PRODUCT CATALOGUE MARINE SIGNALS 2018-2019

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Product Catalogue

Marine Signals

2018-2019

Marine Products

- Marine Lanterns
- Self-contained Lanterns
- Monitoring & Control
- Power Systems

Self-contained M850
on a port buoy in Turkey

VP LED lantern on an ice buoy
in the archipelago of Finland

Company

Foreword 4
Company presentations 6

Marine Lanterns

LED 110 – Buoy lantern 10
LED 155 – Buoy lantern 14
VP LED – Ice buoy lantern 18
MPV LED – Ice buoy lantern, heavy duty 22
LED 160 – Full-range lantern 26
LED 350 – Medium range lantern 30
LED 350H – Long range lantern 34
ODSL 200 – Sector light 38
E8592 – Projector Sector Light 42
E8593 – Projector Sector Light 46
E8594 – Projector Sector Light 50
LS 100 – Range light 54
LO 200M – Range light 58
LO 200 – Range light 62
LO 200H – Range light 66
E8554 – Range light 70
LT 1000 – Light Tube 74
SBFL 160 – Marker Light 78
SBFH 160 – Hybrid Marker Light 80
Lantern Technology 82

Self-contained

M550 – 1 to 3 NM lantern 88
M650H – 2 to 4+ NM lantern 92
M660 – 2 to 4+ NM lantern 96
M850 – 3 to 6+ NM lantern 100
M860 – 4 to 7+ NM lantern 104
HBL 110 – Hybrid LED lantern 108
SC110 – LED lantern 112
SC 160 I – LED lantern 116
SC 160 II – LED lantern 120
SCLS 100 – LED light 124
SCL0 200M – LED light 128

Monitoring & Control

LightGuard 134
LightGuard Monitor 136
LightGuard Basic 138
Sabik lanterns with integrated AIS 140
Sabik Bluetooth® Control 141
LightGuard AIS for AtoN 142

Power systems

Solar Modules 148
PS 30/PS 120 – Main Power Supplies 150
UPS 12 – Uninterruptible Power Supply 151
Alkaline Primary Batteries 152
Sonnenschein Solar Block – VRLA Batteries 154
Sunica Ni-Cd Batteries 156
SBE 86/86SS – Battery Cabins 158
SBE 68SS – Battery Cabins 160

General

Engineering 162
Quality and Environment 164
Appendixes 166

In a niche business segment like Marine Aids to Navigation, a manufacturer can only prevail by continually delivering value to the customer. The market is slowly changing, and as a manufacturer we need to be able to adapt to new requirements and adopt new ideas. Autonomous ships are being developed, e-Navigation is already utilized in various ways, new inland water routes are being developed for transportation and new arctic routes are being discussed.

Since the foundation of our company, we have always been committed to deliver the most comprehensive and efficient range of marine Aid to Navigation signal products. We also need to be agile and respond quickly to changes in the environment and last, but not least, we need to maintain the customer's confidence in our products and our service.

The marine signal is today mainly viewed as a backup to the on-board navigation equipment on the ship, except for the most challenging turns in the fairways. Therefore, we need to have focus on this in our product development and in our technology roadmaps. To put it simply, we need to provide the best value for money.

With the power of consolidation of the four strong manufacturers, we are now better positioned than ever to take on all of these challenges. We have an excellent fleet of products, and a great team of true industry professionals eager and willing to help you. Despite all the changes we have made in the last couple of years, your closest Sabik Marine sales contact persons has mainly stayed the same, so you have a familiar person to call or email in case you need advice.

Connectivity has been one of our focus areas for the last couple of years and continues to be so for the future. With the fleet of unique technologies developed by our various product development teams, we now have several integrated communication systems we can offer in almost all of our products. With the shift in direction where the visual AtoN is now considered more the secondary system for navigation, the AtoN owner wants to maintain this backup system efficiently and cost effectively; and this calls for connectivity. Bluetooth, mobile and satellite networks combined with cloud based servers enables owners to deliver bottom line savings with managed connected systems.

Our team is committed in providing you with the best-in-class solutions to your projects in this challenging and competitive industry. Our aim is continue investing into customer relations and marketing & distributor materials to assist you better in your business. We have always been forerunners in technological development and soon we will have some new, exciting product launches to announce. Stay tuned on our website and social media channels as well as subscribe to our newsletter to be among the first ones to hear the news.

Our "Marine Signals 2018-2019" catalogue presents you the current product offering of the Sabik, Carmanah and EKTA product brands.

We also want to take this opportunity to thank you for your valued cooperation and wish you all the success in your business. We are looking forward to showing the way to the future with you,

Lars Mansner
Managing Director
Sabik Marine

To Our Valued Customers,

I am pleased to help introduce the 2018 edition of Sabik Marine's product catalogue. Carmanah Technologies and Sabik have enjoyed a long history together, with success that continues to grow. As part of our continued growth strategy, the Carmanah and Sabik team were proud to expand the Sabik Marine family by acquiring two companies in 2017.

In January 2017, we acquired the EKTA marine aids to navigation assets from Cybernetica AS of Estonia, which will help ensure Sabik remains a dominant supplier within Europe. Then, in August 2017, we purchased New Zealand's Vega Industries. Vega's best-in-class PEL light solutions, among other cutting-edge technologies, will also play a vital role in expanding Sabik's position in the industry.

With the addition of new businesses comes new technologies. Both EKTA and Vega have strengthened our product portfolios and expanded the technology we work with—which is clear on the following pages, where EKTA's line is included. Stay tuned for the inclusion of Vega products in our next catalogue.

Sabik is committed to providing the best quality, most comprehensive single-source solutions for marine aids to navigation, and doing so with the best possible customer service. Together with our new acquisitions, we are even more equipped to maintain and enhance our commitment to making Sabik Marine the best provider of marine aids to navigation in the world.

I remain delighted and excited for the future of our marine division and the industry overall. Thank you for considering our products and services—as always, we are grateful for your business. You can expect to see more development of innovative solutions that maintain our high standards of quality and robustness, ensuring we provide you with products you can rely on in any application.

John Simmons
CEO
Carmanah Technologies Corporation

Sabik Marine is the world's leading manufacturer of marine signals. Our mission is to enhance safety for traffic; on waterways, on roads and on railways. We are also one of the leading manufacturers of railway signals in the Northern Europe. Sabik Marine has operations in Finland, Canada, Germany, UK, Singapore, Estonia and Russia.

WE SHOW THE WAY

SABIK MARINE is a leader in technology and our R & D engineers continuously re-develop and enhance our existing products and solutions further as well as bringing new innovations to the industry. Safety remains our main driver. Our reliable systems defy the harshest environmental conditions from boreal snow and drifting ice to monsoons and hurricanes. Our **high-quality products** withstand severe temperature fluctuations and months without daylight, never faltering and thus effectively preventing possible hazardous incidents. By **innovating new technologies** and implementing these in our products, often the first to do so, Sabik Marine is ultimately showing the way for the industry. We contribute to the development of industry standards and technologies by actively participating in the international committee work of **IALA** (The International Association of Marine Aids to Navigation and Lighthouse Authorities).

After Carmanah Technologies acquisition of Sabik in 2015, the growth of SABIK MARINE, Carmanah's Marine Division, continued with the further acquisitions of EKTA in Estonia and Vega Industries in New Zealand in 2017. SABIK MARINE is now the largest supplier of marine signals in the world with the most comprehensive range of marine signaling solutions. Our global team of marine aids-to-navigation professionals can bring extensive knowledge and know-how to your projects with years of experience in this industry. Our global distribution network, including over 100 distributors, covers all the continents and serves our end-customers locally in all longitudes and latitudes.

Carmanah Technologies produces a portfolio of products focused on energy optimized LED and solar technologies. We design, develop and distribute energy efficient LED solutions for infrastructure including: signaling systems for the marine aids to navigation, airfield ground lighting, offshore wind marking, aviation obstruction and traffic markets. Since 1996, we have earned a global reputation for delivering strong and effective products for industrial applications that perform reliably in some of the world's harshest environments. Our LED and solar power systems provide durable, dependable, efficient and cost-effective solutions which have been deployed in over 400,000 installations in 110 countries.

The manufacturer reserves the right to make changes and/or improvements in designs & dimensions without notice and without incurring obligation.

Industrial Member

Marine Products
Our product range consists of a wide selection of self-contained and high performance signal lanterns which can be tailored to meet customized requirements. The merger of Sabik, Carmanah, Vega and Ekta marine products enables us to offer a unique combination of low mix high volume self-contained solar lights and high mix low volume long range and special lights. Almost all of our lanterns can incorporate connectivity solutions such as remote monitoring and control.

Our product range includes:

- **Self-contained lanterns**
- **Buoy lanterns**
- **Heavy-duty ice buoy lanterns**
- **Range lights**
- **Beacons**
- **Sector lights**
- **Directed Sector lights**
- **Lock and bridge signals**
- **Remote monitoring and control**
- **AIS equipment**

Solutions & Services
Our comprehensive range of marine signaling systems includes also power supplies and structures. Our advanced monitoring and programming tools; LightGuard Monitor and Bluetooth® Control take marine navigation experience to a completely new level.

Our services and solutions offering consists of:

- **Ice buoys**
- **Power supply systems**
- **Communication systems**
- **Turn-key solutions**
- **Installation, training and commissioning**

This catalogue "Marine Signals 2018-2019" presents you the product offering of our Sabik, Carmanah and EKTA brands for the marine industry.

Marine Lanterns

LED signals for all applications

Advanced LED technology has changed signaling technology conclusively. Solutions and services are developing all the time to serve customers in the marine aids to navigation industry better and better. Sabik Marine offers the world's most comprehensive range of marine LED lanterns. Our selection of Carmanah, Sabik and Ekta branded customizable products include:

- **buoy lanterns**
- **ice buoy lanterns**
- **medium and long range beacon lanterns**
- **range lights**
- **sector lights**
- **light tubes for structure illumination**
- **self-contained lanterns**
- **marker lights for aquaculture farms**

Sabik Marine lanterns are well-known for their optical performance, reliability, modularity and functionality. We are constantly developing our products to serve our customers better. By selection our lantern you not only get a reliable lantern but also a complete selection of intelligent solutions. Our customers have the ability to choose the right features for their specific needs so they can operate their aids to navigation efficiently and at lower lifetime cost.

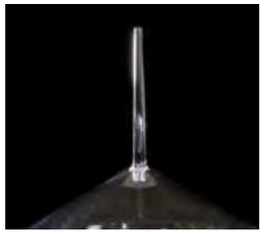
Marine Lantern LED 155 with LO200H range lights in Spain

LED 110

Marine LED lantern for buoys and small beacons

LED 110 is a maintenance free short range LED lantern. Using the latest in high power LED technology, Sabik's intelligent electronics and our especially designed efficient optics, we have been able to achieve an excellent performance for the lantern. LED 110 is made from polycarbonate for durability and low weight.

- **Range up to 4 NM at Tc = 0,74 (5 NM at Tc = 0,85)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Produced of durable polycarbonate plastic**
- **Integrated flasher with day light switch and 2A solar charger**
- **Internal calendar; light can be switched off for winter**
- **Adjustable intensity and range**
- **Vertical divergence 8° @ 50 % (±1°) of peak intensity**
- **Programmable with Sabik standard IR programming devices**
- **Integrated event log (Black box function) for 365 days**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM remote monitoring**



Lens
Bird deterrent top design.

Optical lens
New efficient omnidirectional lens.

PTFE breathing
Vent for pressure release in the bottom of the lantern.

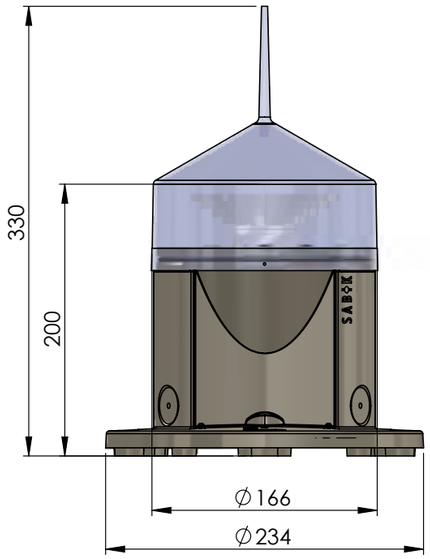
Programming with PC
Using Sabik USB interface.

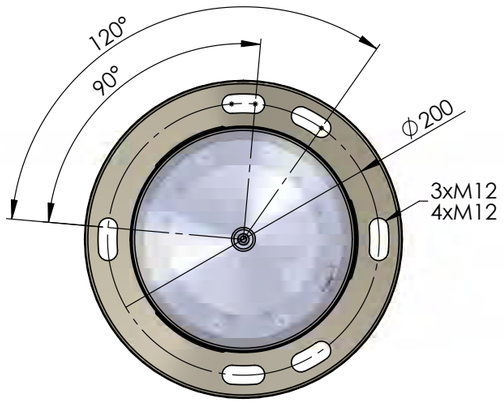
Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Cable entry
From side or bottom of the lantern.

Installation
The bottom plate of the LED110 supports installation on structure using 3 or 4 x M12 on a 200 mm diameter or 3 x M8 on a 150 mm diameter.

Technical Specification LED 110





Optical performance

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

Main Technical Specification

Lens visual/Mechanical diameter	166 mm
Lens material	UV stabilized Polycarbonate
Body material	UV stabilized Polycarbonate
Light source	High Power Light Emitting Diode (LED)
Vertical divergence	8° @ 50% (±1°) of peak intensity
Unit lifetime	Up to 10 years
Weight	2 kg
Temperature range	-40°…+60°C
Degree of protection	IP 67
Supply Voltage	9 – 30 VDC
Power consumption	Max 1,3 watt

Order Overview LED 110

Option matrix

OPT 9S: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 4S: GPS sync	Integrated GPS sync including GPS antenna
OPT 1S: Optical Feedback System	Integrated LED performance measurement
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

Product codes

LED 110 wide lens	Colour
LED 110 WW	white
LED 110 WR	red
LED 110 WG	green
LED 110 WY	yellow

Product code example: LED 110WR.4S

- ***LED 110WR*** is Sabik code for LED 110 with wide lens in red
- ***4S*** is a selection of option 4 GPS syncronization

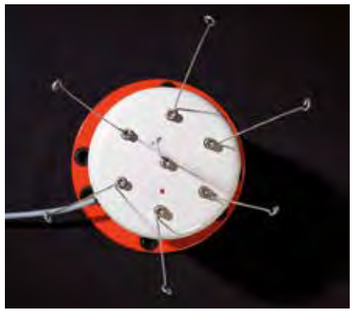
SABIK
a Carmanah company

LED 155

Marine LED lantern for buoys and minor beacons

LED 155 is a general purpose LED lantern commonly used on both fixed and floating structures. The lantern is modular in design. It can be configured with two different vertical divergencies and 1-3 tiers depending on operational requirements.

- **Range up to 8 NM at Tc = 0,74 (12 NM at Tc = 0,85)**
- **Standard IALA colours Red, Green, White, Yellow and Blue/Yellow**
- **Rugged aluminium housing for installation in harsh marine environments**
- **Extremely low power consumption, suitable for solar and battery operation**
- **Integrated flasher with day-night switch**
- **Integrated 16A solar panel charger using pulse width modulation**
- **Adjustable intensity and range**
- **Available with narrow (6°) or wide (10°) vertical divergence**
- **Programmable with Sabik standard IR programming devices**
- **Integrated event log for 365 days**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM Remote monitoring**



Bird spikes
Stainless steel as standard. Easy to replace.

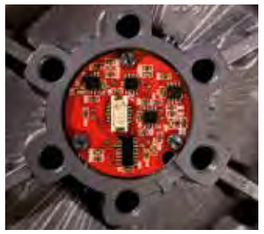
GPS
GPS unit and antenna integrated in the lantern for wireless synchronization and for position monitoring.

Light Guard GSM
GSM unit and antenna integrated in the lantern for remote monitoring and control.

Additional cable entry
Equipped as standard with two cable entries. If the second entry is needed e.g. for a solar module, a standard M20 cable gland can be fitted.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Installation
The bottom plate supports installation on structure with 3 x M12 bolts on a 200 mm diameter. The mounting holes are galvanic isolated with plastic isolators. PTFE breathing vent for pressure release.



OFBS
The Optical Feedback System (OFBS) enables built-in monitoring of LED degradation over time.

Simplex

Duplex

Triplex

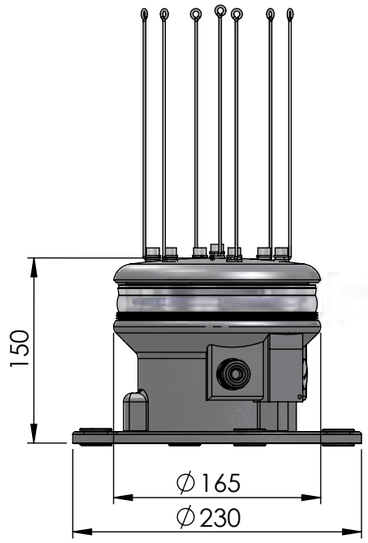
White

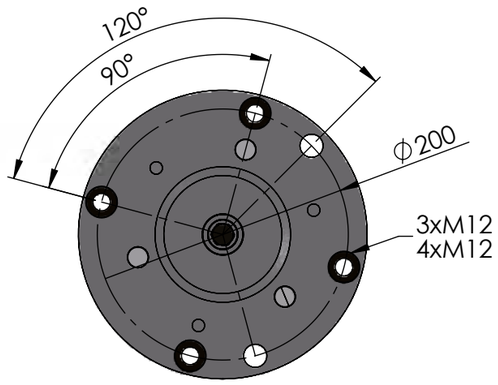
Red

Green

Yellow

Technical Specification LED 155





Optical performance LED 155

Maximum fixed intensity, narrow lens (fixed structures)				
Simplex, 6 W	200 cd	240 cd	380 cd	200 cd
Duplex, 12 W	380 cd	450 cd	720 cd	380 cd
Triplex, 18 W	560 cd	660 cd	1060 cd	560 cd

Maximum fixed intensity, wide lens (floating structures)				
Simplex, 6 W	120 cd	160 cd	240 cd	120 cd
Duplex, 12 W	230 cd	300 cd	450 cd	230 cd
Triplex, 18 W	340 cd	440 cd	670 cd	340 cd

Optical performance LED 155 B/Y

Maximum fixed intensity		
Nominal 5 W	45 cd	45 cd

Main Technical Specification LED 155

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Vertical divergence	6° or 10° @ 50% (±1°) and 10° or 20° @ 10% (±2°) of peak intensity
Unit lifetime	Up to 10 years
Weight	3,9 kg for single tier unit
Temperature range	-40°…+60°C
Supply Voltage	10– 32 VDC
Solar Panel Charger	16 ampere PWM charger
Power consumption	Max 6 watts / tier
Degree of protection	IP68

Main Technical Specification LED 155 Blue/ Yellow wreck mark

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Vertical divergence	10° @ 50 % (± 1°) of peak intensity
Unit lifetime	Up to 10 years
Weight	4,2 kg
Temperature range	-40°…+60°C
Supply Voltage	10 – 32 VDC
Power consumption	Max 6 watts

Order Overview LED 155

Option matrix

OPT 1: Optical Feedback System	Integrated LED performance measurement
OPT 4: GPS sync	Integrated GPS sync including GPS antenna
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

N = Narrow (6° @ 50 % of peak intensity) **single tier (standard)**		**Two tiers (duplex)**		**Three tiers (triplex)**	
Red	LED 155 1NR	**Red**	LED 155 2NR	**Red**	LED 155 3NR
Yellow	LED 155 1NY	**Yellow**	LED 155 2NY	**Yellow**	LED 155 3NY
Green	LED 155 1NG	**Green**	LED 155 2NG	**Green**	LED 155 3NG
White	LED 155 1NW	**White**	LED 155 2NW	**White**	LED 155 3NW

W = Wide (10° @ 50 % of peak intensity) **single tier (standard)**		**Two tiers (duplex)**		**Three tiers (triplex)**	
Red	LED 155 1WR	**Red**	LED 155 2WR	**Red**	LED 155 3WR
Yellow	LED 155 1WY	**Yellow**	LED 155 2WY	**Yellow**	LED 155 3WY
Green	LED 155 1WG	**Green**	LED 155 2WG	**Green**	LED 155 3WG
White	LED 155 1WW	**White**	LED 155 2WW	**White**	LED 155 3WW

Product code example: LED 115-3NR.9

- ***LED 155 3*** is Sabik code for a three-tier LED 155
- ***NR*** is the code for a Narrow Red lens
- ***9*** is a selection of option 9 GSM monitoring together with GSM/GPS antennas

Order Overview LED 155 B/Y

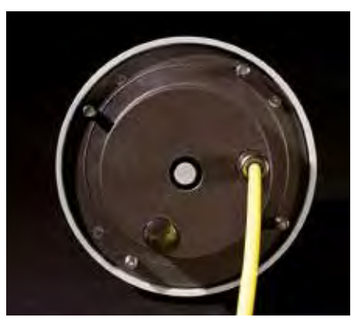
Wreck marking lantern blue/yellow

VP LED

Ice buoy LED lantern

The VP LED is a LED lantern designed to be used in moderate ice conditions. It has a proven record of surviving the crushing pressure and dynamic forces of ice. VP LED is mainly used on plastic ice spars and buoys when a light weight unit is important.

- **Marine grade aluminium housing**
- **Designed to be fully waterproof, can sustain extensive submersion**
- **Integrates firmly into buoy top and presents a very low profile to lateral forces from ice**
- **Lantern can be removed for battery replacement**
- **Range up to 6 NM (Tc = 0,74)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Extremely low power consumption, ideal for primary battery operation**
- **Integrated flasher with day light switch**
- **Adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Integrated 365 day event log**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM Remote monitoring**



Bird spikes
Stainless steel as standard. Easy to replace.

Service
The lantern forms a waterproof service door to the buoy. The primary battery can be replaced by removing the lantern.

Aluminium body
The marine grade aluminium housing with epoxy painting is corrosion resistant and will survive a lot of abuse from ice.

Polycarbonate lens
The low profile optical lens is designed to give minimum exposure to ice forces. Lens is supported by the lantern structure sufficient to protect the unit in arctic conditions.

Waterproof
The lantern is also protected against humidity from inside the buoy. Should the buoy leak, the lantern is still protected. Pressure vent enables breathing.

