabik Easy programmer can be used for programming the lantern and for reading the status of the lantern and battery
- Advanced bluetooth programming and control up to 50 m radius available as a new app



Main Technical Specification

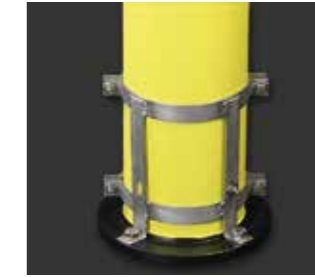
Lantern intensity setting	17 cd
Max lantern intensity	40 cd
Vertical divergence	8° @ 50% (±1°) of peak intensity
Buoy material	UV resistant Polyethylene
Lantern material	UV resistant Polycarbonate
Weight without adapter plate	33 kg
Degree of protection, lantern	IP 67
Lantern programming	Wireless with Sabik Easy programmer or with an advanced Bluetooth android mobile app
Primary battery 220 Ah	Changing interval > 1,5 year



Lens
Sabik designed optics with polycarbonate lens.



Mechanics
Special mechanics suitable for different types of floats available.



Strengthening attachments
Special strengthening attachments as an accessory.



Light reflectors
External reflectors in the upper part of the buoy.



Programming and control
Lantern can be programmed and battery status controlled also with an advanced Bluetooth app for android and IOS mobile phones.



Programming and monitoring
Lantern can be programmed and battery status monitored with the Sabik Easy Programmer.



Battery and radar reflector
220 Ah primary battery and radar reflector integrated in the marking light.

Product codes

SBFL 160-1.7YBS	Marker light with 220Ah primary battery + sync
SBFL 160-1.7YTS	Marker light with 230/12V power supply and 12Ah back-up battery + sync

Product code for mechanical fixing

841011	Mechanics for buoy installation
841022	Mechanical strengthening for buoy installation

Product code for lanterns

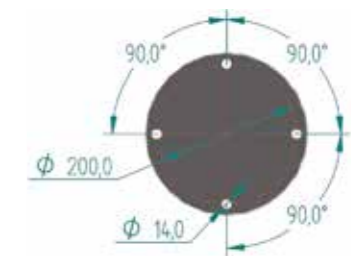
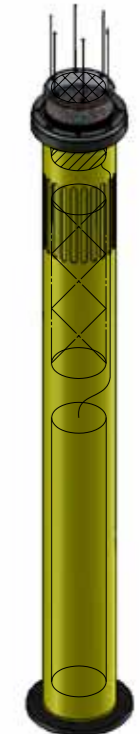
VPL 110Y4	Lantern for SBFL marker light with synchronization
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Product code for battery

950168	220 Ah primary battery
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Product code for Programmer

980332	Sabik Easy Programmer
	Bluetooth app for android and IOS mobile phones available



SBFH 160

Hybrid Marker Light for Aquaculture Farms

SBFH 160 is a hybrid marker light especially developed for aquaculture farms. It is designed to meet requirements regarding night and day time visibility as well as radar visibility. It can also be installed directly on floats for aquaculture farms. This hybrid marker light has a unique hybrid system including a solar panel and an integrated rechargeable battery. During the dark winter months an alkaline battery is used as a power supply. The partly integrated, robust lantern has very low power consumption and is equipped with GPS synchronization. LightGuard remote monitoring can be added as option. Advanced bluetooth programming app also available for android and IOS mobile phones.

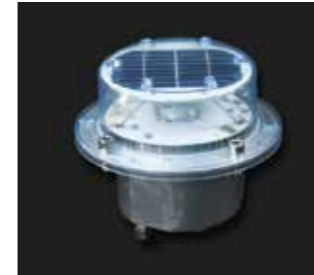
- Adjustable intensity and range
- Standard range 3 NM at Tc = 0.74 (4,5 NM at Tc = 0,85)
- Standard IALA colours
- Equipped with internal radar reflector
- Energy sources: main Nimh battery and solar panel as main and Alkaline battery as back-up
- Vertical divergence 8° @ 50% (±1°) of peak intensity
- GPS synchronization as standard
- Optionally integrated GSM/GPS remote monitoring
- Remote monitoring with LightGuard Monitor
- Mounting mechanism can be customized for different floats
- Sabik Easy programmer can be used for programming the lantern and for reading the status of the lantern and battery



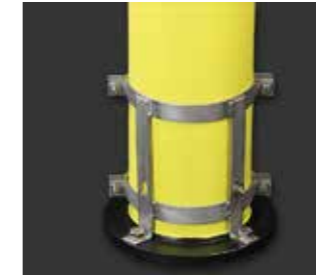
- Advanced bluetooth programming up to 50 m radius available as a new feature

Main Technical Specification

Lantern intensity setting	17 cd
Max lantern intensity	40 cd
Vertical divergence	8° @ 50% (±1°) of peak intensity
Buoy material	UV resistant Polyethylene
Lantern material	UV resistant Polycarbonate
Weight without adapter plate	35 kg
Degree of protection, lantern	IP 67
Lantern programming	Wireless with Sabik programmer
Primary battery 220 Ah	Changing interval > 1,5 year



Lantern
Light unit lens produced of polycarbonate. Integrated solar panel and rechargeable battery.



Special mechanics as an accessory
Special mechanics suitable for different types of floats are available.



Light reflectors
External reflectors in the upper part of the buoy.



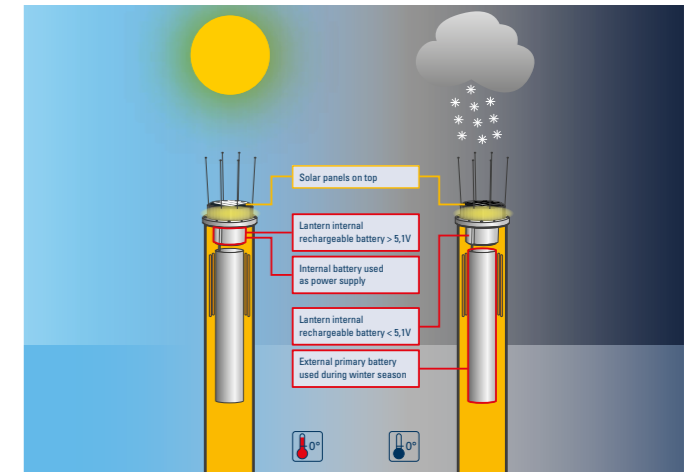
Programming and monitoring
Lantern can be programmed and battery status monitored with the Sabik Easy Programmer.



Programming and monitoring
Lantern can be programmed and battery status monitored also with the Sabik Bluetooth application.



Back-up Alkaline battery and radar reflector
220 Ah primary battery and radar reflector integrated in the marking light.



Product codes

SBFH 160-1.7YBS

Hybrid marker light with integrated rechargeable battery and a 220 Ah battery as back-up + sync