GPS
GPS unit and antenna integrated in the lantern hat for wireless synchronization and for position monitoring. The integrated GPS antenna is moulded and survives ice pressure.

GSM
GSM unit and antenna integrated in the lantern for remote monitoring and control. For more information please see the LightGuard Section.

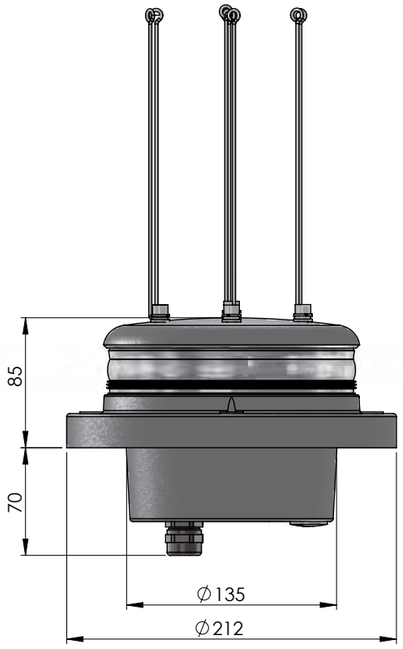
Additional cable entry
Equipped as standard with two cable entries. If a second entry is needed, e.g. for a solar module, a standard M20 cable gland can be fitted.

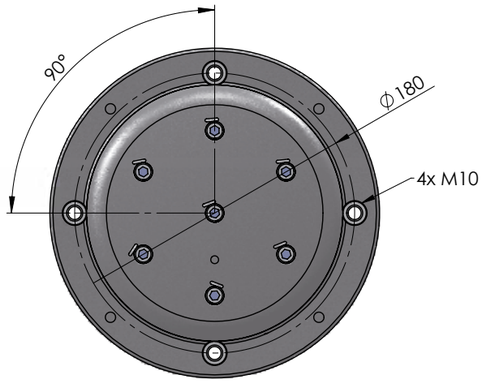
Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

OFBS
The Optical Feedback System (OFBS) enables built-in monitoring of LED degradation over time.

Installation
The lantern is integrated with the buoy top for maximum support against lateral forces. Mounting with 4 pcs of M10 bolts.

Technical Specification VP LED





Optical performance

Maximum fixed intensity				
At full power 6 W	120 cd	160 cd	240 cd	120 cd

Main Technical Specification

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Vertical divergence (wide lens)	10° @ 50 % (±1°) of peak intensity 20° @ 10 % (±2°) of peak intensity
Unit lifetime	Up to 10 years
Weight	3,2 kg
Temperature range	-40°…+60°C
Supply Voltage	10 – 32 VDC
Solar Panel Charger	16 ampere PWM charger
Power consumption	Max 6 watts/tier
Degree of protection	IP 68

Order Overview VP LED

Option matrix

OPT 1: Optical Feedback System	Integrated LED performance measurement
OPT 4: GPS sync	Integrated GPS sync including GPS antenna
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

N = Narrow (6° @ 50 % of peak intensity)		W = Wide (10° @ 50 % of peak intensity)	
Red	VP LEDNR	**Red**	VP LEDWR
Yellow	VP LEDNY	**Yellow**	VP LEDWY
Green	VP LEDNG	**Green**	VP LEDWG
White	VP LEDNW	**White**	VP LEDWW

Product code example: VP LEDNW.13

- ***VP LED*** is Sabik code for a buoy lantern
- ***NW*** is the code for a Narrow lens in white
- ***13*** is a selection of option 13 Aux card with RS485 and I/O

Order Overview VP LED B/Y

Wreck marking lantern blue/yellow

Product codes

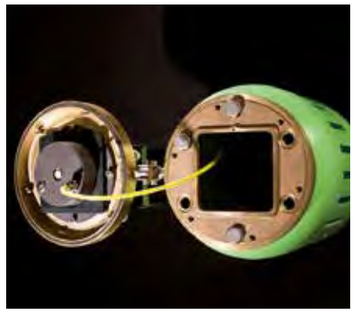
VP LED BLUE/YELLOW WRECK MARK	980107

MPV LED

Heavy duty ice buoy LED lantern

The MPV LED is a LED lantern designed to be used in most severe ice conditions, and is capable of surviving the crushing pressure and dynamic forces of ice in winter conditions.

- **Rugged bronze alloy housing for installation in harsh marine environments**
- **Designed to be fully water proof – can withstand submersion down to 100 meters**
- **Integrates firmly into buoy top – presents a very low profile to lateral forces from ice**
- **Enables battery replacement through lantern without removing the lantern from buoy**
- **Visual range from 2 to 6 NM (Tc = 0,74)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Extremely low power consumption; ideal for primary battery operation**
- **Integrated flasher with day light switch**
- **Adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Integrated 365 day event log**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM Remote monitoring**



Bird spikes
Stainless steel as standard. Easy to replace.

Hinged
The primary battery can be changed easily as hinged flanges allow the lantern to open safely in sea conditions. The lantern acts as the water-proof door to the battery cabin.

Bronze Alloy
The special bronze alloy is corrosion resistant and will survive continuous abuse from moving ice blocks.

Polycarbonate lens
The low profile optical lens is designed to give minimum exposure to ice forces and is supported by the lantern structure sufficient to protect the unit in arctic conditions.

GPS
GPS unit and antenna integrated in the lantern for wireless synchronization and for position monitoring. The integrated GPS antenna is moulded and survives ice pressure.

GSM
GSM unit and antenna integrated in the lantern for remote monitoring and control. For more information please see the LightGuard Section.

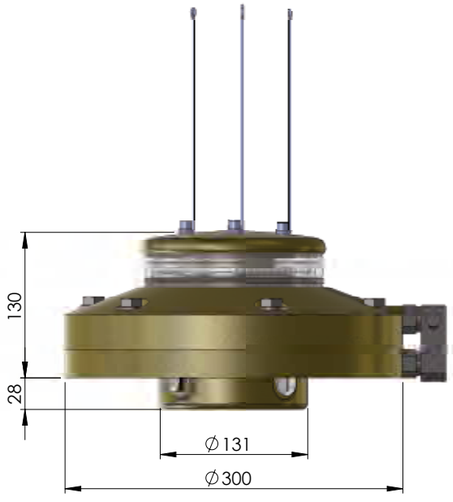
Additional cable entry
Equipped as standard with two cable entries. If the second entry is needed e.g. for a solar module, a standard M20 cable gland can be fitted.

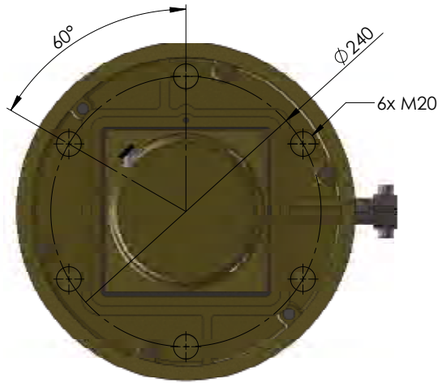
Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Installation
The lantern is integrated with the buoy top for maximum support against lateral forces.

OFBS
The Optical Feedback System (OFBS) enables built-in monitoring of LED degradation over time.

Technical Specification MPV LED





Optical performance

Maximum fixed intensity				
At full power 6 W	120 cd	160 cd	240 cd	120 cd

Main Technical Specification

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Vertical divergence (wide lens)	10° @ 50% (±1°) of peak intensity 20° @ 10% (±2°) of peak intensity
Unit lifetime	Up to 10 years
Weight	25 kg
Temperature range	-40°…+60°C
Supply Voltage	10 – 32 VDC
Solar Panel Charger	16 ampere PWM charger
Power consumption	6 watts
Degree of protection	IP 68

Order Overview MPV LED

Option matrix

OPT 1: Optical Feedback System	Integrated LED performance measurement
OPT 4: GPS sync	Integrated GPS sync including GPS antenna
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

W = Wide (10° @ 50 % of peak intensity)		
Red	MPV LED1WR	H = with hinge
Yellow	MPV LED1WY	J = without hinge
Green	MPV LED1WG	
White	MPV LED1WW	

Product code example: MPV LED1WG.4

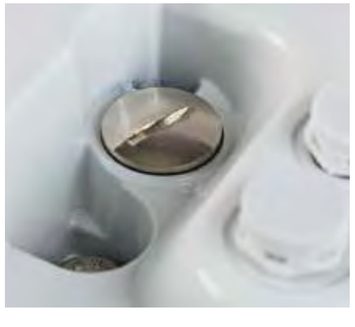
- ***MPV LED1*** is Sabik code for a MPV LED
- ***WG*** is the code for a wide lens in green
- ***4*** is a selection of option 4 GPS syncronization

LED 160

Full range lantern for fixed and floating installations

This all-round LED 160 lantern has world-class optical performance with options for buoys and fixed installations. Three different lantern options available covering a range from 3 NM up to 12NM (Tc = 0,74)

- **Standard IALA colours Red, Green, White, Yellow and Blue**
- **Best in class optical performance**
- **New designed rugged injection moulded aluminium housing**
- **Field installation easy thanks to the integrated junction box with 3 cable entries**
- **Extremely low power consumption, suitable for solar and battery operation**
- **Integrated 16A solar panel charger**
- **Adjustable intensity and range**
- **The lantern is available in two different versions. LED 160 with Narrow 5° and with Wide 10° vertical divergence, and the LED 160H with a 2,5° vertical divergence.**
- **Programmable with Sabik standard IR programming devices**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM/GPS remote monitoring**
- **Can be programmed and controlled up to 50 meters distance with Bluetooth® Control**
- **Available with integrated AIS (Refer page 140)**



Optics
Optics designed for high power LEDs.

Supply cable
Integrated junction box with up to 3 cable entries.

Cable connection
Connection to spring type terminal block.

Grounding plug
The base plate has a grounding plug to enable good protection against electromagnetic interference.

Programming
Combined IR programming and photocell window in lantern base.

PTFE breathing
Vent for pressure release for both junction box and lantern housing.

GSM/GPS monitoring
Special designed lantern top for GSM and GPS antennas.

Bird spike
Bird spike with thread to be installed in the center of the lantern top.

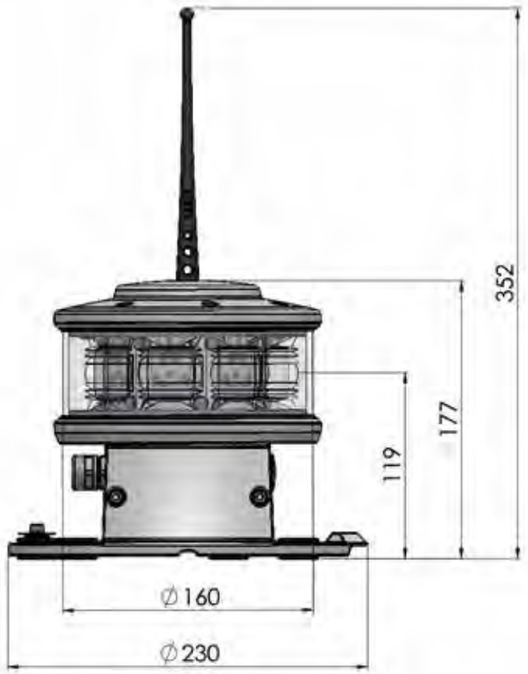
Lantern colour
Lantern colour is clearly indicated by the colour plate.

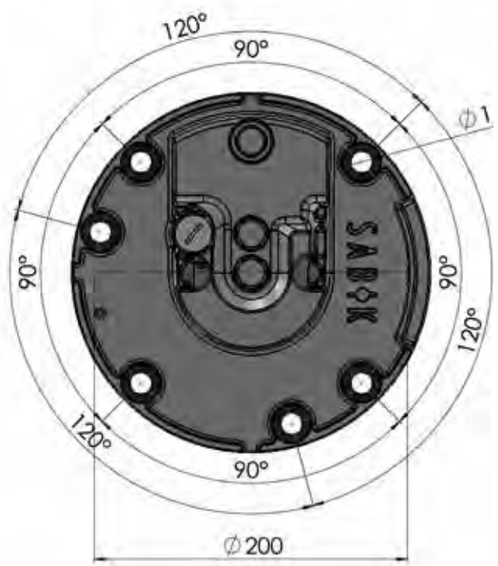
Installation
The bottom plate supports installation on structure with 3x M12 or 4xM12 bolts on a 200 mm diameter.

Bluetooth® Control
Lantern can be programmed and controlled up to 50 meters distance with standard android and iOS mobile phones.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Technical Specification LED 160





Optical performance

Maximum fixed intensity LED 160H (2,5° @ 50% of top intensity)				
Max power 36 W			4300 cd	

Maximum fixed intensity LED 160N (5° @ 50% of top intensity)				
	1150 cd	**1200 cd**	**1000 cd**	**1850 cd**
Power consumption	**13 W**	**16 W**	**16 W**	**16 W**

Maximum fixed intensity LED 160W (10° @ 50% of top intensity)				
	550 cd	**850 cd**	**550 cd**	**1100 cd**
Power consumption	**12 W**	**16 W**	**16 W**	**16 W**

Main Technical Specification

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized Acrylic
Light source	High Power Light Emitting Diodes
Vertical divergence	2,5°@50% of peak intensity (FWHM) 5°@50% of peak intensity (FWHM) 10°@50% of peak intensity (FWHM)
Weight	3,3 kg
Temperature range	-40° – +60°C
Supply Voltage	10 – 32 VDC
Solar Panel Charger	16 ampere PWM charger
Power consumption	13W – 16W
Power consumption LED 160H	36 W
Degree of protection	IP 67

Order Overview LED 160

Option matrix

Optical feedback **OPT 1L**	Integrated LED performance measurement
GPS sync **OPT 4L**	Integrated GPS sync including GPS antenna
LightGuard GSM + GPS **OPT 9L**	Integrated GSM/GPS based monitoring including GSM/GPS antennas
Battery control card **OPT 11L**	Control card for secondary (emergency) battery
Automatic Identification System **OPT AIS**	OPT AIS 1: Lantern with integrated AIS type 1 OPT AIS 3: Lantern with integrated AIS type 3 Refer page 140

Product codes

LED 160H High intensity lantern	**LED 160N Lantern with narrow lens designed for fixed structures**	**LED 160W Lantern with wide lens designed for buoys**	**Colour**
LED 160HW	LED 160NW	LED 160WW	white
	LED 160NR	LED 160WR	red
	LED 160NG	LED 160WG	green
	LED 160NY	LED 160WY	yellow
	LED 160NB	LED 160WB	blue

Product code example: LED 160NG.9L

- ***LED 160NG*** is Sabik code for LED 160 with narrow lens in green
- ***9L*** is a selection of option 9 integrated GSM/GPS monitoring

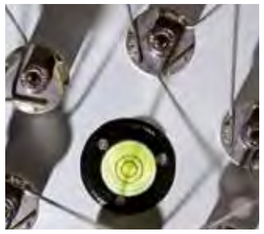
LED 350

High intensity LED lantern for fixed installations

LED 350 is a high performance omni-directional LED precision beacon with a range up to 15 NM (Tc = 0,74). 10 NM range with white achieved with less than 10 watts.

- **High light efficiency; 175 candela/watt**
- **Supplied with 1-7 tiers, max 14 700 cd luminous intensity white**
- **Standard IALA colours Red, Green, White, Yellow**
- **Rugged aluminium housing for installation in marine environment**
- **Extremely low power consumption, suitable for solar and battery operation**
- **Integrated flasher with day light switch and a 16A solar panel charger**
- **Field adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Integrated 365 day event log**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM remote monitoring**
- **Optionally available with tamper proof serial number**
- **Equipped with Bluetooth programming**

Bird spikes
Stainless steel bird deterrents as standard. Easy to replace. Offers great protection against large birds like cormorants. Spike designed to prevent injury to service technicians.



Level indicator
The lantern can easily be levelled in field using the integrated bubble level indicator.

IR port and photocell
Combined infrared communication port and photocell is located on the base of the lantern.

Additional cable entry
Equipped as standard with two cable entries. If the secondary entry is needed e.g. for a solar module standard M20 cable gland can be fitted.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Triplex
Multiple tiers up to 7 tiers for high intensity.

Installation
The bottom plate of the LED 350 supports installation on structure using 3 x M12 bolts or 4 x M12 bolts on a 200 mm diameter.

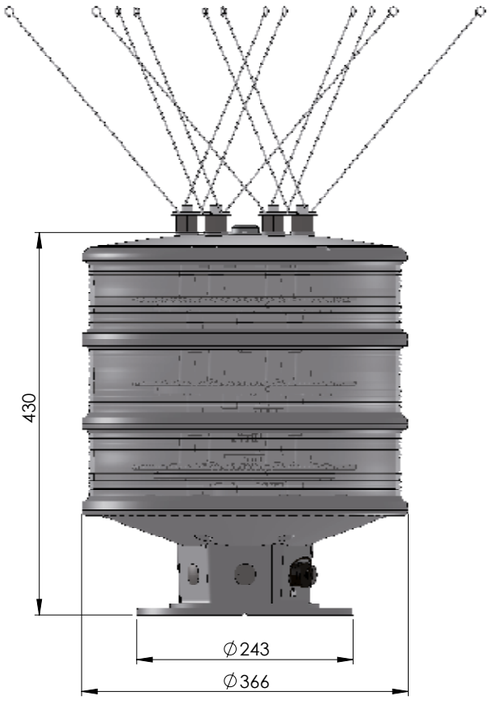
Grounding plug
The base plate has a grounding plug as standard to enable good protection against electromagnetic interference.

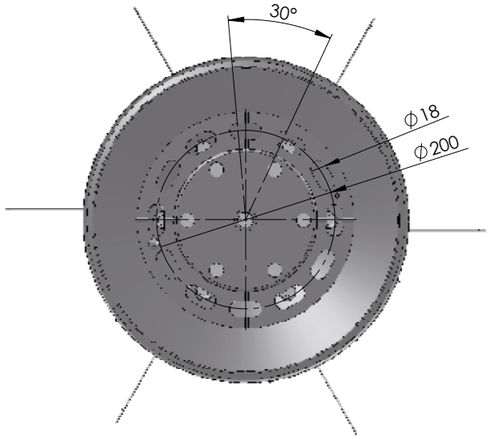
External baffles
The lantern can be optionally supplied with multiple colours using external radial baffles between the colours. This enables warning sectors to be integrated in the same lantern.

Simplex Combinations
The LED 350 lantern can also be combined with the LED 155 buoy lantern in order to increase short distance visibility.

Bluetooth® Control
Lantern can be programmed and controlled up to 50 meters distance with standard android and iOS mobile phones.

Technical Specification LED 350





Optical performance

Maximum fixed luminous intensity				
1-tier, 12 W	1.400 cd	1.400 cd	2.100 cd	1.500 cd
2-tiers, 24 W	2.800 cd	2.800 cd	4.200 cd	3.000 cd
3-tiers, 36 W	4.200 cd	4.200 cd	6.300 cd	4.500 cd
4-tiers, 48 W	5.600 cd	5.600 cd	8.400 cd	6.000 cd
5-tiers, 60 W	7.000 cd	7.000 cd	10.500 cd	7.500 cd
6-tiers, 72 W	8.400 cd	8.400 cd	12.600 cd	9.000 cd
7-tiers, 84 W	9.800 cd	9.800 cd	14.700 cd	10.500 cd

Main Technical Specification

Lens visual/Mechanical diameter	350 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Vertical divergence	1.5° @ 50% (±0.3°) and 3° @ 10% (±0.5°) of peak intensity
Unit lifetime	Up to 10 years
Weight	10 kg for single tier unit, add 2 kg for each tier
Temperature range	-40°…+60°C
Supply Voltage	10 – 32 VDC
Solar Panel Charger	16 ampere PWM charger. Solar production (Ah) is logged
Power consumption	12 watts / tier
Degree of protection	IP 67

Order Overview LED 350

Option matrix

OPT 1: Optical Feedback System	Integrated LED performance measurement
OPT 4: GPS sync	Integrated GPS sync excluding GPS antenna
OPT 7: External GPS	External GPS antenna for OPT 4
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing
External baffles	External baffles when unit is supplied with coloured sectors

single tier (standard)		Two tiers (duplex)		Three tiers (triplex)	
Red	LED 350 1R	Red	LED 350 2R	Red	LED 350 3R
Yellow	LED 350 1Y	Yellow	LED 350 2Y	Yellow	LED 350 3Y
Green	LED 350 1G	Green	LED 350 2G	Green	LED 350 3G
White	LED 350 1W	White	LED 350 2W	White	LED 350 3W

Product code example: LED 350 3W.10

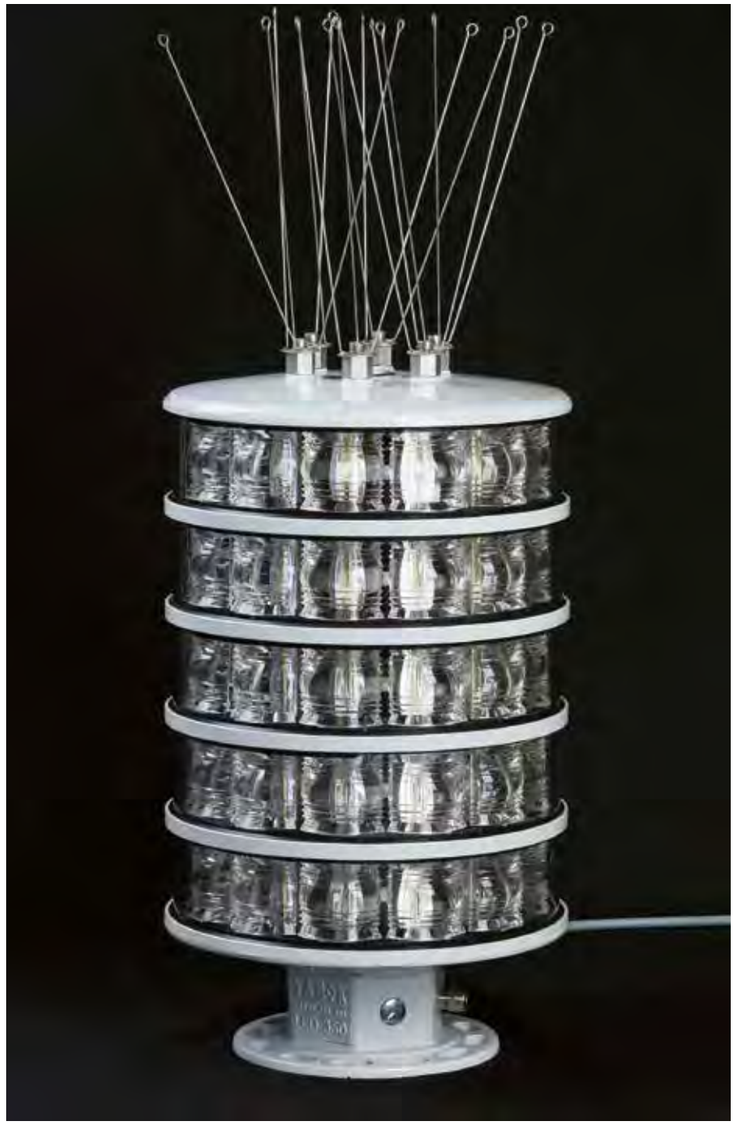
- ***LED 350 7*** is Sabik code for a seven-tier LED 350
- ***W*** is the code for a lens in white
- ***10*** is a selection of option 10 integrated GSM antenna

LED 350H

High Power LED lantern for fixed installations

A LED beacon capable of visual ranges up to 18 NM (Tc = 0,74) 30 NM (Tc = 0,85). LED 350H is designed to substitute rotating beacons with a considerably smaller power consumption.

- **Up to 15.000 cd luminous intensity per tier at only 100 watts**
- **Can be supplied with up to 5 tiers. Max luminous intensity an impressive 75.000 cd**
- **Rugged aluminium housing for installation in marine environments**
- **Low power consumption, suitable for solar and battery operation**
- **Integrated flasher with daylight switch and a 16 A solar panel charger**
- **Field adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Integrated 365 day event log**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM Remote monitoring**
- **Equipped with Bluetooth programming**



Bird spikes
Stainless steel bird deterrents as standard. Easy to replace. Offers great protection.

Level indicator
The lantern can easily be levelled in field using the integrated bubble level indicator.

IR port and photocell
Combined infrared communication port and photocell is located on the base of the lantern.

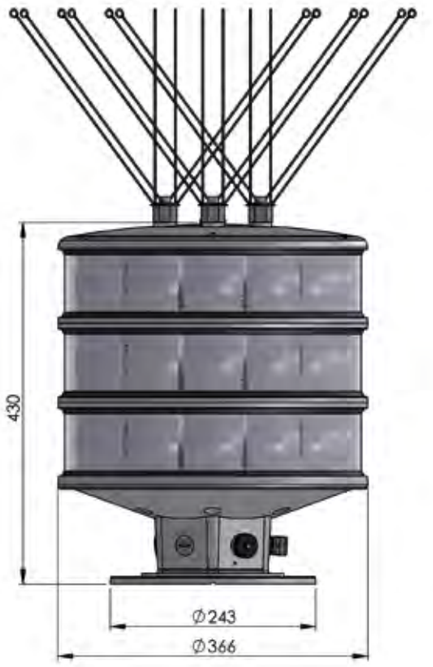
Grounding plug
The base plate has a grounding plug as standard to enable good protection against electromagnetic interference.

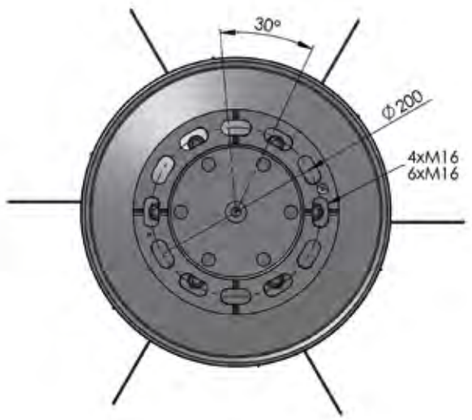
Additional cable entry
Equipped as standard with two cable entries. If the second entry is needed e.g. for a solar module standard M20 cable gland can be fitted.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Bluetooth® Control
Lantern can be programmed and controlled up to 50 meters distance with standard android and iOS mobile phones.

Technical Specification LED 350H





Optical performance

Maximum fixed luminous intensity			
1-tier, 100 W	4.500 cd	8.000 cd	15.000 cd
2-tier, 200 W	9.000 cd	16.000 cd	30.000 cd
3-tier, 300 W	13.500 cd	24.000 cd	45.000 cd
4-tier, 400 W	18.000 cd	32.000 cd	60.000 cd
5-tier, 500 W	22.500 cd	40.000 cd	75.000 cd

Main Technical Specification

Lens visual/Mechanical diameter	350 mm
Lens material	UV stabilized Polycarbonate
Light source	High Power Light Emitting Diodes (LEDs)
Vertical divergence	1.5° @ 50 % (± 0.3°) and 3° @ 10 % (± 0.5°)of peak intensity
Unit lifetime	Up to 10 years
Weight	12 kg for single tier unit, add 4 kg for each tier
Temperature range	-40°…+60°C
Supply Voltage	20 – 32 VDC
Solar panel charger	16 ampere PWM charger. Solar panel production (Ah) is logged
Power consumption	100W/ tier
Degree of protection	IP 67

Order Overview LED 350H

Option matrix

OPT 1: Optical Feedback System	Integrated LED performance measurement
OPT 4: GPS sync	Integrated GPS sync excluding GPS antenna
OPT 7: External GPS	External GPS antenna for OPT4 and OPT9
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

Product codes

Colour	white	red	green
LED 350H 1 tier	LED 350H 1W	LED 350H 1R	LED 350H 1G
LED 350H 2-tier	LED 350H 2W	LED 350H 2R	LED 350H 2G
LED 350H 3-tier	LED 350H 3W	LED 350H 3R	LED 350H 3G
LED 350H 4-tier	LED 350H 4W	LED 350H 4R	LED 350H 4G
LED 350H 5-tier	LED 350H 5W	LED 350H 5R	LED 350H 5G

Product code example: LED 350H 3W.7-9

- ***LED 350H 3W*** is Sabik code for a three-tier LED 350H with lens in white
- ***7-9*** is a selection of OPT7 and OPT9

LED 350H 12V

LED350H is also available with supply voltage 10-18 VDC for one and two layer lanterns. There is no internal solar panel charger integrated in this 12V model lantern.

Product codes for 12VDC white lantern

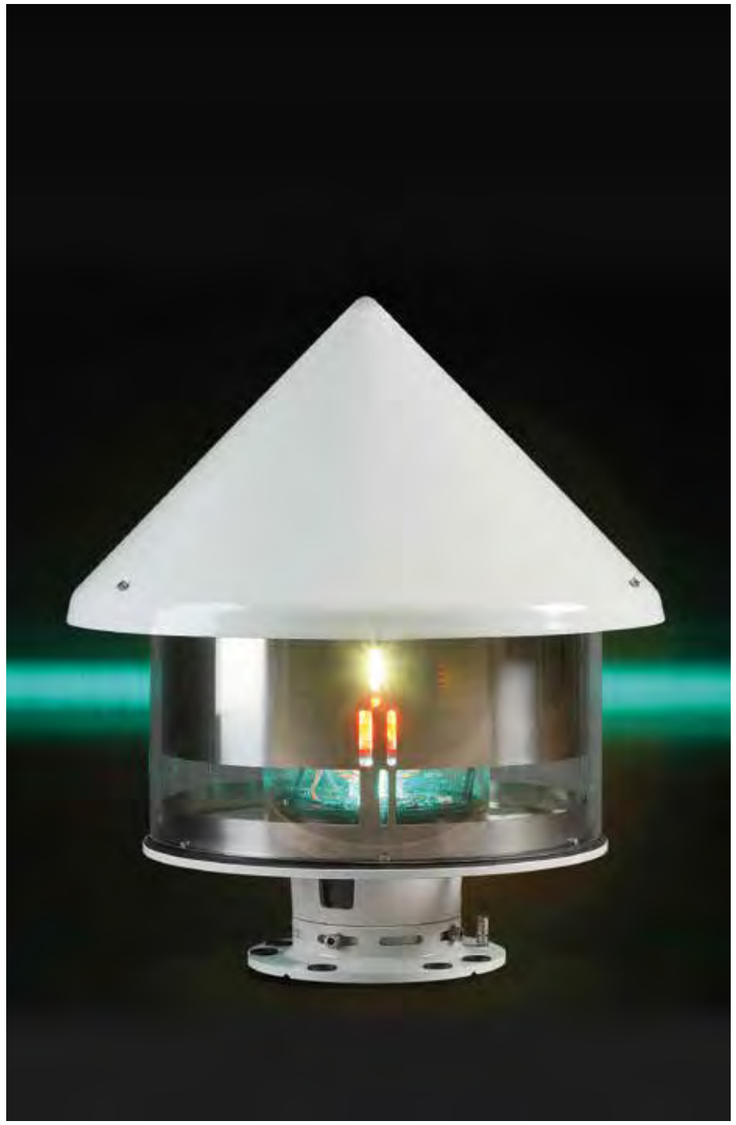
1 LAYER	LED 350H 1W 12V
2 LAYERS	LED 350H 2W 12V

ODSL 200

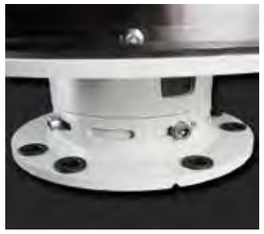
Omnidirectional LED sector light

ODSL 200 omnidirectional sector light is an innovative, compact new sector light with accurate sector borders. This light is equipped with a replaceable LED optical unit. The range of the light, depending on colour and flash character, is between 6 and 10 NM (Tc = 0,74).

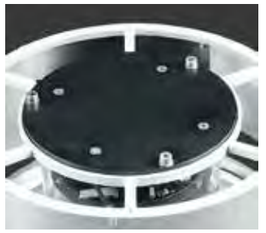
- **Sectors are fully verified at Sabik's photometric range prior to delivery**
- **Field installation is easy thanks to a rotation mechanism in the base**
- **Precision alignment, at site, can be done with a gun sight (has to be ordered separately)**
- **After installation sector alignments remain unchanged even if the LED optical unit is replaced**
- **Light can be delivered with an external weather cover**
- **The standard sector light is available as a 3, 6 or 12 layer model**
- **Small area of uncertainty between the sectors, typically less than 0,5 °**
- **Integrated flasher with daylight switch and a 16 ampere solar panel charger**
- **Programmable with Sabik standard IR programming devices**
- **This light can be equipped with remote monitoring, synchronization and optical feedback**
- **Patented omni-directional LED sector light technology**
- **Equipped with Bluetooth programming**



Optics
Optics designed for high intensity LEDs.



Adjustment
Rotation mechanism in basement.



Replaceable LED unit
LED optical unit is separated from the sector plate.

IR port and photocell
Combined infrared communication port and photocell is located on the base of the lantern.

Installation
The bottom plate supports installation on structures using 3 x M12 bolts or 4 x M12 bolts on a 200mm diameter.

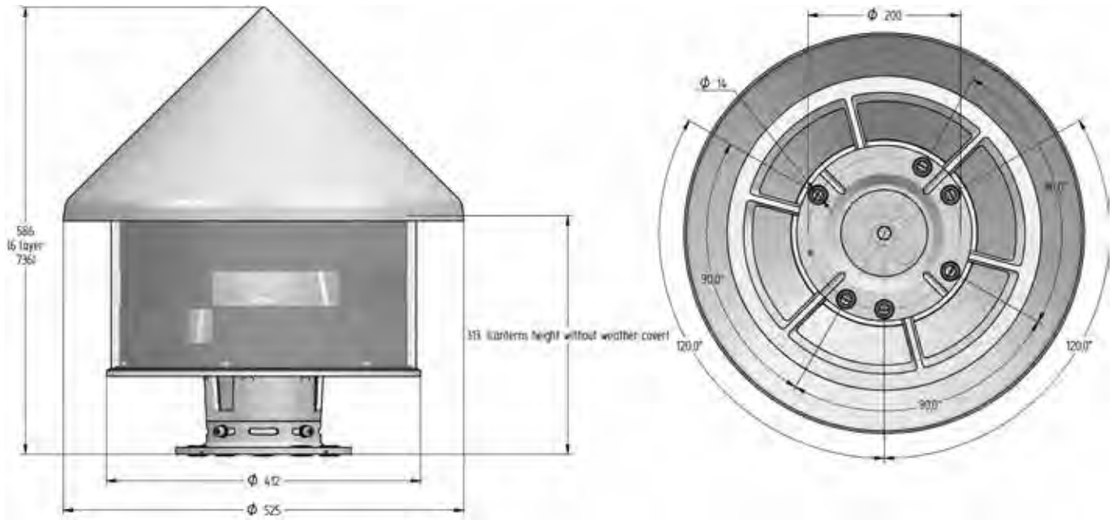
Protection
Weather cover as option. Protects the lantern in outdoor installations.

High protection degree
The PTFE breathing vent for pressure release in the bottom of the LED optical unit.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Equipped with Bluetooth programming
Bluetooth control- Lantern can be programmed and controlled up to 50 meters distance with standart android and IOS mobile phones.

Technical Specification ODSL 200



Optical performance

Maximum fixed intensity per tier and colour			
Max power 3,5 W	250 cd	250 cd	600 cd

When using weather cover reduce 6 % intensity.

Main Technical Specification

Lens visual/Mechanical diameter	200 mm
Lens material	UV stabilized Acrylic
Light source	High Power Light Emitting Diodes
Vertical divergence	2°@50% of peak intensity (FWHM)
Unit lifetime	Up to 10 years
Weight lantern	3-tier 10,5 kg, 6-tier 13,4 kg, 12-tier 22,4 kg
Weight including weather cover	3-tier 14 kg, 6-tier 17,4 kg, 12-tier 26,4 kg
Height	3-tier 577 mm, 6-tier 727 mm, 12-tier 1027 mm
Temperature range	-40° – +60°C
Supply Voltage	10 – 32 VDC
Solar panel charger	16 ampere PWM charger
Power consumption	3,5 watts/tier
Degree of protection	IP 67

Order Overview ODSL 200

Option matrix

OPT 4: GPS sync	Integrated GPS sync with external GPS antenna
OPT 7: External GPS	External GPS antenna for OPT4 and OPT9
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring with external antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring with external GSM antenna

Product codes

ODSL 200
ODSL 200 3, 3 layer lantern
ODSL 200 6, 6 layer lantern
ODSL 200 12, 12 layer lantern

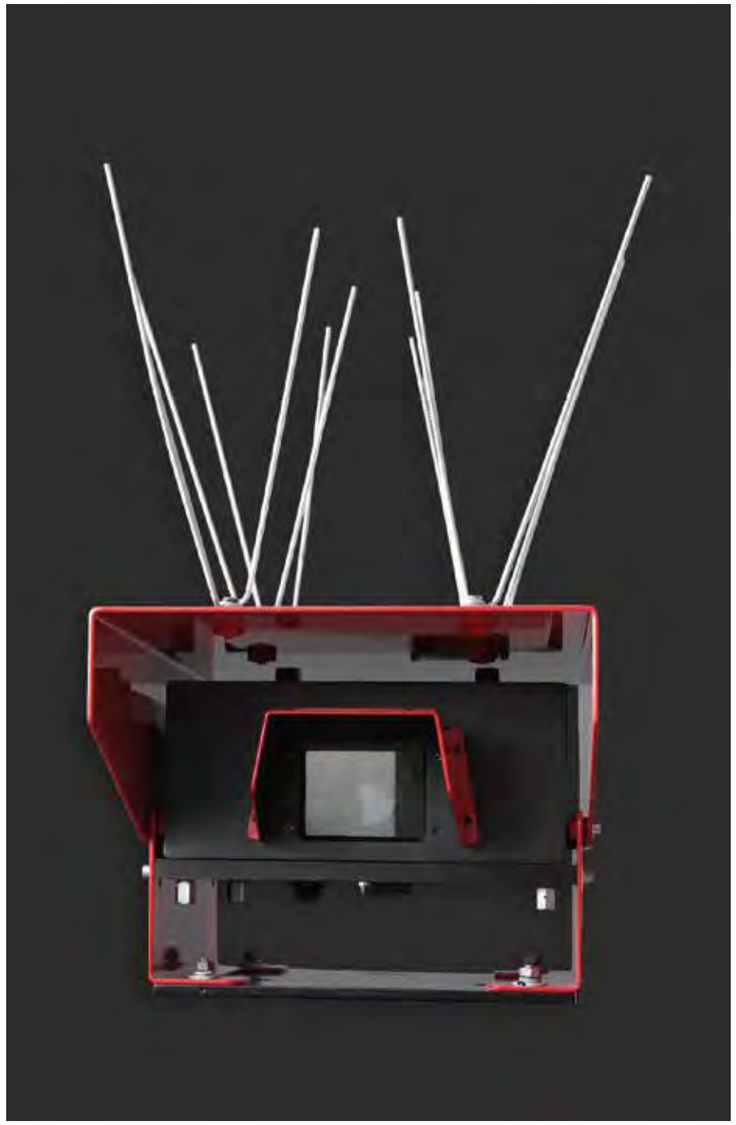
ODSL 200 WEATHER COVER
ODSL 200 3WC, 3 layer weather cover
ODSL 200 6WC, 6 layer weather cover
ODSL 200 12WC, 12 layer weather cover

Gun sight for exact alignment
821035

E8592

LED Projector sector light signal, up to 17 M range

The E8592 is a high-performance, power efficient marine LED Projector sector lantern with composite beam of three signal colours featuring nearly identical luminous intensities. Sector configuration is tailored to customer requirements at the factory. All E859X Lanterns provide factory configured Day and Night mode luminous intensities selectable by a single digital input, supporting fast PWM control necessary for generating navigational signals at reduced intensities, as well as for utilizing Fixed-and-Flashing (FFL) rhythmic characters or Slow Flash Front (SFF). The field proven E8592 design can be offered with optional Opposite-Isophase sector signal control for producing rhythmic characters reducing the latency of spatial awareness update for the mariners: the white sector signal is active during the eclipse in the coloured sectors and vice versa, resulting in immediate awareness about leaving the white sector without the usual delay caused by the common eclipse. A two-tiered design with two additional sectors providing alternating flashing on sector boundaries is available as E8596.



Vertical beam tilting arrangement
The light module can be tilted inside the protective frame within the limits of ±2°.

Pedestal
Three prolonged Ø16 mm mounting holes on a 200 mm circle.

ekta™ standard cable with plug
The power/signal cable for E859X lights is supplied to site specific length

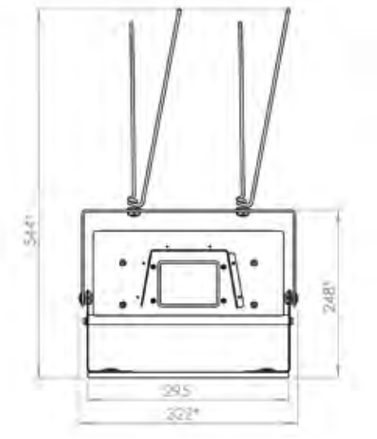
Bird Deterrents
Stainless steel as standard, mounted at the AtoN site.

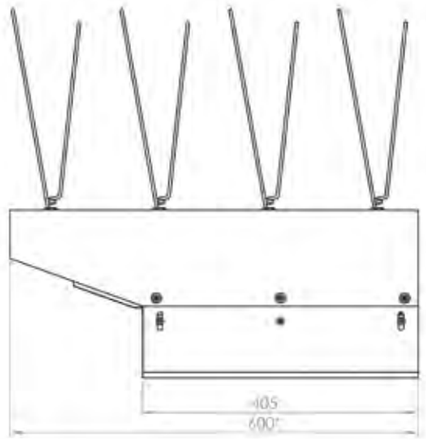
Rifle sights
Mechanical parts fitted permanently to the middle of the bottom plate.

Structural Health Monitoring option
Optional triaxial acceleration sensor integrated on the Lantern for AtoN mast SHM.

- **Power efficient Day/Night light signalling system for port entry lights or leading line systems replacement**
- **IALA colours Red, Green, White with application-specific luminous intensities nearly uniform up to 40 kcd**
- **Factory-customized sector configuration with precision of ≤ 0.05° (3')**
- **Sector with 3° to 6° with total subtense of approximately 13°**
- **Vertical divergence either 1.8° or 3°**
- **Boundary resolution typically better than 2'**
- **Robust light signal unit that can be equipped with a Sabik SMC Flasher or with external Ekta control and monitoring system**
- **Day and Night mode luminous intensities configured in hardware, peak value depending on selected colour and horizontal divergence**
- **Internal optical LED performance diagnostics with condition output**
- **Available with optional Opposite-Isophase sector signal control**
- **Optionally available in "smart" version with externally integrated flasher and telematics controller with triaxial acceleration sensor integrated on the Lantern for Structural Health Monitoring of the AtoN mast**
- **Easy to install – requires only simple procedures for aiming the composite beam vertically**
- **No maintenance needed where sprinkling of the lens by wave particles or dirt can be avoided**

Technical Specification E8592





Optical performance

Number of sectors	3 (R, W, G)		
Typical peak luminous intensity of the light signal per colour	40,000 cd		
Nominal range, Night / Day (T=0.74)	up to 17 M / 2.3 M		
Subtense angle coverage per sector (total approximately 13°)	≤3°	≤3°	≤6°
Vertical divergence, typical	1.8°	3°	3°
Power consumption in flash	≤15W	≤45W	≤80W
Achievable boundary resolution	≤ 0.04° (2′)		
Range of beam adjustment in field conditions, H / V	±6° / ±2°		

Main technical specification

Light source	High Power Light Emitting Diodes (LED)
Vertical divergence	1.8° or 3° (FWHM)
Lens material	optical glass
Enclosure material	polycarbonate optical unit potted in resin on aluminium bottom plate, marine grade aluminium protective cover, painted steel mounting plate
Operating environment	-40 °C to +55 °C
Power supply voltage	12 VDC (10 … 24 V)
Power consumption in flash	up to 80 W depending on configuration
Degree of ingress protection	IP 67
Overall height (excl. bird deterrents)	250 mm
Focal plane height	140 mm
Installation	3 x #10-14 on 200 mm circle

Order Overview E8592

Option matrix

Sector lights for IALA Region A	E8592.RWG
Sector lights for IALA Region B	E8592.GWR

Accessories

Bird deterrent rod set (incl. screws)	8264.050
Cable Connector, 90deg, female 6 + PE-position	C016 30F006 100 10
Programmable Flasher, integrated	E8672
Programmable Flasher with GPS, integrated	E8672.G
TelFiCon™-Flasher for complete AtoN telematics, integrated	E9272

Product codes

Since this product is usually ordered in AtoN site specific configuration, simple ordering codes covering all possible alternatives are not available.