Product code for mechanical fixing

841011

Mechanics for buoy installation

841022

Mechanical strengthening for buoy installation

Product code for lanterns

HBL 110Y4

Hybrid lantern for SBFL marker light with synchronization

Product code for battery

950168

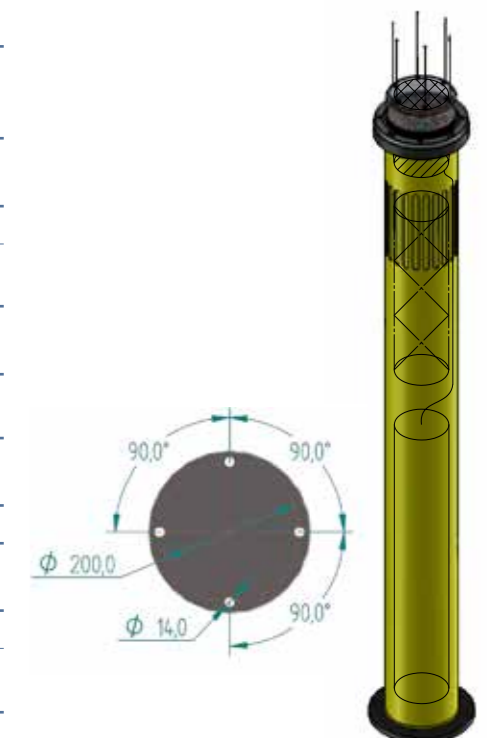
220 Ah primary battery

Product code for Programmer

980332

Sabik Easy Programmer

Bluetooth app for android and IOS mobile phones available

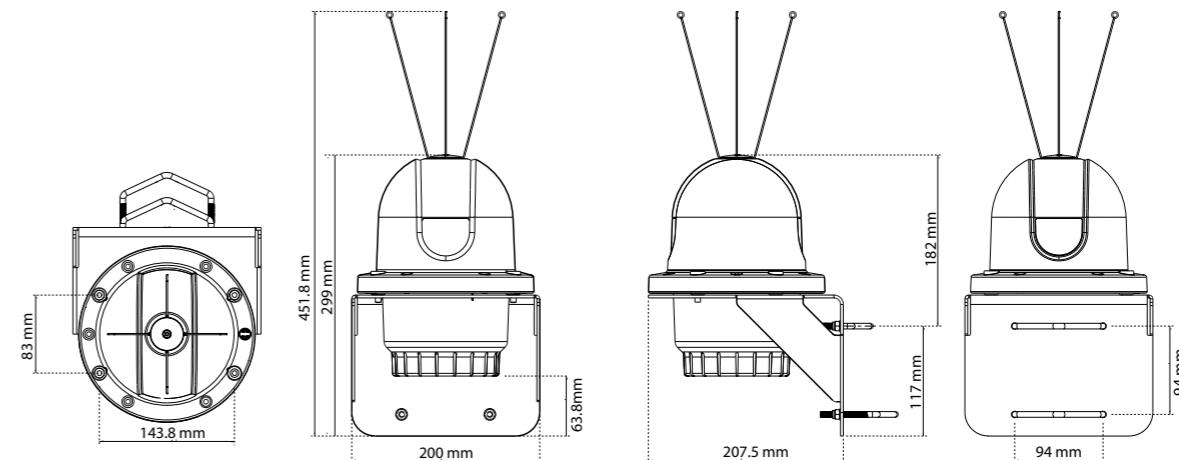
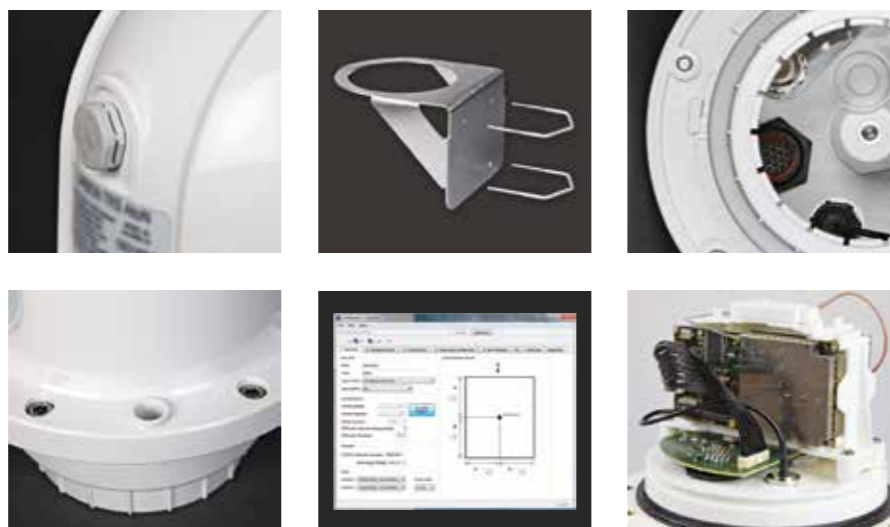


LightGuard AIS for AtoN

The LightGuard AIS (LGA) unit is a fully compliant AIS transponder suitable for all aids to navigation installations. Housed in a rugged triple protected housing suitable for the harsh marine environment, it can be deployed on exposed locations, on buoys and fixed structures. The unit comes with GPS antenna integrated in the housing but external GPS antenna can be connected if required.