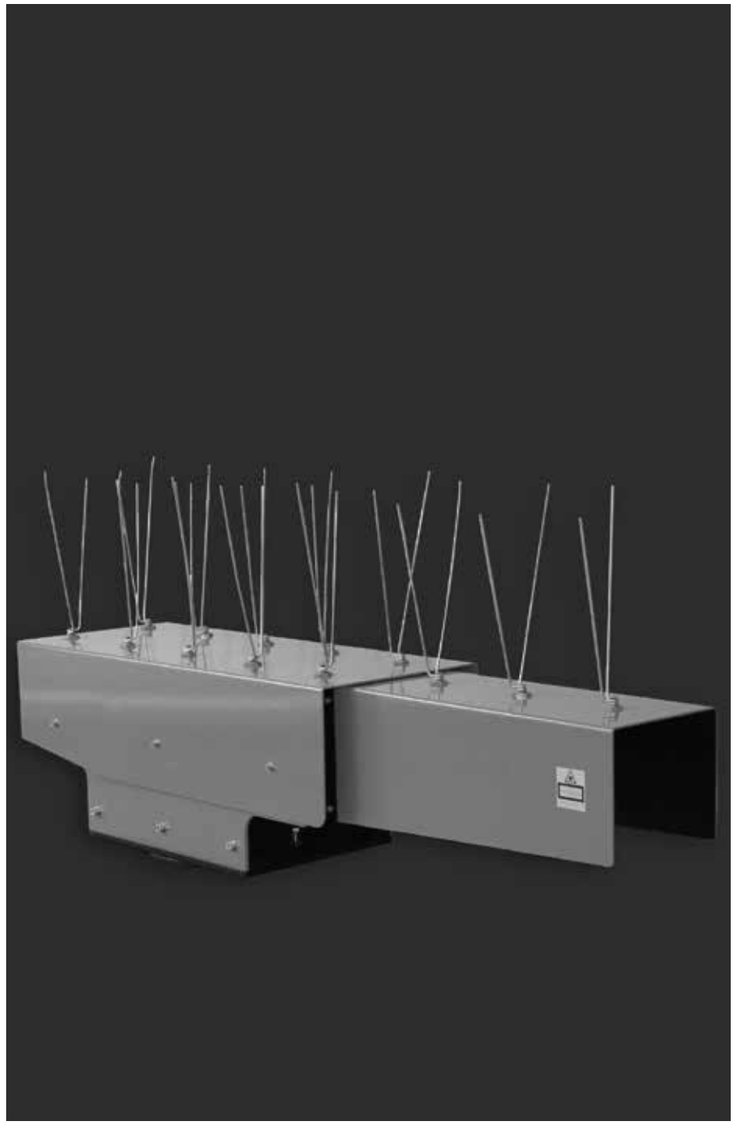
Product code example: E8592.RWG.T3

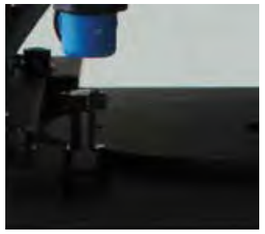
- Projector sector light for IALA Region A with integrated TelFiCon™-Flasher E9272

E8593

LED Projector sector light signal, up to 21 M / 4 M daytime range

The E8593 is a high-performance, power efficient medium intensity marine LED Projector sector lantern with beam configuration tailored to customer requirements at the factory. All E859X Lanterns feature factory configured Day and Night mode luminous intensity selectable by a single digital input, supporting fast PWM control necessary for generating navigational signals at reduced intensities, as well as for utilizing Fixed-and-Flashing (FFL) rhythmic characters or Slow Flash Front (SFF). The field proven E8593 design can be offered with optional Opposite-Isophase sector signal control for producing rhythmic characters reducing the latency of spatial awareness update for the mariners: the white sector signal is active during the eclipse of coloured sectors and vice versa, resulting in immediate awareness about leaving the white sector without the usual delay caused by the common eclipse. A two-tiered design with two additional sectors providing alternating flashing on sector boundaries is available as E8595.





Vertical beam tilting arrangement
The Lantern can be tilted within the limits of ±2° by adjusting the three levelling bolts on the pedestal.

Lens hood
Supplied detached to minimize the shipping volume.

Rifle sights
Mechanical parts fitted permanently to the right side of the bottom plate.

Mounting arrangement
Three Ø16 mm mounting holes on a 200 mm circle.

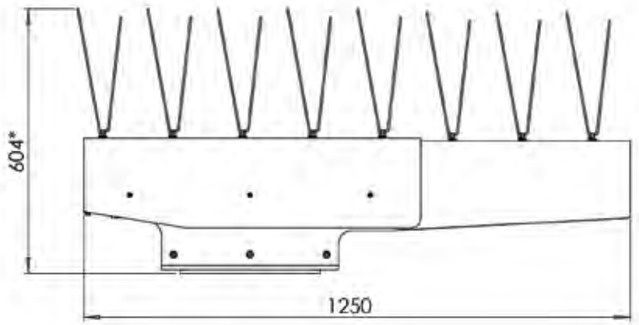
Standard power/signal connector
Most ekta™ lights use similar 7-pole receptacle.

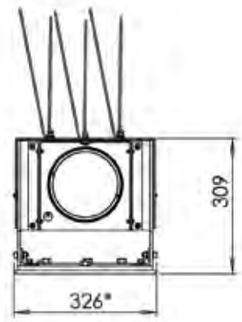
Cable termination
The power/signal cable wires are crimped at the free flying end.

Optional integrated flasher
Equipment from simple flashers to programmable TelFiCon™ - Flashers can be integrated on the back side.

- **Power efficient Day/Night light signalling system for port entry lights or leading line systems replacement**
- **IALA colours Red, Green, White with application-specific luminous intensities nearly uniform up to 250 kcd**
- **Factory-customized sector configuration with precision of ≤ 0.05° (3′)**
- **Sector width up to 2.5° with total subtense of approximately 7.5°**
- **Vertical divergence either 1.2° or 2.5°**
- **Boundary resolution typically better than 8′**
- **Robust light signal unit that can be equipped with a Sabik SMC Flasher or with external Ekta control and monitoring system**
- **Day and Night mode luminous intensities configured in hardware as required - down to 10% by current and further by implementing PWM**
- **Internal optical LED performance diagnostics with condition output**
- **Available with optional Opposite-Isophase sector signal control**
- **Optionally available in “smart” version with externally integrated flasher and telematics controller with triaxial acceleration sensor integrated on the Lantern for Structural Health Monitoring of the AtoN mast**
- **Easy to install – requires only simple procedures for aiming the composite beam vertically**
- **No maintenance needed where sprinkling of the lens by wave particles or dirt can be avoided**

Technical Specification E8593





Optical performance

Number of sectors	3 (R, W, G)		
Typical luminous intensity of the light signal per colour	250,000 cd		
Nominal range, Night / Day (T=0.74)	up to 21 M / 4 M		
Subtense angle per sector (total approximately 7.5°)	≤ 1.2°	≤ 1.2°	≤ 2.5°
Vertical divergence angle	1.2°	2.5°	1.2°
Power consumption in flash	≤ 45 W	≤ 90 W	≤ 90 W
Achievable boundary resolution	~ 0.1° (6'... 9')		
Beam direction adjustment in field conditions, Hor/Vert	± 180° / ± 2°		

Main technical specification

Light source	High Power Light Emitting Diode (LED) clusters
Vertical divergence	1.2° or 2.5° (FWHM)
Lens material	optical glass
Enclosure material	polycarbonate optical unit potted in resin on aluminium bottom plate, marine grade aluminium sides and protective cover, painted steel mounting plate
Weight	< 50 kg
Operating environment	-40 °C to +55 °C
Power supply voltage	12 VDC (10 ... 24 V)
Power consumption in flash	up to 90 W depending on configuration
Degree of ingress protection	IP 67
Overall height (excl. bird deterrents)	309 mm, width 326 mm, depth 1250 mm
Focal plane height	205 mm
Installation	3 x 14mm on 200 mm circle

Order Overview E8593

Option matrix

Sector lights for IALA Region A	E8593.RWG
Sector lights for IALA Region B	E8593.GWR

Accessories

Bird deterrent rod set (incl. screws)	8264.050
Cable Connector, 90deg, female 6 + PE-position	C016 30F006 100 10
Programmable Flasher, integrated	E8672
Programmable Flasher with GPS, integrated	E8672.G
TelFiCon™-Flasher for complete AtoN telematics, integrated	E9272

Product codes

Since this product is usually ordered in AtoN site specific configuration, simple ordering codes covering all possible alternatives are not available.

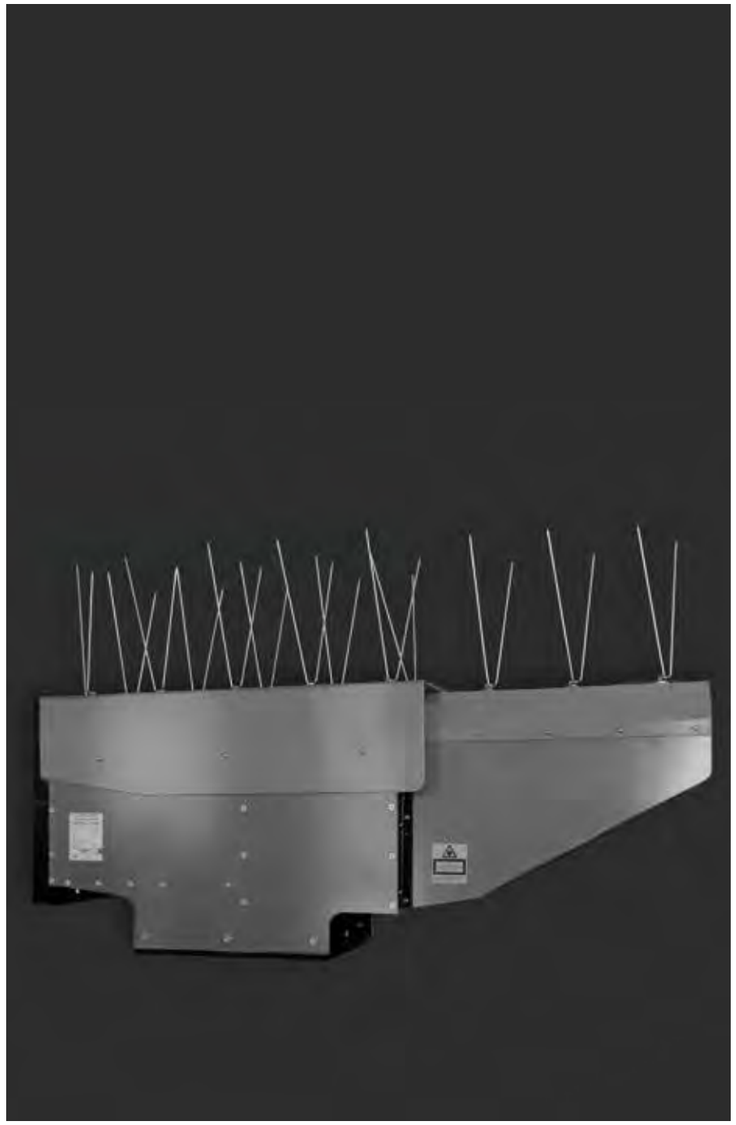
Product code example: E8593.GWR.F2.G1

- Projector sector light for IALA Region B with integrated Flasher E8672 and GPS capability

E8594

LED Projector sector light signal, up to 23 M / 5 M daytime range

The E8594 is a high-performance, power efficient high intensity marine LED Projector sector lantern with beam configuration tailored to customer requirements at the factory. All E859X Lanterns feature factory configured Day and Night mode luminous intensity selectable by a single digital input, supporting fast PWM control necessary for generating navigational signals at reduced intensities, as well as for utilizing Fixed-and-Flashing (FFL) rhythmic characters or Slow Flash Front (SFF). The field proven E8594 design can be offered with optional Opposite-Isophase sector signal control for producing rhythmic characters reducing the latency of spatial awareness update for the mariners: the white sector signal is active during the eclipse of coloured sectors and vice versa, resulting in immediate awareness about leaving the white sector without the usual delay caused by the common eclipse. Same two-tiered design with two additional sectors providing alternating flashing on sector boundaries is available as E8595.



Two-tiered lens design
Powerful sector signals with alternating flashing sector configuration capability.

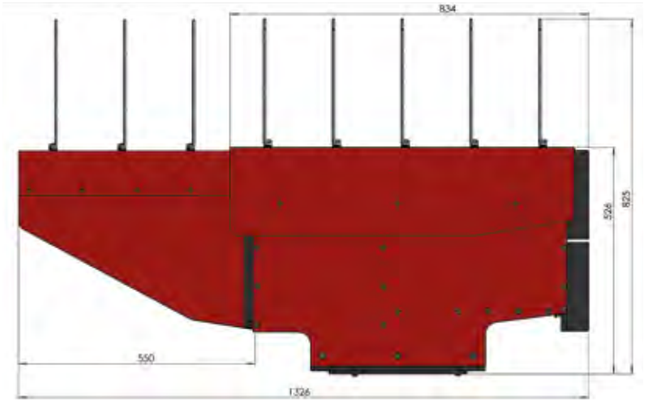
Significant sail surface
Installation quality and mast structure stability are of particular importance at high wind locations.

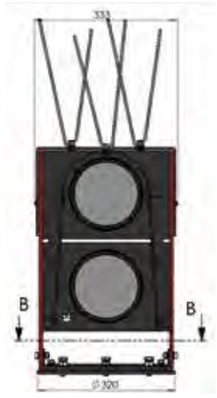
Abundant heat sinks
Efficient dissipation of heat ensures reliable long term operation.

Rifle sights
Alignment is performed by looking through the aperture in the right side of the heat sink.

- **Power efficient Day/Night light signalling system for port entry lights or leading line systems replacement**
- **IALA colours Red, Green, White with application-specific luminous intensities up to 500 kcd**
- **Factory-customized sector configuration with precision of ≤ 0.05° (3′)**
- **Sector width up to 2.5° with total subtense of approximately 7.5°**
- **Vertical divergence 1.2°**
- **Boundary resolution typically better than 8′**
- **Robus light signal unit that can be equipped with a Sabik SMC Flasher on with external Ekta control and monitoring system**
- **Day and Night mode luminous intensities configured in hardware as required - down to 10% by current and further by implementing PWM**
- **Internal optical LED performance diagnostics with condition output**
- **Available with optional Opposite-Isophase sector signal control**
- **Optionally available in "smart" version with externally integrated flasher and telematics controller with triaxial acceleration sensor integrated on the Lantern for Structural Health Monitoring of the AtoN mast**
- **Easy to install – requires only simple procedures for aiming the composite beam vertically**
- **No maintenance needed where sprinkling of the lenses by wave particles or dirt can be avoided**

Technical Specification E8594





Optical performance

Number of sectors	3 (R, W, G)	
Typical luminous intensity of the light signal per colour	500 000 cd	
Nominal range Night (T=0.74, 0.2 µlx) / Day (T=0.74, 1 mlx)	up to 23 M / 5 M	
Subtense angle per sector (total approximately 7.5°)	≤ 1.2°	≤ 2.5°
Power consumption in flash	≤ 90W	≤ 180W
Vertical divergence (FWHM)	1.2°	
Achievable boundary resolution	~ 0.13° (8′… 9′)	
Range of beam adjustment in field conditions, H / V	± 180° / ± 2°	

Main technical specification

Light source	High Power Light Emitting Diode (LED) clusters
Vertical divergence	1.2° (FWHM)
Lens material	optical glass
Enclosure material	polycarbonate optical unit potted in resin on aluminium bottom plate, marine grade aluminium sides and protective cover, painted steel mounting plate
Weight	≤ 92 kg
Operating environment	-40 °C to +55 °C
Power supply voltage	12 VDC (10 … 24 V)
Power consumption in flash	up to 180 W depending on configuration
Degree of ingress protection	IP 67
Overall height (excl. bird deterrents)	526 mm, width 333 mm, depth 1326 mm
Focal plane height	205 mm
Installation	3 x 14mm on 200 mm circle

Order Overview E8594

Option matrix

Sector lights for IALA Region A	E8594.RWG
Sector lights for IALA Region B	E8594.GWR
Sector lights with alternating flashing for IALA Region A	E8595.RWG
Sector lights with alternating flashing for IALA Region B	E8595.GWR

Accessories

Bird deterrent rod set (incl. screws)	8264.050
Cable Connector, 90deg, female 6 + PE-position	C016 30F006 100 10
Programmable Flasher, integrated	E8672
Programmable Flasher with GPS, integrated	E8672.G
TelFiCon™-Flasher for complete AtoN telematics, integrated	E9272

Product codes

Since this product is usually ordered in AtoN site specific configuration, simple ordering codes covering all possible alternatives are not available.

Product code example: E8594.GWR.F2.G1

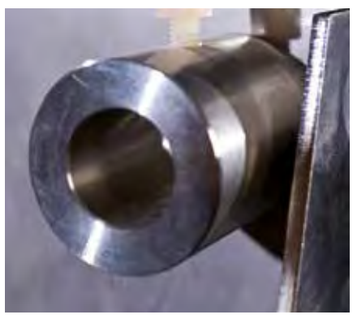
- Projector sector light for IALA Region B with integrated Flasher E8672 and GPS capability

LS 100

LED Range Light

The LS 100 LED signal is designed for applications requiring short and medium range directional light, such as range lights and port traffic signals.

- **Small and compact lantern**
- **Intensity adjustable in three steps from 25 % to 100 %**
- **Fully waterproof housing with PTFE vent for breathing**
- **Visual range from 2 to 12 NM (TC = 0,74)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Low power consumption, ideal for solar system**
- **External Sabik SMC Flasher can be connected to the light**
- **Optional external GPS synchronization**
- **Optional external GSM Remote monitoring**



Sun shield
Protects lens from dust and bird droppings, and improves contrast in daytime.

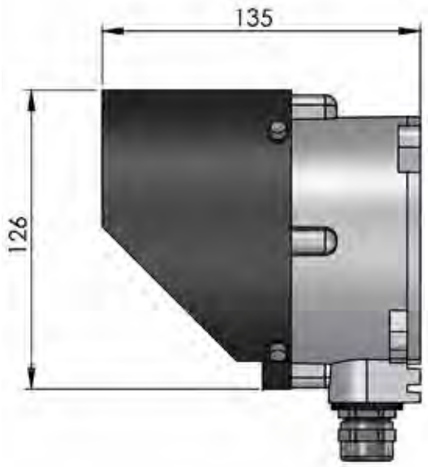
Mounting pedestal
The optional adjustable pedestal in AISI 316 stainless steel enables an easier alignation of the pencil beam with assistance of a precision gun sight.

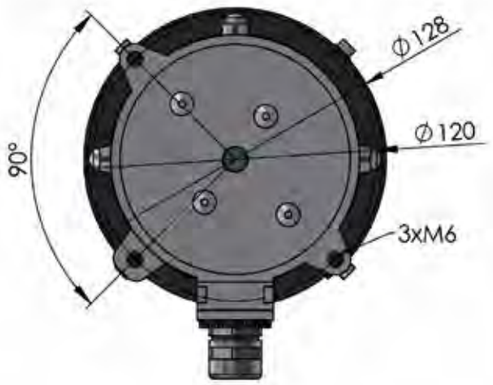
Installation
The mounting pedestal has an integrated holder for an eye sight tool.

Polycarbonate lens
The optical lens consists of 24 pcs miniature Fresnel elements creating a high efficiency precision beam.

Sabik LHC Controller
When remote monitoring or more functionality is needed, like flash character, intensity setting etc. Sabik LHC Controller can be used together with the light.

Technical Specification LS 100





Optical performance

Maximum fixed intensity				
At full power	3.000 cd	3.000 cd	4.000 cd	4.000 cd

Main Technical Specification

Lens visual/Mechanical diameter	100 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Lens divergence (horizontal and vertical)	4° @ 50% (± 1°) of peak intensity 8° @ 10 % (± 2°) of peak intensity
Unit lifetime	Up to 10 years
Weight	1.5 kg with integrated flasher
Temperature range	-40°…+60°C
Supply Voltage	9 – 28 VDC
Power consumption	R/Y: 3.5 W I W/G: 2.5 W

Order Overview LS 100

Option matrix

LHC Controller	Used as external flasher

Product codes

LS 100 STANDARD without LEDFLASHER	Colour
LS 100W	white
LS 100W	red
LS 100G	green
LS 100Y	yellow

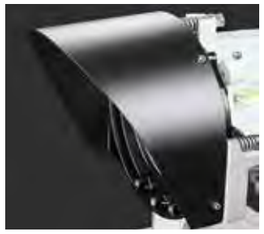
LO 200M

Medium/High Intensity LED Range Light

The LO 200M signal is designed for applications requiring medium and long range directional light, such as range lights and port entry signals.

- **High intensity precision range light**
- **Equipped with a high intensity power LED and especially designed optics**
- **Robust aluminium IP 66 housing**
- **Visual range up to 14NM (Tc = 0,74)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Extremely low power consumption, suitable for solar and battery operation**
- **Vertical divergence 8° @ 50% of top intensity**
- **Integrated flasher with 16 A solar panel charger**
- **Adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM remote monitoring**
- **Equipped with Bluetooth programming**

Aluminium housing
The lantern enclosure is made from marine grade aluminium.



Sun shield
Protects lens from dust and bird droppings. Improves contrast in daytime use.

Installation
The lantern can easily be installed on any flat surface with four M10 size bolts.

PTFE breathing
Vent for pressure release in the back of the lantern.

Optics
Optics suitable for high intensity LED.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

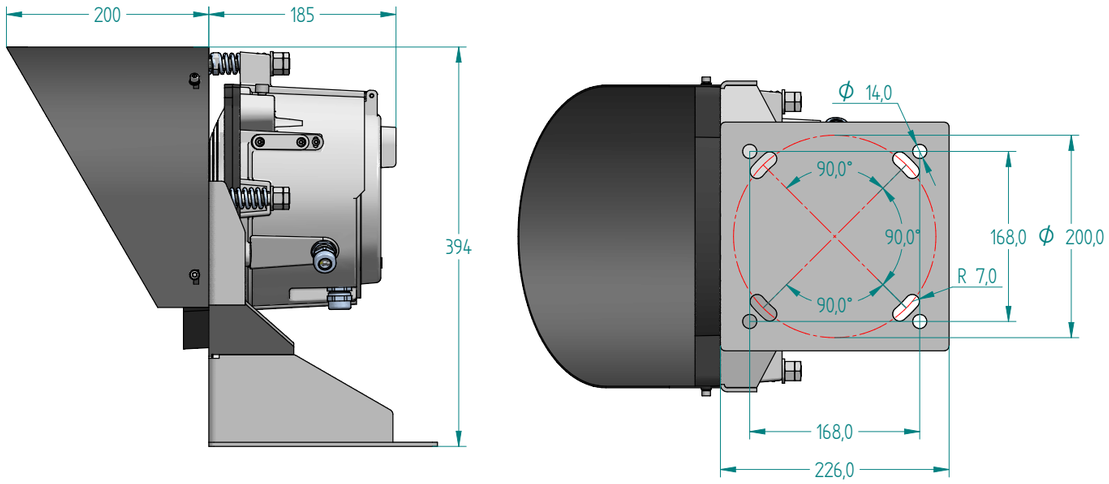
Precision alignment
A gun sight can be utilized for precision alignment to the center line of the range.

Level indicator
The integrated level indicator makes horizontal levelling easy.

Light beam adjustment
The direction of the light beam can be adjusted with 3 bolts. The 3 axis adjustment system enables both vertical and horizontal alignment.

Bluetooth® Control
Lantern can be programmed and controlled up to 50 meters distance with standard android and iOS mobile phones.

Technical Specification LO 200M



Optical performance

Maximum fixed intensity				
At full power	7000 cd	7000cd	7000cd	13000cd

Main Technical Specification

Lens visual/Mechanical diameter	203 mm (8”)
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Lens horizontal divergence	6° @ 50 % (± 1°) of peak intensity
Unit lifetime	Up to 10 years
Weight	8 kg
Temperature range	-40°…+60°C
Supply Voltage	9 – 32 VDC
Power consumption	4W at full intensity
Degree of protection	IP 66

Order Overview LO 200M

Option matrix

OPT 4: GPS sync	Integrated LED performance measurement
OPT7: : External GPS	External GPS antenna
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

Product codes

Product	Colour
LO 200MW	white
LO 200MR	red
LO 200MG	green
LO 200MY	yellow

Product code example: LO 200MR.4

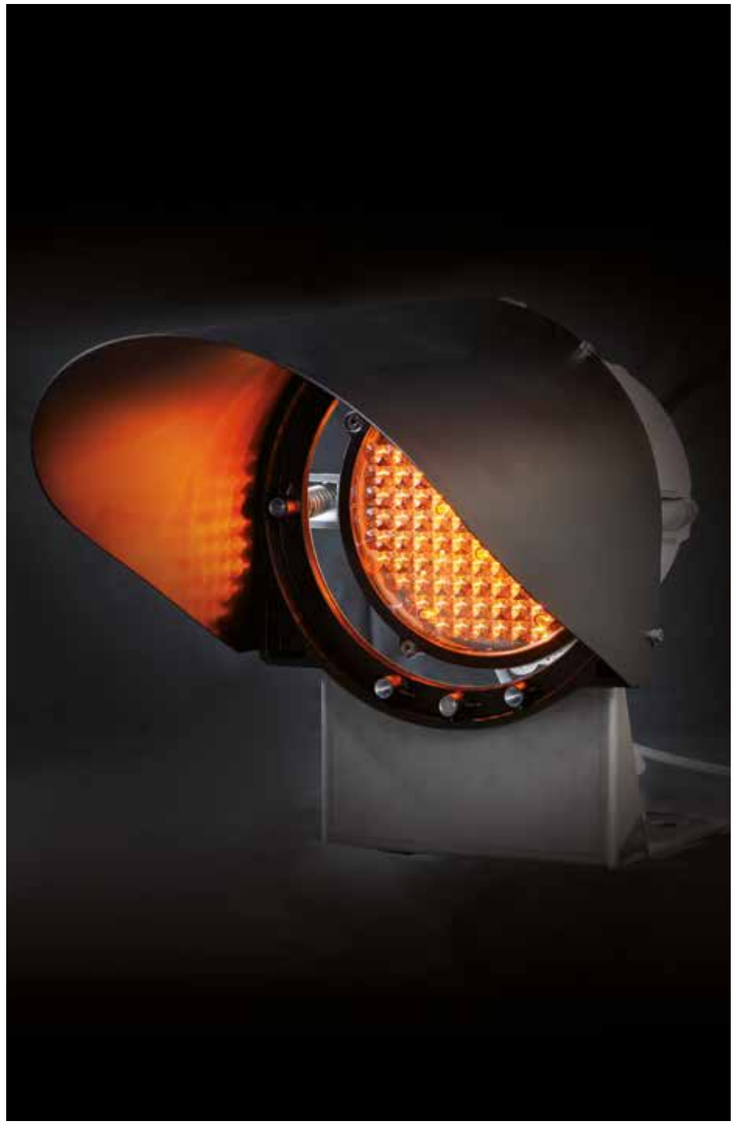
- ***LO 200MR*** is Sabik code for LO 200M in red
- ***4*** is a selection of option 4

LO 200

High Intensity LED Range Light Signal

The LO 200 signal is designed for applications requiring medium and long range directional light, such as range lights and port entry signals.

- **High intensity precision range light**
- **Intensity adjustable from 5% to 100%**
- **Housing fully waterproof with PTFE vent for breathing**
- **Visual range up to 15 NM (Tc = 0,74)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Low power consumption, ideal for solar system**
- **Flasher with daylight switch integrated with the lantern**
- **Integrated 16 ampere PWM solar panel regulator when flasher is integrated**
- **Programmable with Sabik standard IR programming devices**
- **Optionally internal GPS synchronization**
- **Optional nigt time reduction if operated day and night**
- **Equipped with Bluetooth programming**



Aluminium housing
The lantern enclosure is made from marine grade aluminium.

Sun shield
Protects lens from dust and bird droppings. Improves contrast in daytime use.

Installation
The lantern can easily be installed on any flat surface with four M10 size bolts.

PTFE breathing
Vent for pressure release in the back of the lantern.

Polycarbonate lens
The optical lens consists of 120 pcs miniature Fresnel elements creating a high efficient precision beam.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

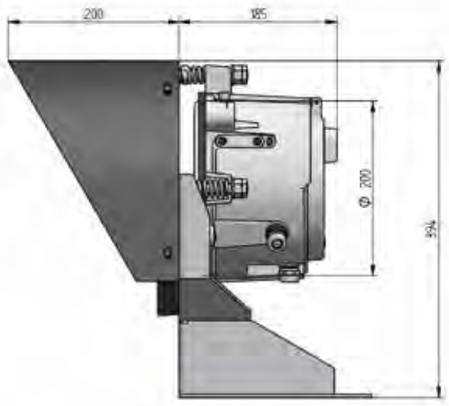
Precision alignment
A gun sight can be utilized for precision alignment to the center line of the range.

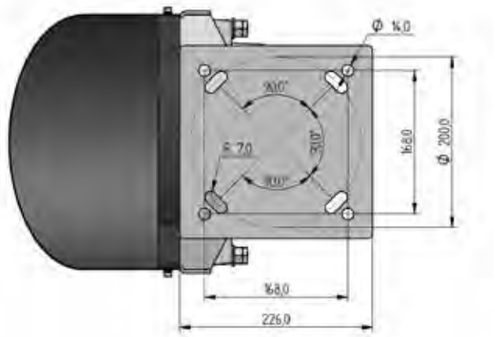
Level indicator
The integrated level indicator makes horizontal levelling easy.

Light beam adjustment
The direction of the light beam can be adjusted with 3 bolts. The 3 axis adjustment system enables both vertical and horizontal alignment.

Bluetooth® Control
Lantern can be programmed and controlled up to 50 meters distance with standard android and iOS mobile phones.

Technical Specification LO 200





Optical performance

Maximum fixed intensity				
At full power 12/15 W	20.000 cd	20.000 cd	25.000 cd	20.000 cd

Main Technical Specification

Lens visual/Mechanical diameter	203 mm (8“)
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Lens divergence (horizontal and vertical)	4° @ 50 % (± 1°) of peak intensity 8° @ 10 % (± 2°) of peak intensity
Unit lifetime	Up to 10 years
Weight	8 kg
Temperature range	-40°…+60°C
Supply Voltage	9 – 32 VDC
Power consumption	15 watts red /yellow, 12 watts green/ white at full intensity
Degree of protection	IP 66

Order Overview LO 200

Option matrix

OPT 4: GPS sync	Integrated GPS sync excluding GPS antenna
OPT 7: External GPS	External GPS antenna for OPT 4 and OPT 9
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

Product codes

Product	Colour
LO 200W	white
LO 200R	red
LO 200G	green
LO 200Y	yellow

Product code example: LO 200G.11

- ***LO 200G*** is Sabik code for LO 200 in green
- ***11*** is a selection of option 11 Control Card

LO 200H

High Intensity LED Range Light Signal

The LO 200H signal is designed to be used as a long range directional light, a port entry signal or a lock traffic signal where long range and high visibility are required. Thanks to the high luminous output, this light can also be used in applications requiring daytime visibility.

The lantern housing forms a solid single-piece heat sink for the high power LEDs, offering the best possible thermal management and ensuring a long lifetime

- **High intensity precision range light equipped with high power LEDs**
- **Intermediate horizontal and vertical beam of 8° (FWHM)**
- **Integrated sun shield to protect lens from dirt and improve contrast**
- **Integrated 3-axis alignment of beam for easy installation**
- **Aluminium housing fully waterproof with PTFE vent for breathing**
- **Visual range up to 18 NM (Tc = 0.74)**
- **Standard IALA colours Red, Green, White and Yellow**
- **The range light has an integrated LED driver, but no flasher or photocell**
- **For additional functionality, the Sabik LHC unit can be connected to the lantern**
- **The range light is delivered with an acid-proof steel mounting mechanism**

Aluminium housing
The aluminium housing is equipped with cooling elements on the back side of the enclosure.

Sun shield
Protects lens from dust and bird droppings. Improves contrast in daytime use of the lantern.

Installation
The lantern can easily be installed on a flat surface with four M10 size bolts.

Cable entry
Cable entry and PTFE breathing vent are from the back of the lantern.

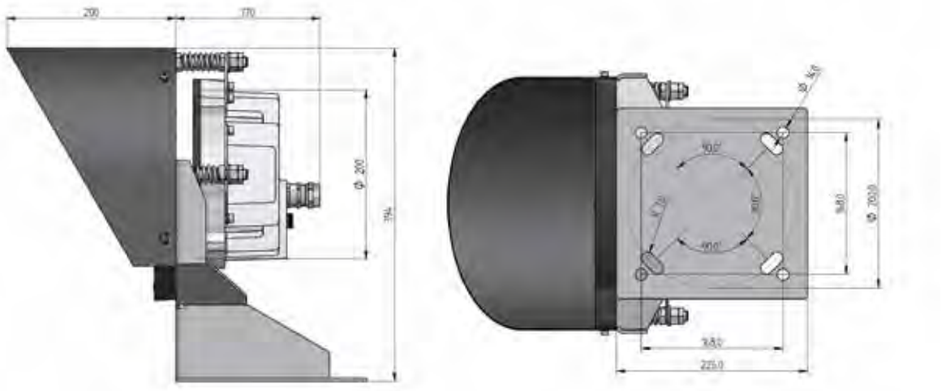
High power LEDs
The performance of the range light has been achieved thanks to high power LEDs with individual lenses.

Light beam adjustment
The direction of the light beam can be adjusted with 3 bolts. The 3 axis adjustment system enables both vertical and horizontal alignment.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Sabik LHC Controller
When remote monitoring or more functionality is needed, like flash character, intensity setting etc. Sabik Lighthouse Controller can be used together with the light.

Technical Specification LO 200H



Optical performance

Maximum fixed intensity				
At full power 50 W	50.000 cd	70.000 cd	100.000 cd	50.000 cd

Main Technical Specification

Lens visual/Mechanical diameter	200 mm (8“)
Lens material	UV stabilized Polycarbonate
Light source	High Power Light Emitting Diodes (LEDs)
Lens divergence (horizontal and vertical)	8° @ 50 % (± 1°) of peak intensity 15 @ 10% (± 2°) of peak intensity
Unit lifetime	Up to 10 years
Weight	10 kg
Temperature range	-40°…+60°C
Supply Voltage	20 – 30 VDC
Power consumption	50 watts
Degree of protection	IP 66

Order Overview LO 200H

Option matrix

Sabik LHC, External marine flasher	
	LHC Flasher c/w photocell
980091	LHC controller with photocell, GPS sync incl. antenna, holder and coax cable
980090	LHC controller with GSM/GPS, GPS and GSM antenna, holder and coax cable
	LHC external IP 66 300x400x130 polycarbonate enclosure with terminals

Product codes

Product	Colour
LO 200HW	white
LO 200HR	red
LO 200HG	green
LO 200HY	yellow

E8554

LED range light signal for leading lights, up to 24 M range

The E8554 is a robust high-performance, long life marine LED range lantern with several standard beam configuration alternatives available. The field proven E8554 design is foreseen with life cycle extension capability by replacing the LEDs after ten to twelve years for improved power efficiency. An E8554 Lantern supports fast PWM control necessary for generating navigational signals at reduced intensities, as well as for utilizing Fixed-and-Flashing (FFL) rhythmic characters or Slow Flash Front (SFF).

- **Standard IALA colours Red, Green, White**
- **Factory-customized luminous intensity with peak value depending on selected colour and horizontal divergence**
- **Uniquely uniform beam width "flat top" horizontal profile, 3.5° to 30° FWHM**
- **Vertical divergence ≥ 3.8° (FWHM)**
- **Focal height 216 mm**
- **Internal redundant arrays and constant current electronics, dual power/signal receptacles as standard**
- **Stainless steel outer frame and pedestal, aluminium heat sink / back plate**
- **A 4x6 matrix of 24 lenses of machined optical grade UV-stable acrylic**
- **UV resistant, field-replaceable polycarbonate front cover**
- **Robust light unit for redundant AtoN systems without programmable parts inside**
- **Two built-in light sensors for redundant control systems**
- **Day and Night mode luminous intensities are currently configured by flasher by adjusting PWM duty cycle, hard-wired D/N intensities for external selection a future option**
- **Optionally available in "smart" version with externally integrated flasher and telematics controller**
- **Optionally available without the pedestal for building LED clusters for high-intensity leading lines**

High power LEDs and custom optics
Flexible platform for several horizontal divergence alternatives.

Integrated light sensors
Redundant leading light systems may use either integrated or additional light sensors.

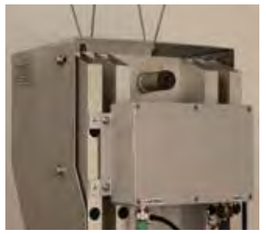
Field-replaceable protective screen
UV-stable polycarbonate front cover with integrated PUR seal is a commercially available spare part.

Vertical beam tilting arrangement
The light module can be tilted inside the protective frame within the limits of ±6°.

Pedestal
Combination of three and four Ø16 mm mounting holes on a 200 mm ring. Horizontal beam alignment within ±8° is possible by turning the light unit on the pedestal.

Bird Deterrents
Stainless steel as standard.

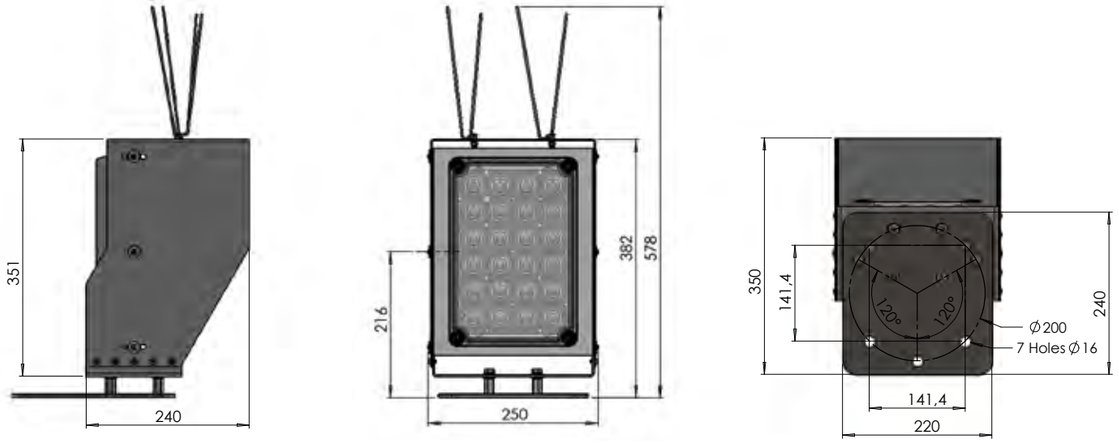
Sighting Scope mount
Mechanical interface for attaching an optional Sighting Scope.



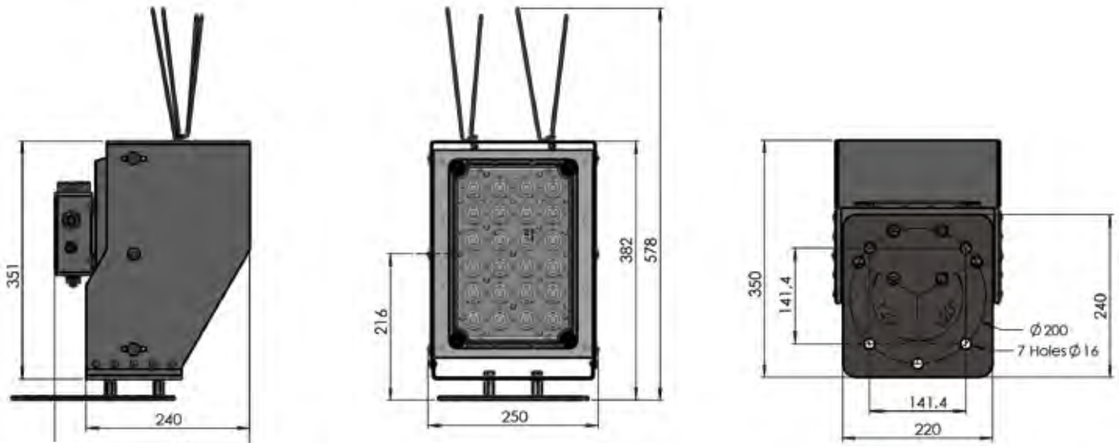
Optional integrated flasher
Alternatives range from simple robust flashers to fully programmable Flashers with GPS synchronization and calendar based seasonal operation.

"Flat top" horizontal profile
Uniquely uniform nearly up to 50% FWHM

Technical Specification E8554



Dual LED Range Lantern E8554



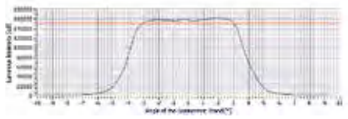
Smart LED Range Lantern E8554 with integrated flasher

Optical performance

Maximum fixed intensity – E8554 Parameter																		
Hor. divergence FWHM (typ)	3.8 deg	4.0 deg	7.6 deg	15 deg	21 deg	29 deg	3.8 deg	4.0 deg	7.8 deg	15 deg	22 deg	30 deg	3.8 deg	4.0 deg	7.9 deg	15 deg	22 deg	30 deg
Hor. divergence FWTM (typ)	6.0 deg	6.0 deg	9.5 deg	17 deg	24 deg	32 deg	6.0 deg	6.0 deg	10 deg	17 deg	25 deg	33 deg	6.0 deg	6.0 deg	10 deg	18 deg	25 deg	33 deg
Vert. divergence FWHM (typ)	3.8 deg	3.8 deg	3.8 deg	3.8 deg	3.8 deg	3.8 deg	3.8 deg	4.0 deg	4.0 deg	4.0 deg	4.0 deg	4.0 deg	3.8 deg	3.9 deg	3.9 deg	3.9 deg	3.9 deg	3.9 deg
Luminous intensity (typical)	320 kcd	180 kcd	90 kcd	90 kcd	42 kcd	60 kcd	386 kcd	255 kcd	126 kcd	126 kcd	60 kcd	79 kcd	660 kcd	440 kcd	220 kcd	220 kcd	95 kcd	110 kcd
Power consumption (typical)	47 W	32 W	32 W	64 W	44 W	90 W	63 W	63 W	63 W	124 W	60 W	120 W	70 W	68 W	68 W	132 W	64 W	130 W

Main technical specification

Power supply voltage	12 VDC (9 ...27 or 36 V)
Power consumption in flash	Up to 132 W depending on configuration
Light source	High Power Light Emitting Diodes (LED)
Vertical divergence	≥ 3.8° (FWHM)
Lens material	UV stabilized Acrylic
Operating environment	-40 °C to +55 °C
Degree of ingress protection	IP 67
Weight	12.2 kg (13 kg with integrated Flasher)
Overall height (excl. bird deterrents)	382 mm
Installation	3 x Ø16, 4 x Ø16, on 200 mm circle



Order Overview E8554

Option matrix

Range lantern with white signal	E8554.W.N.X
Range lantern with green signal	E8554.G.N.X
Range lantern with red signal	E8554.R.N.X
Range lantern with blue signal	E8554.B.N.X
Range lantern with yellow signal	E8554.Y.N.X
Marking N specifies the horizontal divergence of the light signal	E8554.C.7.X
Marking D indicates a dual configuration of the Lantern	E8554.C.N.D
Marking F indicates an integrated flasher, identifying the type (F2=E867X)	E8554.C.N.F2
Marking G indicates a flasher with GPS synchronization (G=E867X.G)	E8554.C.N.X.G1
Marking T indicates an integrated telematics module (TelFiCon™-Flasher)	E8554.C.N.T3

Accessories

Transparent UV-stable polycarbonate front cover	EKJ 80-T
Bird deterrent rod set (incl. screws)	8264.050
Cable Connector, 90deg, female 6 + PE-position	C016 30F006 100 10
Sighting scope set (with carrying case)	8553.Q00
Programmable Flasher, integrated	E8672
Programmable Flasher with GPS, integrated	E8672.G

Product codes

Product ordering code consists of symbols describing the light signal colour, horizontal divergence, external wiring of the internal redundant LED arrays (dual as standard, single when supplied with integrated flasher or on special order).