The unit is supplied with a standard stainless steel mounting bracket making the installation to a buoy or a beacon structure easy.

- Rugged enclosure with IPx6 and IPx7 degree of protection
- Integrated GPS antenna in enclosure
- Lowest power consumption on the market in both Type 1 and Type 3 configuration
- Integrated interface to lantern (health and ON/OFF) and racon (health)
- Supports messages #6, #8, #12, #14, #21, #25 and #26
- Supports virtual messages
- Wide voltage range from 10 to 32 VDC
- Approved by the Federal Maritime and Hydrographic Agency (BSH)



Main Technical Specification

Weight	1.3 kg without cables and mounting bracket	
ELECTRICAL		
Supply voltage	10 to 32 VDC (absolute min and max)	
Average Power consumption @ 12VD	Type 1 (FATDMA channel access)	< 45 mW (0,09 Ah/day) with 1 msg/3 minutes
	Type 3 (RATDMA channel access)	< 400 mW (0,8 Ah/day) with 1 msg/3 minutes
	typical added consumption for optional sensor board	+ 50 mW (0,1 Ah/day) with one input active (consumption varies with I/O's and functionality)
STANDARDS		
Applicable equipment standards	IEC62320-2 ITU-R M.1371-4 IEC61162-1 IEC61162-2 IEC61108-1 IEC60945	
Approvals	BSH approved	
INCLUDED IN PACKAGE	AtoN transceiver Stainless steel mounting bracket and fixing Bird deterrent components USB configuration cable Mating connectors for power and data cables Optional sensor interface cables Product manual and CD with programming software	

Functionality

The unit is available in both Type 1 (transmit only via FATDMA channel access) and Type 3 (transmit and receive using RATDMA channel access) configuration. In standard configurations it can be directly interfaced to a Sabik lantern for updating the lantern health and ON/OFF status in the message 21.