Product code example: E8554.G.20.F2.G1

- Green range light signal with ≥20° horizontal FWHM
- with integrated flasher E8672 and GPS capability

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LT 1000

LED Light Tube

LT 1000 LED Light tube is designed to replace traditional floodlights. The light is distributed directly towards the mariner instead of illuminating the structure. Only a fraction of energy is required compared to traditional floodlights.

- **Maintenance free LED light tubes for illuminating fixed aids to navigation**
- **Housing fully waterproof with PTFE vent for breathing**
- **Standard IALA surface colours Red, Green, White and Yellow in accordance with E-108 Recommendation**
- **Low power consumption, ideal for solar systems**
- **Can be used standalone or with control unit**
- **With the control unit the intensity can be adjusted from 15 % to 100 %**
- **Control unit also includes integrated solar panel regulator and photocell**
- **Configuration and field maintenance with Programmer Mk2 or laptop computer**

Waterproof
Completely sealed design, PTFE vent for breathing.

Robust
Designed for marine environment.

Uniformity
LT 1000 optical design creates an even and balanced light distribution with no blind spots.

Installation
The LED tube can be installed on any flat surface with four bolts. Rubber gaskets around mounting bolts allow thermal expansion.

Array
When the light tubes are mounted in arrays on the surface of the AtoN structure the light creates a good visual impression of the illuminated area. This allows the mariners to easily detect the structure.

Leading lights
Light tubes can be used to enhance the visibility of a leading line. Mounted vertically on the daytime panels, the leading light becomes very conspicuous in built-up areas with a lot of background light.

LT Control Unit
LEDFlasher is the controller in the control unit. Each unit can control max 10 light tubes.

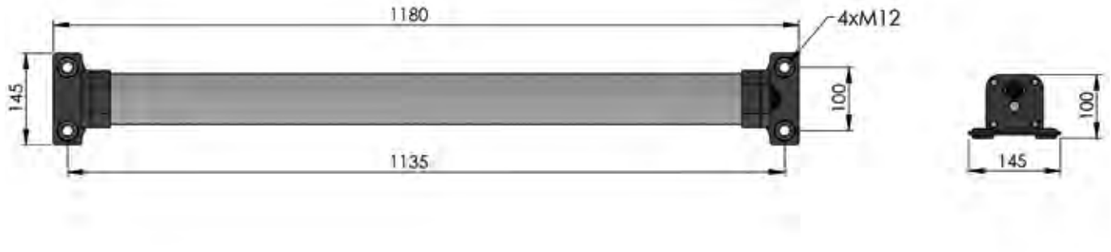
White

Red

Green

Yellow

Technical Specification LT 1000



Optical performance

Maximum Illuminance				
At full power 3 W	100 cd/m2	100 cd/m2	100 cd/m2	100 cd/m2

Main Technical Specification

Dimensions	1180 x 145mm
Lens tube material	UV stabilized Acrylic
End terminal material	Marine grade anodized aluminium
Light source	Light Emitting Diodes (LEDs)
Viewing angle	150°
Unit lifetime	Up to 10 years
Weight	2.5 kg
Temperature range	-40°…+60°C
Supply Voltage	9 – 30 VDC
Power consumption	High setting = max 3 watts Low setting = max 0,5 watt

Order Overview LT 1000

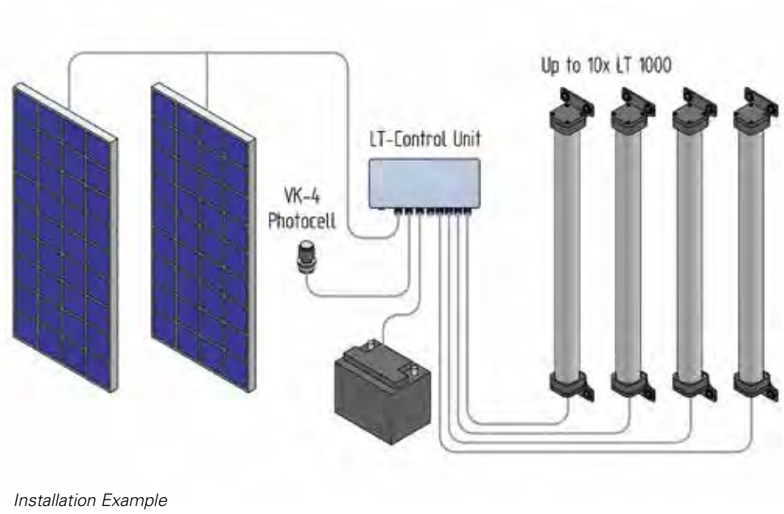
Option matrix

Supply cables with connector	2 m 6 m 10 m

Product codes

LT 1000 0,5W Power 0,5W	LT 1000 3W Power 3 W	Colour
LT 10001W	LT 10003W	white
LT 10001R	LT 10003R	red
LT 10001G	LT 10003G	green
LT 10001Y	LT 10003Y	yellow

CONTROL BOX	980269
LT-1000 CABLE 2M	715620-2
LT-1000 CABLE 6M	715620-6
LT-1000 CABLE 10M	715620-10



Installation Example

SBFL 160

Marker Light for Aquaculture Farms

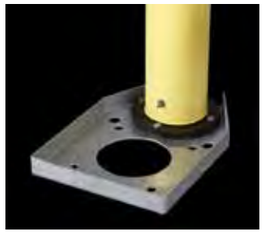
SBFL 160 is a marker light especially developed for aquaculture farms. The unit is designed to meet requirements regarding night and day time visibility as well as radar visibility. It can also be installed directly on floats for aquaculture farms.
The marker light consists of a yellow buoy tube with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

- **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 main battery**
- **Vertical divergence 8° @ 50% (±1°) of peak intensity**
- **GPS synchronization as standard**
- **Optionally integrated GSM/GPS remote monitoring**
- **Remote monitoring with LightGuard Monitor can be added as an option**
- **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® Control up to 50m available for android and iOS smart phones**

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 years

Lens
Sabik designed optics with polycarbonate lens.



Mechanics
Special mechanics suitable for different types of floats available.

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

Product code for lanterns

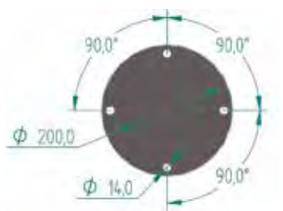
VPL 110Y4	Lantern for SBFL marker light with synchronization

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



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 an 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.

- **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® Control up to 50m available for android and iOS smart phones**

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 Easy programmer or with an advanced Bluetooth android mobile app
Primary battery 220 Ah	Changing interval > 1,5 years

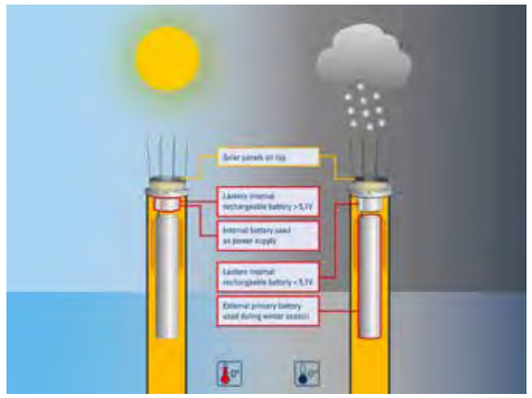
Lantern
Light unit lens produced of polycarbonate. Integrated solar panel and rechargeable battery.

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

Product code for lanterns

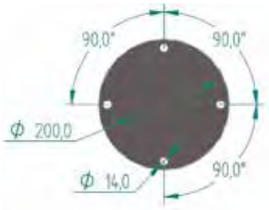
HBL 110Y4	Hybrid lantern for SBFL marker light with synchronization

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



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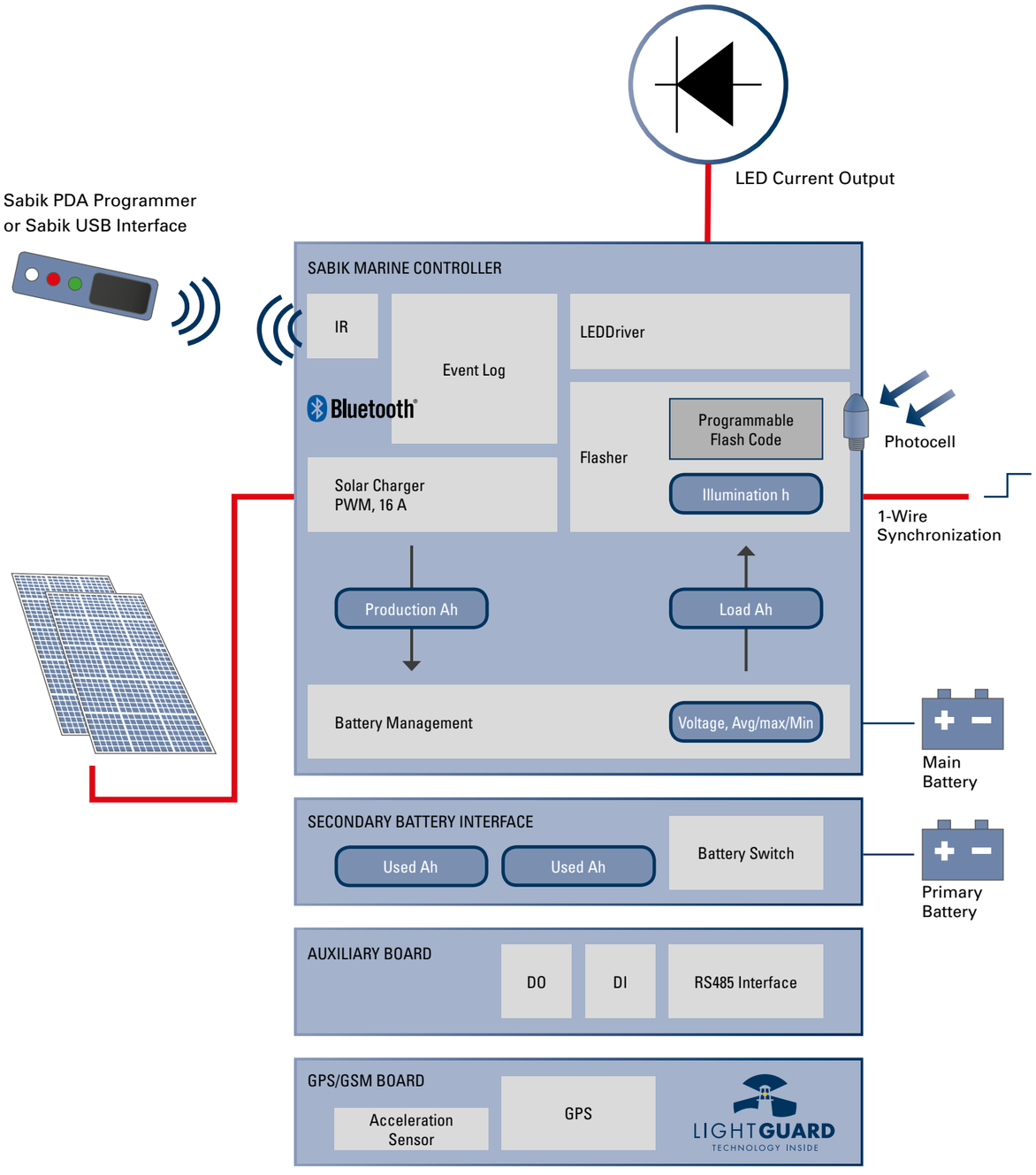
Sabik Marine Controller Functionality



Lantern Technology

Sabik Marine Controller (SMC) is the lantern integrated controller (flasher). The SMC comes with all the proven solutions invented by Sabik for the previous generation controllers. A wide range of innovative functions are included and we are setting a new standard for efficiency of flashers.

SMC is a versatile controller with a whole range of functions integrated as standard and a variety of add-on options.

Key features include:

- **Low energy consumption in all operating stages (daytime idle, night-time active and between flashes). Consumption never exceeds 12 mW (1 mA @ 12VDC)**
- **Intensity dynamics from 5% to 100%**
- **Wireless infrared communication link for configuration and maintenance**
- **Daytime sensor calibrated in lux with user configurable levels**
- **16 A PWM solar panel charger with temperature sensor and user configurable levels**
- **Event log/black box that logs and stores all status changes in the lantern**
- **Power output to LEDs measured, enabling accurate power management of light**

Options include:

- **GSM monitoring with integrated GPS receiver as plug-in units**
- **Power consumption of GSM monitoring less than 25 mW (2 mA) in average**
- **Optical Feedback system for most of the Sabik lanterns**
- **Tilt switch**
- **Secondary battery switch enables lantern to run on two battery sources, one acting as hot standby.**

User interfaces:

- **New Bluetooth® Control app available for android and IOS mobile phones**
- **Easy Programmer for configuration. Collected data can be uploaded to a PC.**
- **Windows based software for configuration and maintenance**

Sabik Marine Controller Feature	Standard	Option
Wide input voltage range – range of up to 10 - 32 V enables operation with all kinds of DC power supplies – stable output intensity within the whole input voltage range	✓	
Pulse Width Modulated (PWM) solar panel charger – 16 ampere (200 watts) charging current	✓	
Solar panel production Ampere Hour meter – measures and logs the total solar panel production and daily min/max current	✓	
Event log – stores all main events in memory – events include lantern start/stop, errors, change of setting, power failure – protected by a four week back up battery (capacitor)	✓	
Black box – same unit as the Event log, events stored in a non volatile Flash memory		✓
Secondary battery interface – an auxiliary board enabling hot switch to a standby battery if the main battery fails		✓
Cable sync – one wire cable sync, where all lanterns are masters and/or slaves		✓
Output power measurement – measurement of power output to LED load is recorded	✓	
Operating hours counter – stores the lantern »mileage« in a non volatile memory	✓	
Wireless infrared communication port – IR port with secured two-way communication protocol – programming with Windows software or Windows Mobile device (PDA)	✓	
Intensity setting – Can be adjusted from 5 % to 100 %	✓	
Optical Feedback Monitoring – auxiliary OFBS sensor card that monitors LED degradation over time – available to most lanterns		✓
Auxiliary card – enables connection of two external I/O's – can be used as a digital alarm output – RS 485 port integrated for connection to host system (MODBUS)		✓
Tilt switch – switches off the light when the lantern is tilted over in close to horizontal position (buoy in storage or under the ice)		✓

Bluetooth® Control

- **Programming range up to 50m @50µA**
- **Connected within one second, no pairing required**
- **Lantern settings PIN-code protected**
- **Requires BLE 4.0 (Android 4.3+ or iPhone)**
- **Available for Android and iOS**

Sabik Easy Programmer

- **User friendly and compact in size**
- **Integrated infrared port**
- **Two-way communication**
- **Lantern data can be downloaded to a PC**

Product code

Sabik Easy programmer
980332

Sabik IR interface and Windows program

- **USB to IR interface for Windows computer with USB port**
- **Lantern configuration**
- **Delivered as a set with a one meter long USB extension cable and software on memory stick**

Product code

Sabik IR interface and Windows program
980336

Self-contained Lanterns

With integrated power supply units

Self-contained solutions are now even more comprehensive than before thanks to constant development of LEDs, solar panels and battery technologies. Self-contained lanterns with an integrated light and solar power supply are an ideal solution for the operator. These solutions are hassle-free with no installation needed on the field.

Our comprehensive range of self-contained lanterns cover visual ranges from 1 to 10 NM for omnidirectional lanterns and up to 14NM for directional lights.
The capacity of the integrated solar system will limit the range and duty cycle for any given location. The larger the energy package, the higher the latitude where the solution can be used.

Self-contained SCLO200M in Chile

Self-contained M650H in the United Kingdom

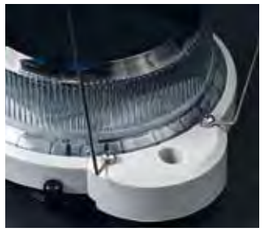
M550

Solar Powered LED Marine Lantern, 1 to 3 NM Range

Leveraging custom optics, high-efficiency solar panels, and premium materials, this miniature solar LED marine lantern offers up to three times the range at half the size of its M502 predecessor. Now with replaceable, recyclable batteries this lantern provides excellent value and reliable operation over the long term. Battery life expectancy is five years with product life up to 15 years and a three-year warranty. Ideal for marine aids-to-navigation, marina lighting, dock lighting, and port lighting. To view performance in your installation location, visit www.sabik-marine.com ->Marine Selector Tool

- **40 user-adjustable flash patterns and programmable intensities**
- **Replaceable, recyclable, high-temperature-rated NiMH AA batteries**
- **Automatic Light Control (ALC) 2.0; achieve optimal intensities throughout the year**
- **Premium grade, UV resistant polycarbonate body and lens material**
- **IP 68 rated**
- **Ventilated battery compartment**

Solar Modules
High-efficiency cells embedded in shatterproof polyurethane.



Bird Deterrent
Stainless steel bird deterrent available as accessory. Fits up to four per lantern.

Installation
Simple installation using 2 x M6 bolts on a 127 mm diameter. No additional mounting hardware required.

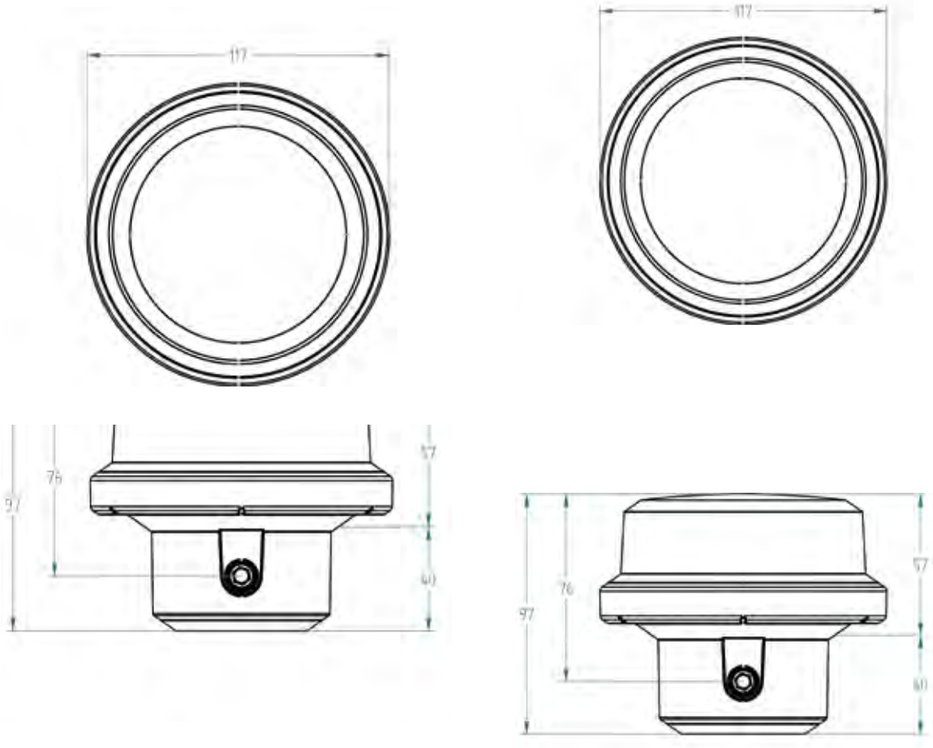
Pole Mount
Easily adjusts to 2 3/8 inch, 60mm or 1 7/8 inch, 48 mm pole dimensions.

Batteries
Replaceable and recyclable NiMH batteries with extreme temperature range and 5-year life expectancy.

IR Controller
Check battery status, change flash code, adjust light intensity and turn lantern off with optional mini IR (Infrared) programmer.

External Switch
Optional external ON/OFF switch.

Technical Specification M550



Optical performance

Maximum fixed intensity				
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.

Main Technical Specification

Construction	Premium grade, UV resistant polycarbonate lens/head and polycarbonate/polysiloxane co-polymer base.
Lens visual/Mechanical diameter	102 mm
Lens material	UV stabilized polycarbonate
Light source	High Flux Surface Mount LED
Solar module	High efficiency cells
Battery	NiMH AA batteries
Degree of ingress protection	IP 68
Weight	Flange Mount: 0.37 kg (0.8 lbs) Pole Mount: 0.40 kg (0.9 lbs)
Overall height	56 mm (flange mount), 96 mm (pole mount)
Overall width	155 mm dia.
Installation	2 x M6 on 128 mm dia.

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**
70943	**Flange 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

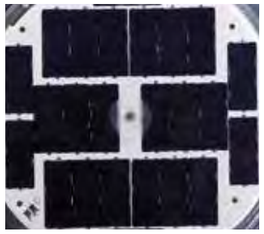
M650H

Self-contained LED lantern for buoys and minor beacons, 2 to 4 NM Range

The M650H is a cost effective, self-contained, high-performance, low-maintenance and easy-to-install solar LED marine lantern. The M650H features a replaceable battery pack that extends the service life beyond five years, reducing the total cost of ownership. Applications include: marine aids-to-navigation marking, marina lighting, dock lighting, and port lighting. To view performance in your installation location, visit www.sabik-marine.com ->Marine Selector Tool

- **Standard IALA colours Red, Green, White, Yellow, Blue**
- **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**
- **Colour-specific temperature corrected LED drivers provide consistent intensity under all operating conditions**
- **IP 68 rated. Double O-ring sealing with waterproof vent**
- **SLA battery**
- **Ventilated battery compartment**
- **Adjustable intensity and range**
- **Vertical divergence > 8º (FWHM)**
- **Programmable with On-Board User Interface, USB port, or optional wireless IR-Programmer**
- **Integrated event-log**
- **Optional ON/OFF switch**
- **Optional external charger**
- **Optionally integrated GPS synchronization**

Bird Deterrent
Stainless steel as standard. Tool-less installation and replacement.



Solar Modules
High-efficiency cells with bypass and blocking diode function. Maximum power point tracking (MPPT) for optimal energy collection.

SLA Battery
Tool-less replaceable and recyclable best-in-class battery pack with extreme temperature range and 5-year life expectancy. On-board battery status feedback of Good, Charge, Low or Replace. True battery voltage shown.

Colour Indicator
Protective bumper indicates LED colour.

On-Board User Interface
Configure lantern parameters and features and access status reports.

650 Device Manager Software
Connect Windows based PC via USB port to configure parameters, view detailed information about the lantern, change transition settings, change passcodes, and update firmware. Multi-level access for advanced features.

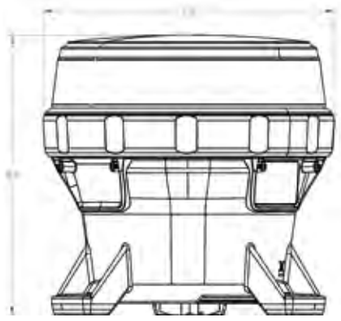
IR Controller
Check battery status, change flash code, set ship mode and turn lantern off with optional IR (Infrared) controller.

Installation
Supports installation on structure using 3 x M6 bolts on a 150 mm diameter.

Bottom Cover Removal Tool
Available as accessory.

Barge Application
For barge application, sector plates with open sectors of 112,5º, 135º and 225º.

Technical Specification M650H



Optical performance

Maximum fixed intensity				
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.

Main Technical Specification

Lens visual/Mechanical diameter	165 mm
Lens material	UV stabilized Polycarbonate
Light source	High Power Light Emitting Diode (LED)
Vertical divergence	>8° (FWHM)
Solar module	High efficiency cells; bypass and blocking diodes; MPPT
Battery	Sealed Lead Acid
Degree of ingress protection	IP 68
Weight	1.58 kg
Overall height	169 mm
Overall width	176 mm dia.
Installation	3 x M6 on 150 mm dia.

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)

Accessories

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**
57383	**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	M650R	M650R-S	M650R-GPS	M650R-SGPS
green	M650G	M650G-S	M650G-GPS	M650G-SGPS
white	M650W	M650W-S	M650W-GPS	M650W-SGPS
yellow	M650Y	M650Y-S	M650Y-GPS	M650Y-SGPS
blue	M650B	M650B-S	M650B-GPS	M650B-SGPS

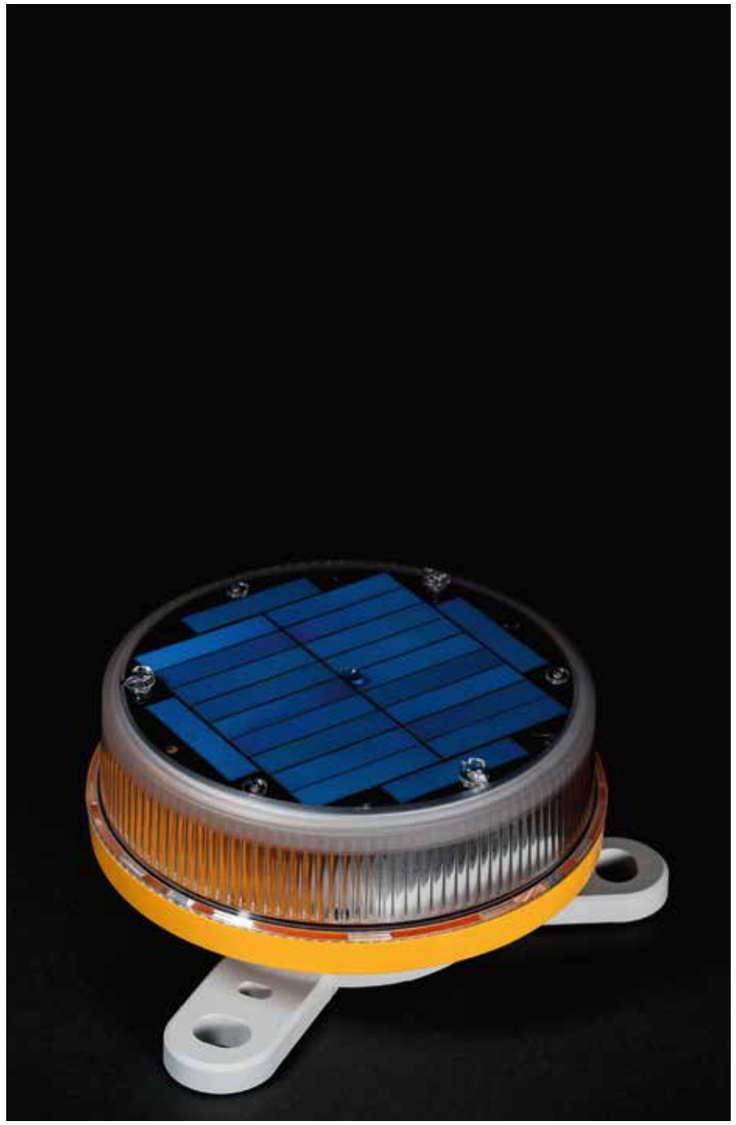
M660

Self-contained LED lantern for buoys and minor beacons, up to 4 NM Range

The M660 is a high-performance, long life, easy-to-use and cost effective self-contained solar LED marine lantern. The M660 features a Li-ion battery pack that extends the service life of the lantern up to eight years. M660 has four different mounting options and can be programmed and controlled with Bluetooth® Control. To view performance in your installation location, visit Marine Selector Tool in www.sabik-marine.com ->Marine Selector Tool

- **Standard IALA colours Red, Green, White, Yellow, Blue**

  Ventilated battery compartment
- **Adjustable intensity and range**
- **Vertical divergence > 8º (FWHM)**
- **High-efficiency solar cells. Maximum Power Point Tracking (MPPT) for optimal energy collection**
- **Premium grade UV resistant, polycarbonate/polysiloxane co-polymer body and lens material**
- **IP 68 rated. O-ring sealing with waterproof vent.**
- **Li-ion battery, optional dual pack**
- **Programmable with Bluetooth® Control and IR-Programmer**
- **Optional ON/OFF switch, external charger and charging port**



Bird Deterrents
Stainless steel as standard.

Solar Modules
High-efficiency cells. Maximum Power Point Tracking (MPPT) for optimal energy collection.

Li-ion
Replaceable Li-ion battery pack with extreme temperature range and up to 8-year life expectancy.

Colour Indicator
Lantern body indicates LED colour.

Installation
Four different mounting options Dual bolt circles standard (150 and 200 mm, 3 holes). Two pole mounting options.

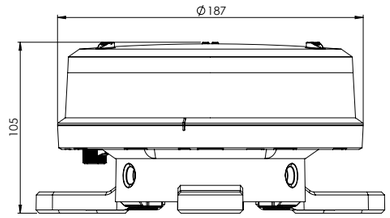
Pole Mount
Pole mount by removing adapter, 70 diameter and 72 diameter (nominal, sched.40).

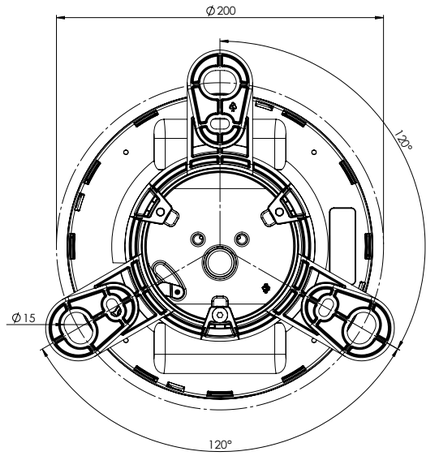
Bluetooth® Control
Lantern can be programmed and battery status checked up to 50 meters distance with an app for Android and iOS.

IR Controller
Set intensity, change flash code, check battery status, set ship mode and turn lantern off with optional IR (Infrared) controller.

External Switch
An optional external switch can be installed.

Technical Specification M660





Optical performance

Maximum fixed intensity				
40 cd	42 cd	71 cd	52 cd	18 cd

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

Main Technical Specification

Lens visual/Mechanical diameter	177 mm
Lens material	UV stabilized Polycarbonate
Light source	High Power Light Emitting Diode (LED)
Vertical divergence	>8° (FWHM)
Solar module	High efficiency cells; MPPT
Battery	Li-ion (IEC 61233)
Degree of ingress protection	IP 68
Weight	0.8 kg
Overall height (excl. bird deterrents)	105 mm
Installation (adapter)	3 x M6 on 150mm and 3 x M12 on 200mm
Installation (pole mount)	70 or 72 diameter

Order Overview M660

Option matrix

M660 Switched	ON/OFF switch
M660 Unswitched	No ON/OFF switch
M660 Dual Battery	Dual Battery Pack
M660 Charge Port	With Charge Port

Accessories

69934	**660 Bird Deterrent – Single**
79848	**Spare adapter (incl. screws)**
79273	**Optional switch**
79399	**660 Battery Replacement Pack**
69885	**660 International Wall Charger Assembly**
69899	**IR (Infrared) Programmer**
38334	**660 Standard Bolt Kit**
79400	**660 Dual Battery Replacement Pack**

Product codes

Colour	M660 unswitched	M660 switched	M660 dual battery	M660 charge port
red	M660R	M660R-S	M660R-2B	M660R-C
green	M660G	M660G-S	M660G-2B	M660G-C
white	M660W	M660W-S	M660W-2B	M660W-C
yellow	M660Y	M660Y-S	M660Y-2B	M660Y-C
blue	M660B	M660B-S	M660B-2B	M660B-C

Product code example: M660RSC2B

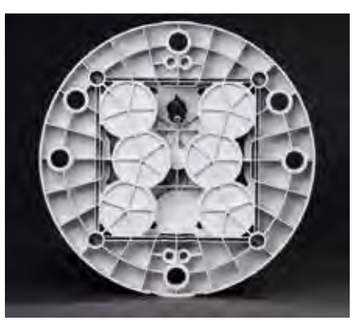
- ***M660R*** is Sabik/Carmanah code for M660 in red
- with a selection of switched with charge port and dual battery

M850

Solar Powered LED Marine Lantern, 3 to 6+ NM Range

The M850 combines a compact, high-efficiency solar engine with premium components and a rugged design for best-in-class performance at an optimal price. This lantern is suitable for use in most solar locations. To view performance in your installation location, visit www.sabik-marine.com ->Marine Selector Tool

- **Option for standard or wide divergences (for fixed or floating applications)**
- **Multiple cost-effective battery pack options suitable for a wide variety of installation 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 powder-coated aluminium chassis**
- **Adjustable intensity and range**
- **IP 68 rated**
- **GPS synchronized flash option**



Top-mounted Display
Easily check light settings with a »tap-to-activate« digital display.

Infrared Programmer
Check battery state of charge, program flash codes, set intensities and more.

Optical Assembly
Durable, UV resistant optical lens with options for standard (8°) or wide (10°) divergence.

Scalable Battery Pack
Multiple replaceable, recyclable battery pack options for reliable, cost-effective performance in a variety of installation locations.

Visible Colour Indicator
LED colour is clearly indicated by the colour of the lantern head.

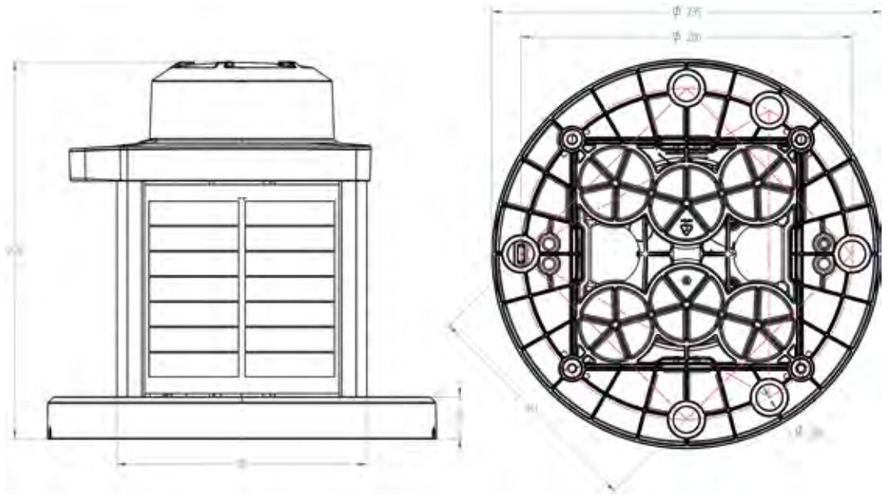
External Charge Port
Optional charge port in the lantern base allows for easy overnight charging via wall plug.

Installation
Supports installation on structure using 3 x M12 bolts, 4 X M12 bolts, or 5 x M12 bolts on a 200 mm diameter. Standard and security bolt kits are available.

Bird Deterrent
Stainless steel bird deterrent. Five deterrents supplied with option for up to ten per lantern.

Solar Modules
High efficiency cells protected by rugged powder-coated aluminium extrusion.

Technical Specification M850



Optical performance

Maximum fixed intensity				
M850	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.

Main Technical Specification

Lens visual/Mechanical diameter	111 mm
Construction	Premium grade, UV resistant polycarbonate lens/head and polycarbonate/polysiloxane co-polymer base
Light source	High Flux Surface Mount LEDs with colour-specific temperature-corrected LED driver
Vertical Divergence	8º or 10º (FWHM)
Solar modules	High-efficiency cells; MPPT
Battery	Multiple replaceable, recyclable battery options (refer to options matrix)
Degree of ingress protection	IP 68 immersion
Weight	4.5 kg M850 60X 5.3 kg M850 96E
Overall height	226 mm
Overall width	235 mm dia.
Installation	3, 4 or 5 x M12 on 200 mm dia.

Order Overview M850

Option matrix

Model	Colour Options	Battery	Lens	Control	Charge Port
M850	Red White Green Yellow	60X 96E	Standard (8°) Wide (10°)	GPS Sync Non-GPS Sync	With External Chargeport Without External Chargeport

Accessories

71757	**M800 Series Standard Bolt Kit**
71884	**M800 Series Security Bolt Kit (drivers not included)**
53288	**M800 Series Security Key**
53289	**M800 Series Security Socket**
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**
HEAD KIT	**M800 Series Head Replacement Kit (please specify colour at time of order)**
HEAD KIT GPS	**M800 Series GPS Head Replacement Kit (please specify colour at time of order)**
69899	**Remote Control**

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

M860

Solar Powered LED Marine Lantern, 4 to 7+ NM Range

With a durable, large-format solar engine, the M860 is engineered for consistent, reliable performance at remote installations and in challenging insolation locations. This is a premium and full-featured lantern that is suitable for achieving longer ranges in challenging insolation locations. To view performance in your installation location, visit www.sabik-marine.com ->Marine Selector Tool

- **Option for standard or wide divergences (for fixed or floating applications)**
- **Multiple cost-effective battery pack options suitable for a wide variety of installation 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 powder-coated aluminium chassis**
- **Adjustable intensity and range**
- **IP 68 rated**
- **GPS synchronized flash option**
- **Remote monitoring options available**

Top-mounted Display
Easily check light settings with a »tap-to-activate« digital display.

Infrared Programmer
Check battery state of charge, program flash codes, set intensities and more.

Optical Assembly
Durable, UV resistant optical lens with options for standard (8°) or wide (10°) divergence.

Scalable Battery Pack
Multiple replaceable, recyclable battery pack options for reliable, cost-effective performance in a variety of installation locations.

Visible Colour Indicator
LED colour is clearly indicated by the colour of the lantern head.

External Charge Port
Optional charge port in the lantern base allows for easy overnight charging via wall plug.

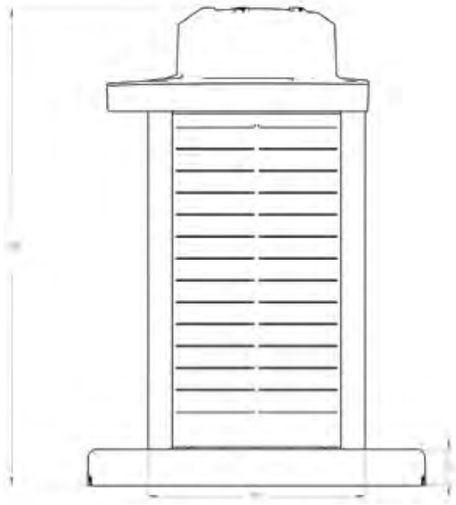
Installation
Supports installation on structure using 3 x M12 bolts, 4 x M12 bolts, or 5 x M12 bolts on a 200 mm diameter. Standard and security bolt kits are available.

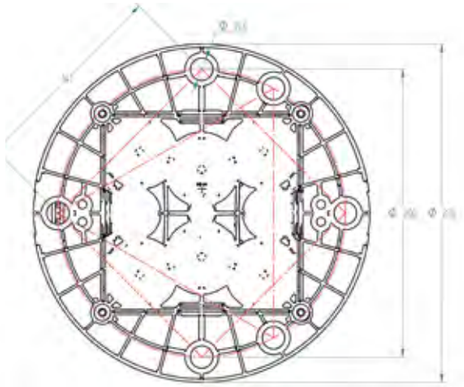
Bird Deterrent
Stainless steel bird deterrents. Five deterrents supplied with option for up to ten per lantern.

Solar Modules
High efficiency cells protected by rugged powder-coated aluminium extrusion.

Monitoring
Optional integrated satellite modem and antenna for remote monitoring. For more information, please see the LightGuard section.

Technical Specification M860





Optical performance

Maximum fixed intensity				
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.

Main Technical Specification

Lens visual/Mechanical diameter	111 mm
Construction	Premium grade, UV resistant polycarbonate lens/head and polycarbonate/polysiloxane co-polymer base
Light source	High Flux Surface Mount LEDs with colour-specific temperature-corrected LED driver
Vertical Divergence	8º or 10º (FWHM)
Solar modules	High-efficiency cells; MPPT
Battery	Multiple replaceable, recyclable battery options (refer to options matrix)
Degree of ingress protection	IP 68 immersion
Weight	6.4 kg M860 96E 10.2 kg M860 200BC
Overall height	328 mm
Overall width	235 mm dia.
Installation	3, 4 or 5 x M12 on 200 mm dia.

Order Overview M860

Option matrix

Model	Colour Options	Battery	Lens	Control	Charge Port
M860	Red White Green Yellow	96E 200BC	Standard (8°) Wide (10°)	GPS Sync Non-GPS Sync	With External Chargeport Without External Chargeport

Accessories

71757	**M800 Series Standard Bolt Kit**
71884	**M800 Series Security Bolt Kit (drivers not included)**
53288	**M800 Series Security Key**
53289	**M800 Series Security Socket**
69885	**M800 Series AC/DC 12V-2.5A Charger, International Plug Adapters**
69934	**Bird Deterrent (single)**
69955	**M800 Series Battery Replacement Kit - 96 Wh**
69956	**M800 Series Battery Replacement Kit - 200 Wh**
HEAD KIT	**M800 Series Head Replacement Kit (please specify colour at time of order)**
HEAD KIT GPS	**M800 Series GPS Head Replacement Kit (please specify colour at time of order)**
69899	**Remote Control**

Product codes

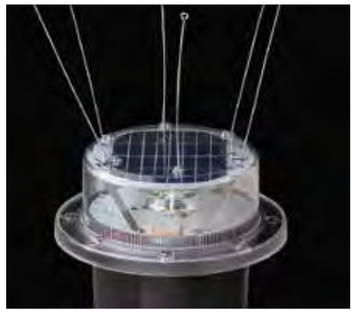
Colour	M860 96E (with 96Wh battery)	M860 200BC (with 200Wh battery)	M860 96E GPS (with 96Wh battery)	M860 200BC GPS (with 200Wh battery)
red	M860R-96E	M860R-200BC	M860R-96EGPS	M860R-200BCGPS
green	M860G-96E	M860G-200BC	M860G-96EGPS	M860G-200BCGPS
white	M860W-96E	M860W-200BC	M860W-96EGPS	M860W-200BCGPS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

HBL 110

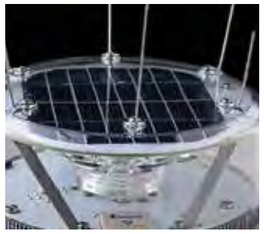
Unique Hybrid LED lantern

HBL 110 is a robust lantern with an outer polycarbonate cover to be used integrated into buoy applications. It 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 backup. This hybrid solution also saves time and money as batteries can be changed less often and there is less need for maintenance visits. This lantern has very low power consumption and is equipped with GPS synchronization. LightGuard remote monitoring can be added as an option and advanced **Bluetooth® Control** app is also available for android and iOS mobile phones.

- **Adjustable intensity and range**
- **Integrated flasher with day and night switch**
- **Standard range: 4 NM at Tc = 0,74 (5 NM at Tc = 0,85)**
- **Available in standard IALA colours**
- **Vertical divergence 8° @ 50% (±1°) of peak intensity**
- **GPS synchronization as standard**
- **Remote monitoring with LightGuard Monitor**
- **Programmable with Sabik standard IR programming devices**
- **Advanced Bluetooth® Control up to 50m available for android and iOS smart phones**



Lens
Sabik especially designed optical unit with outer polycarbonate cover.



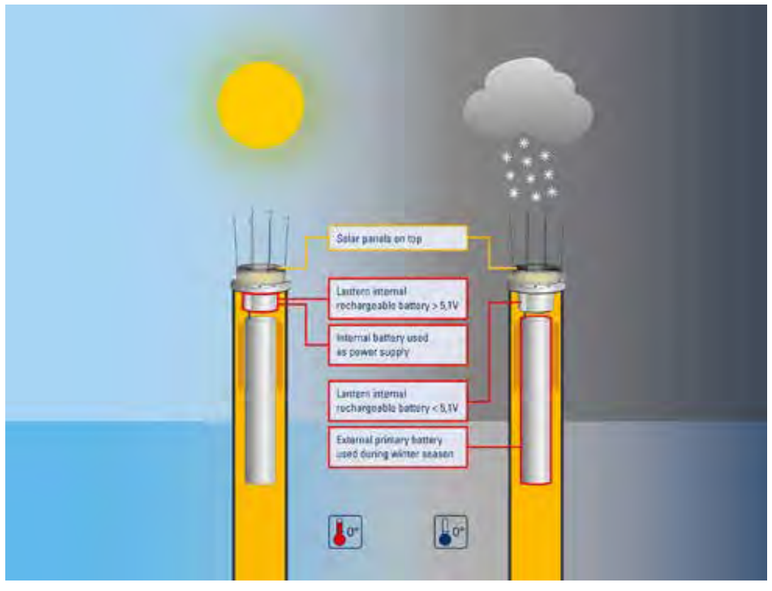
Bird spikes
Stainless steel bird deterrents as standard. Easy to replace.