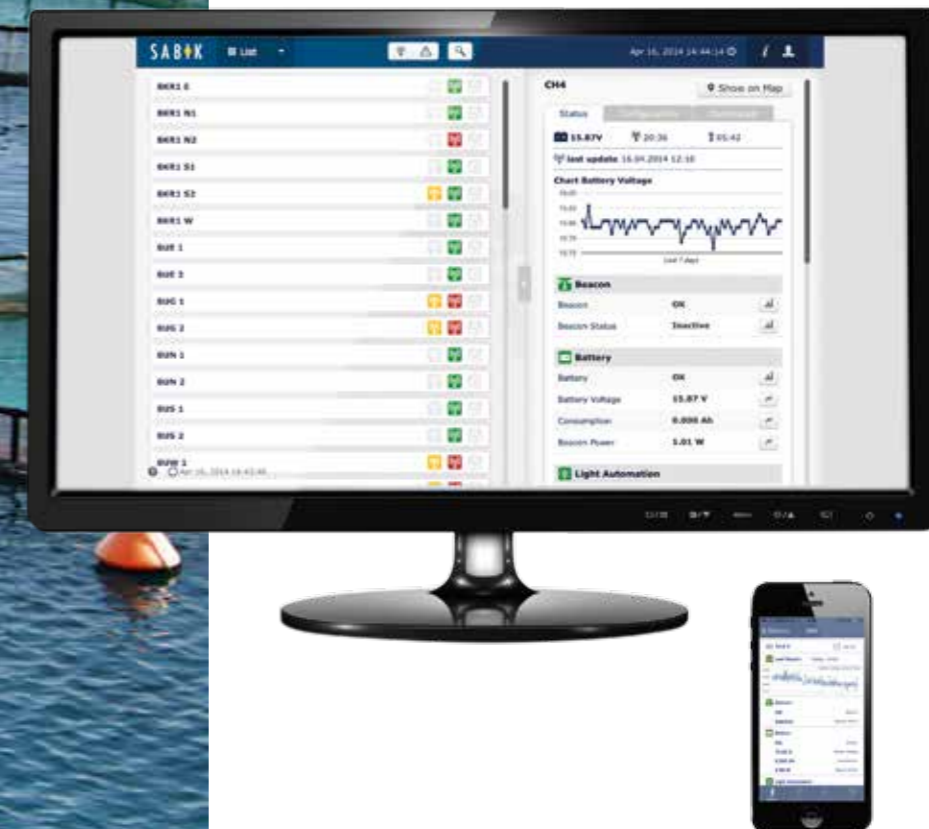
Order Overview LightGuard AIS for AtoN

Product code	Description
LGAT1	LightGuard AIS transponder Type 1 (Transmit only)
LGAT1S	LightGuard AIS transponder Type 1 (Transmit only) with sensor board
LGAT3	LightGuard AIS transponder Type 3 (Transmit and receive)
LGAT3S	LightGuard AIS transponder Type 3 (Transmit and receive) with sensor board

Easy-to-use, monitor and control – also with Bluetooth

Carmanah/Sabik also offers easy monitoring and control of your fish farm. The LightGuard Monitor system can be used in fish farming so that one can monitor the position of a fish cage in addition to lantern functionality and battery voltage. An alarm will be sent with position information if the fish cage moves e.g. due to strong wind from its original position.

As an extra, we offer a Bluetooth application for easy mobile programming and control of SBFL 160 and SBFH 160 up to 50 meter radius from the lantern. This app is available for android and IOS mobile phones by complementing the LightGuard Monitor solution and making lantern monitoring even more comprehensive.



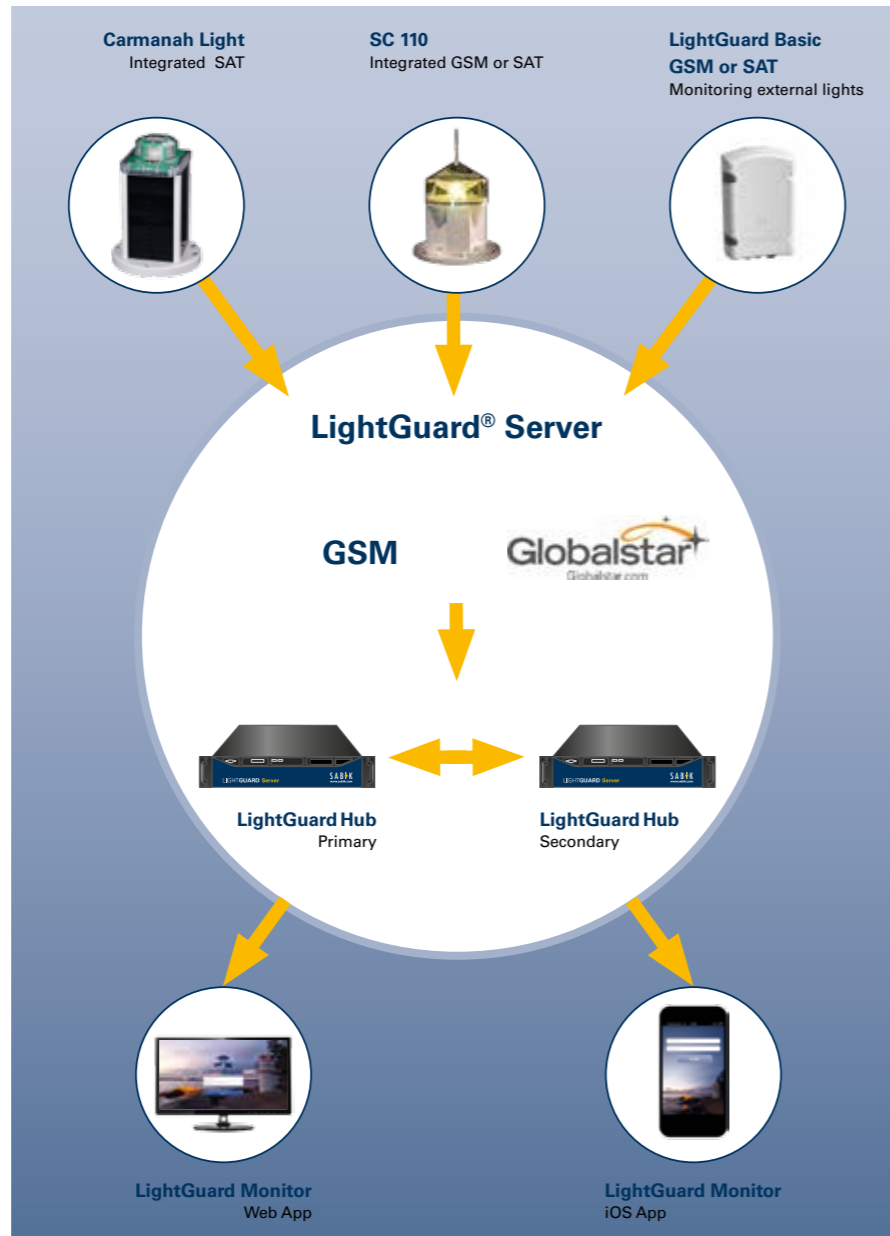
LightGuard Monitor

Intelligent Remote Control

LightGuard Monitor is an intelligent web-based software solution for monitoring lanterns in fish farms and positioning of fish cages. Optionally, it can also be used to monitor marine traffic using real-time AIS data.

The state of the art, web-based interface means that it can be used on any internet enabled desktop computer, laptop or tablet regardless of the hardware and the operating system installed.

We have also developed the LightGuard Monitor app for IOS mobile access to the data of your monitored stations. SMC-enabled SABIK lights facilitate two-way communication via GSM.



List view
The list view uses simple symbols to show the most important details at a glance, such as alarm, light on/off and the status of communication.



Detail view
The detail view provides a quick overview of more important parameters, such as battery status and on and off times of the stations.



Search and sort
Well designed search and sort functions enable fast access to specific stations, for example to all stations with a reported alarm.



Status report
Selecting a station provides you with a detailed status report with chart views without losing sight of all the other stations.



Configuration
Accessing the configuration of a station is just as easy as accessing the status, assuming the user has the appropriate access rights.



Two-way communication
Two-way communication makes it possible to set up, configure or test new stations via the software interface.



Map display
In addition to having all stations clearly displayed as a list, they can also be displayed with the status symbols on different charts.



Map selection
A variety of chart views can be selected for displaying the stations, these include marine charts with a variable degree of image detail or satellite images.



AIS display
It is not only possible to monitor aids to navigation. AIS data can optionally be used to display marine traffic in the electronic chart display system.



Security
A password prompt protects the software against unauthorized access attempts. A 2-factor authentication process for login provides a further level of security.



Smartphone APP
We have also developed the LightGuard Monitor app. You can keep an eye on your monitored data at all times with an Internet-enabled smartphone.



LightGuard Server
With a primary server and a secondary server, there are always two redundant data stores no matter what.



Carmanah/Sabik – a cooperation to enhance safety

Carmanah and Sabik are corporate partners sharing technological knowledge with sales and marketing cooperation. Together, Carmanah and Sabik deliver one of the most comprehensive lines of marine lighting solutions in the world and are able to provide solutions for aquaculture needs. Our joint global distribution network covering all the continents serves our customers in all longitudes and latitudes.

Sabik is one of the world's leading manufacturers of visual signals with a mission to enhance safety in the traffic: on the waterways, on the roads and in the railways. With more than 30 years of experience Sabik has been delivering reliable and robust products and high quality services for nearly every country in the world.

Carmanah has earned a reputation for delivering strong and effective products for industrial applications worldwide. Industry proven to perform reliably in some of the world's harshest environments, Carmanah solar LED lights and solar power systems provide a durable, dependable and cost effective energy alternative.



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