Solar panel
High efficient solar panel on the top of the lantern.

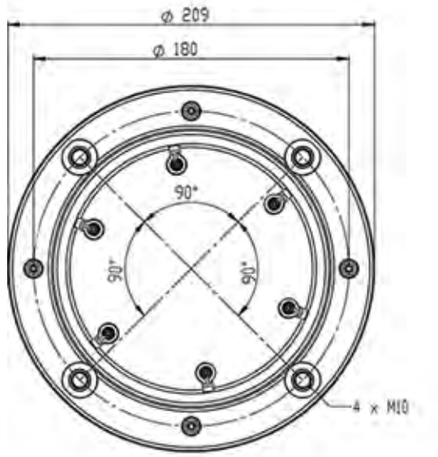
PTFE breathing
PTFE breathing vent for pressure release in the bottom of the lantern.

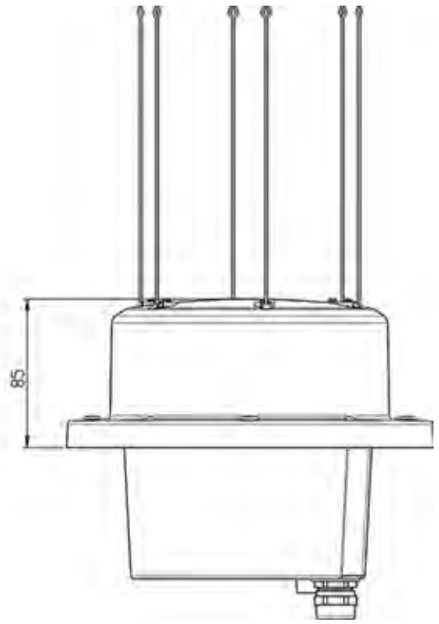
Programming
Lantern can be programmed and battery status monitored with the Sabik user friendly and compact Easy Programmer.

Innovative Bluetooth® app
Lantern can be controlled and battery status checked up to 50 meters distance with standard android and iOS mobile phones.



Technical Specification HBL 110





Optical performance

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

Main Technical Specification

	up to 4 Nautical miles
Lens visual/Mechanical diameter	**166mm**
Lens material	UV stabilized Polycarbonate
Light source	High Power Light Emitting Diode (LED)
Vertical divergence	8° @ 50% (±1°) of peak intensity
Unit lifetime	Up to 10 years
Weight	2,8 kg
Controller	Sabik SMC flasher
Temperature range	-40°…+60°C
Degree of protection	IP 67
Battery Voltage NiMH	6,0 VDC
Battery capacity NiMH	26 Ah
Solar power	1,5W

Order Overview HBL 110

Option matrix

LightGuard GSM + GPS OPT 9H	Integrated GSM based monitoring including GSM/GPS antennas
Optical Feedback System OPT 1H	Integrated LED performance measurement
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

HBL 110 (GPS sync as a standard)	Colour
HBL 110W4	white
HBL 110R4	red
HBL 110G4	green
HBL 110Y4	yellow

Product code for Programmer

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

Order Overview VPL 110

A component lantern without a solar panel and battery

VPL 110 (GPS sync as a standard)	Colour
VPL 110W4	white
VPL 110R4	red
VPL 110G4	green
VPL 110Y4	yellow

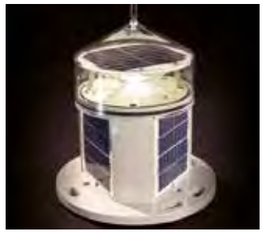
SC 110

Marine self-contained LED light for buoys, beacons, marinas and aquaculture farms

SC 110 is a durable short range LED lantern built from polycarbonate and including an integrated solar power system. This lantern is delivered with Nickel metal hydride battery.
It has more than 6 years lifetime. The lantern is available in 2 and 3 NM versions.

- **Range up to 4 NM (Tc = 0.74) 4,5 NM (Tc = 0.85)**
- **Standard IALA colours Red, Green, White, Yellow**
- **Produced of durable polycarbonate plastic**
- **Available with Lithium-ion or NiMH batteries**
- **Internal calendar, light can be switched off for winter**
- **Adjustable intensity and range**
- **Vertical divergence 8° @ 50% (±1°) of peak intensity**
- **Programmable with Sabik standard IR programming devices**
- **Integrated event log (Black box function) for 365 days**
- **The lantern is delivered in sleep mode. It automatically wakes up when unpacked and light is detected**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM remote monitoring**

Lens
Bird deterred top design.



Solar panels
Optionally 1 (2NM) or 4 (3NM) solar panels.

Battery
Optionally NiMH or $LiFePO_4$ batteries.

Sabik Easy Programmer
User friendly and compact wireless two-way programmer.

Programming with PC
Using Sabik USB interface.

Storage charging
With external charger.

Installation
The bottom plate of the SC 110 supports installation on structure using 3 or 4 x M12 on a 200 mm diameter or 3 x M8 on a 150 mm diameter.

PTFE breathing
Vent for pressure release in the bottom of the product.

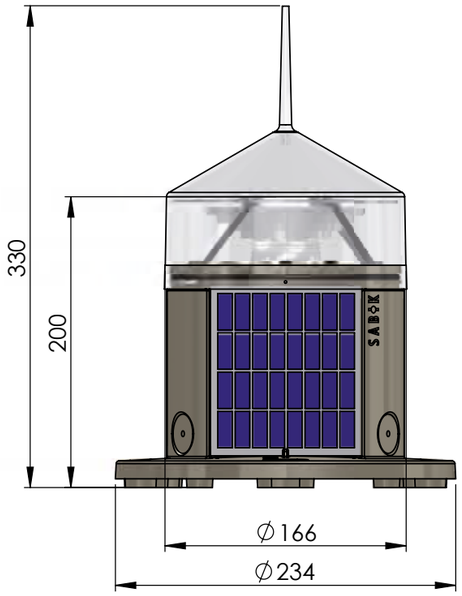
White

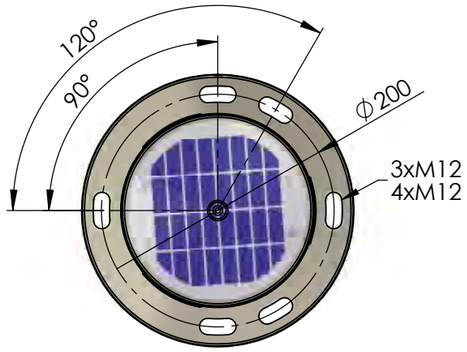
Red

Green

Yellow

Technical Specification SC 110





Optical performance

Maximum fixed intensity				
SC 110 max 4 NM	40 cd	40 cd	50 cd	45 cd

Main Technical Specification

	up to 3 Nautical miles	up to 4 Nautical miles
Lens visual/Mechanical diameter	166 mm	
Lens material	UV stabilized Polycarbonate	
Light source	High Power Light Emitting Diode (LED)	
Vertical divergence	8° @ 50% (±1°) of peak intensity	
Unit lifetime	Up to 10 years	
Weight	2,5 kg	4,2 kg
Controller	Sabik SMC flasher	
Temperature range	-40°…+60°C	
Degree of protection	IP 67	
Battery Voltage NiMH	6,0 VDC	
Battery Voltage $LiFePO_4$	6,4 VDC	
Battery capacity NiMH	8,6 Ah	26 Ah
Solar power	1,5W	4,5W

Order Overview SC 110

Option matrix

OPT 1S: Optical Feedback System	Integrated LED performance measurement
OPT 4S: GPS sync	Integrated GPS sync including GPS antenna
OPT 9S: LightGuard GSM + GPS	Integrated GSM based monitoring with GSM/GPS antennas

Product codes

SCN 110 up to 3 NM self-contained with NiMH battery	Colour
SCN 110.2 WW	white
SCN 110.2 WR	red
SCN 110.2 WG	green
SCN 110.2 WY	yellow

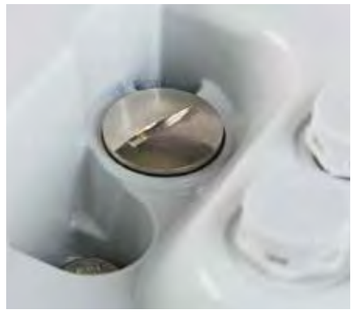
SCN 110 up to 4 NM self-contained with NiMH battery	SCL 110 up to 4 NM self-contained with LiFePO4 battery	Colour
SCN 110.3 WW	SCL 110.3 WW	white
SCN 110.3 WR	SCL 110.3 WR	red
SCN 110.3 WG	SCL 110.3 WG	green
SCN 110.3 WY	SCL 110.3 WY	yellow

SC 160 I

Self-contained LED lantern for buoys and beacons

SC 160 I is a self-contained medium range LED lantern with best-in-class optical performance for fixed and floating structures. The lantern includes solar panels, battery and charge controller. This lantern is designed for harsh marine environments and for long uninterrupted operation.

- **Range up to 8 NM (Tc=0,74) 11 NM (Tc=0,85) depending on geographical location**
- **Standard IALA colours Red, Green, White, Yellow**
- **Lantern made of rugged injection moulded aluminium housing and UV resistant polyethylene body**
- **Integrated flasher with day-light switch and solar charger**
- **Standard VRLA battery and ventilated battery compartment**
- **Solar modules covered with tempered glass**
- **Adjustable intensity and range**
- **Available with narrow (5°) or wide (10°) vertical divergence**
- **Programmable with Bluetooth® Control mobile app up to 50 m radius**
- **Other wireless programming options available such as Sabik Easy Programmer or PC/USB interface**
- **Integrated event log for 365 days**
- **Optionally integrated GPS synchronization and GSM Remote monitoring**
- **Available with AIS**



Bird spike
Bird spike with thread to be installed in the center of the lantern top.

Solar Modules
Solar modules with tempered glass front integrated in the PE-housing.

Remote monitoring
GSM unit and antenna integrated in the lantern for remote monitoring and control. For more information, please see the LightGuard Section.

Installation
The bottom plate of the SC 160 I supports installation on structures with 3 x M12 bolts on a 330 mm diameter.

VRLA Battery
Maintenance free lead acid battery with a designed lifetime of 7 years.

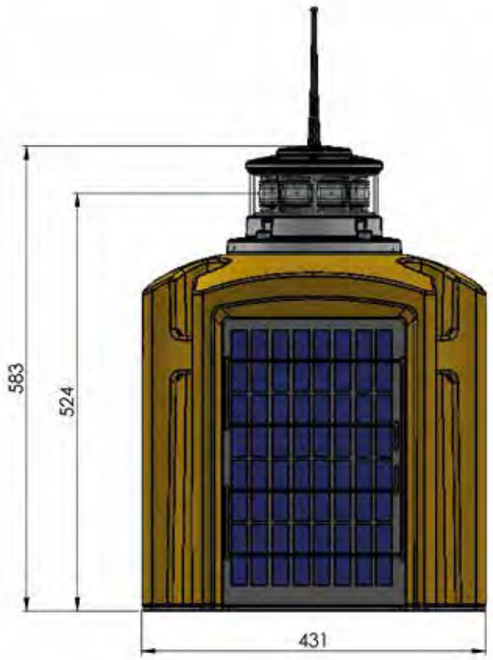
Sabik Easy Programmer
User friendly and compact wireless two way programmer.

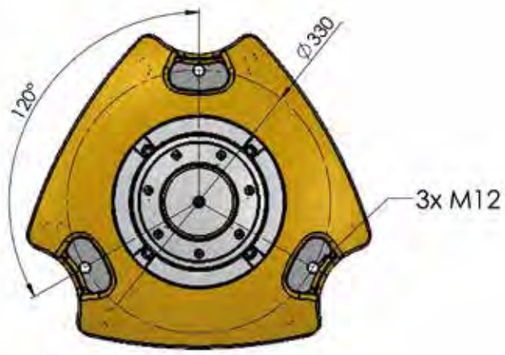
Bluetooth® Control
Lantern can be programmed and battery status checked up to 50 meters distance with an app for Android and iOS.

Programming with PC
Using Sabik USB interface.

AIS Option
Lantern can be equipped with integrated AIS transponder type 1 or type 3

Technical Specification SC 160 I





Optical Performance

Maximum fixed intensity SC 160 IN (5° @ 50% peak intensity FWHM)				
	1150 cd	**1200 cd**	**1000 cd**	**1850 cd**
Power consumption	**13 W**	**16 W**	**16 W**	**16 W**

Maximum fixed intensity SC 160 IW (10° @ 50% peak intensity FWHM)				
	620 cd	**720 cd**	**620 cd**	**1100 cd**
Power consumption	**13 W**	**16 W**	**16 W**	**16 W**

Main Technical Specification

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized acrylic
Light source	High Power Light Emitting Diodes (LEDs)
Vertical divergence options	5°@50% of peak intensity (FWHM) 10°@50% of peak intensity (FWHM)
Solar modules	3 x 10 W
Battery	VRLA GEL-Type, 32Ah/12V
Weight	27 Kg
Overall height	583 mm
Overall width	431 mm dia.
Power consumption	13W - 16W
Installation	3 x M12 on 330 mm dia.

Order Overview SC 160 I

Option matrix

Optical feedback **OPT 1L**	Integrated LED performance measurement
GPS sync **OPT 4L**	Integrated GPS sync including GPS antenna
LightGuard GSM + GPS **OPT 9L**	Integrated GSM/GPS based monitoring including GSM/GPS antennas
Battery control card **OPT 11L**	Control card for secondary (emergency) battery
Automatic Identification System **OPT AIS**	OPT AIS 1: Lantern with integrated AIS type 1 OPT AIS 3: Lantern with integrated AIS type 3 Refer page 140

SC160 I with VRLA Battery			
N = Narrow (5° @ 50 % peak intensity)		W = Wide (10° @ 50 % peak intensity)	
Red	SC160-1NVR	**Red**	SC160-1WVR
Yellow	SC160-1NVY	**Yellow**	SC160-1WVY
Green	SC160-1NVG	**Green**	SC160-1WVG
White	SC160-1NVW	**White**	SC160-1WVW

Example: SC160-1WVW.11

- ***SC160-1WVW*** is the code for SC160 I with VRLA battery and wide lens in white
- ***11*** is a selection of option 11 Control Card for secondary (emergency) battery

SC 160 II

Self-contained LED lantern for buoys and beacons

SC 160 II is a self-contained LED lantern with best in class optical performance for fixed and floating structures with longer range. The lantern includes solar panels, battery and charge controller. This lantern is designed for harsh marine environments and for long uninterrupted operation.

- **Range up to 10 NM (Tc=0,74) 14 NM (Tc=0,85) depending on geographical location**
- **Standard IALA colours Red, Green, White, Yellow**
- **Lantern made of rugged injection moulded aluminium housing and body of UV resistant polyethylene**
- **Integrated flasher with day-light switch and solar charger**
- **Standard VRLA battery and ventilated battery compartment**
- **Adjustable intensity and range**
- **Available with narrow (5°) or wide (10°) vertical divergence**
- **Programmable with Bluetooth Control mobile app up to 50 m radius**
- **Other wireless programming options available such as Sabik Easy Programmer or PC/USB interface**
- **Integrated event log for 365 days**
- **Optionally integrated GPS synchronization and GSM Remote monitoring**
- **Auxiliary connector for external charger or external solar module**
- **Available with AIS option**

Bird spike
Bird spike with thread to be installed in the center of the lantern top.

Solar Modules
Solar modules with tempered glass front integrated in the PE-housing.

Remote monitoring
GSM unit and antenna integrated in the lantern for remote monitoring and control. For more information, please see the LightGuard Section.

Auxiliary connector
Auxiliary connector enables external charging or additional solar modules.

VRLA Battery
Maintenance free lead acid battery with a designed lifetime of 7 years.

Sabik Easy Programmer
User friendly and compact wireless two way programmer.

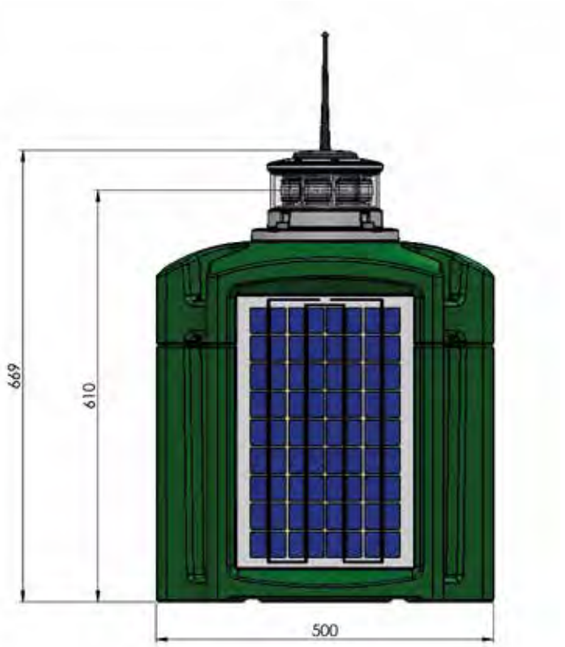
Bluetooth® Control
Lantern can be programmed and battery status checked up to 50 meters distance with an app for android 4.4. or above and for iOS.

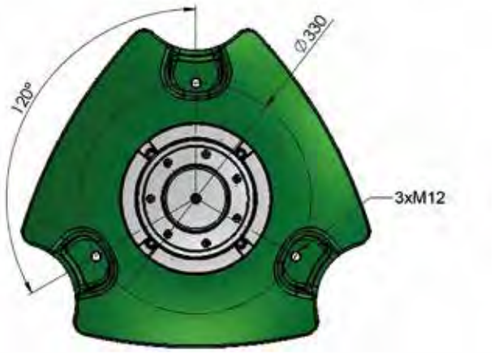
Programming with PC
Using Sabik USB interface.

Installation
Mounting holes with metal inserts.

AIS Option
Lantern can be equipped with integrated AIS transponder type 1 or type 3

Technical Specification SC 160 II





Optical Performance

Maximum fixed intensity SC 160 IIN (5° @ 50% peak intensity)				
	1150 cd	**1200 cd**	**1000 cd**	**1850 cd**
Power consumption	**13 W**	**16 W**	**16 W**	**16 W**

Maximum fixed intensity SC 160 IIW (10° @ 50% peak intensity)				
	620 cd	**720 cd**	**620 cd**	**1100 cd**
Power consumption	**13 W**	**16 W**	**16 W**	**16 W**

Main Technical Specification

Lens visual/Mechanical diameter	160 mm
Lens material	UV stabilized acrylic
Light source	High Power Light Emitting Diodes (LEDs)
Vertical divergence	5°@50% of peak intensity (FWHM) 10°@50% of peak intensity (FWHM)
Solar modules	3 x 11 W
Battery	VRLA GEL-Type, 60Ah/12V
Weight	35 Kg
Overall height	669 mm
Overall width	500 mm dia.
Power consumption	13W - 16W
Installation	3 x M12 on 330 mm dia.

Order Overview SC 160 II

Option matrix

Optical feedback **OPT 1L**	Integrated LED performance measurement
GPS sync **OPT 4L**	Integrated GPS sync including GPS antenna
LightGuard GSM + GPS **OPT 9L**	Integrated GSM/GPS based monitoring including GSM/GPS antennas
BBattery control card **OPT 11L**	Control card for secondary (emergency) battery
Automatic Identification System **OPT AIS**	OPT AIS 1: Lantern with integrated AIS type 1 OPT AIS 3: Lantern with integrated AIS type 3 Refer page 140

SC160 II with VRLA Battery			
N = Narrow (5° @ 50 % peak intensity)		W = Wide (10° @ 50 % peak intensity)	
Red	SC160-2NVR	**Red**	SC160-2WVR
Yellow	SC160-2NVY	**Yellow**	SC160-2WVY
Green	SC160-2NVG	**Green**	SC160-2WVG
White	SC160-2NVW	**White**	SC160-2WVW

Example: SC160-2WVR.4

- ***SC160-2WVR*** is the code for SC160 II with VRLA battery and wide lens in red
- ***4*** is a selection of option 4L GPS sync including GPS antenna

SCLS 100

Self-contained LED Light with 10 NM Range

SCLS 100 is a self-contained range light for use on fixed structures. The light is a complete package including solar panels battery and charge controller. The light is made for long uninterrupted operation.

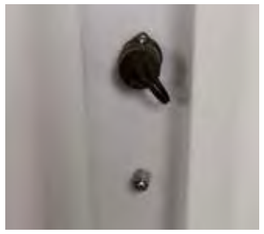
- **Range up to 10 NM (Tc=0,74) 15 NM (Tc = 0,85)**
- **Standard IALA colours Red, Green, White, Yellow**
- **Light module of rugged aluminium housing and body of UV resistant polyethylene**
- **Light horizontally and vertically adjustable in the field**
- **Integrated flasher with day-light switch and solar charger**
- **Standard VRLA battery. Other battery options on request.**
- **Ventilated battery compartment**
- **Solar modules with tempered glass in front**
- **Adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM remote monitoring**
- **Optionally auxiliary connector for external charger or external solar module**

Aluminium housing
Rugged housing with sunshield.

Installation
The bottom plate of the SC-LS100 supports installation on structure using 3 x M10 bolts on a 330 mm radius.

Adjustable
Field adjustable in both horizontal and vertical direction.

Solar Modules
Solar modules with tempered glass front well integrated with the PE-housing.



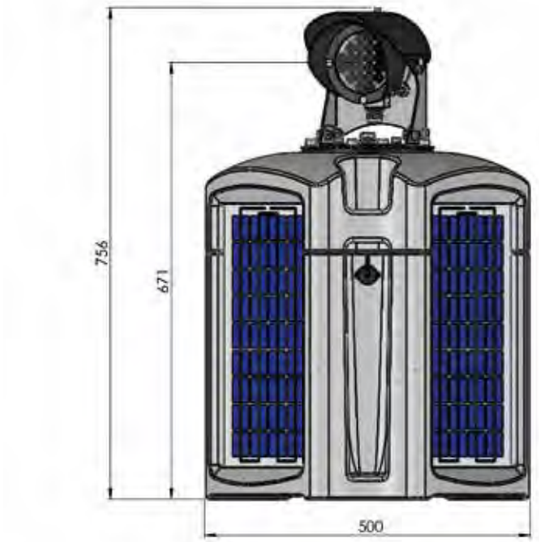
Auxiliary connector
(Optionally) enables external charging or additional solar modules.

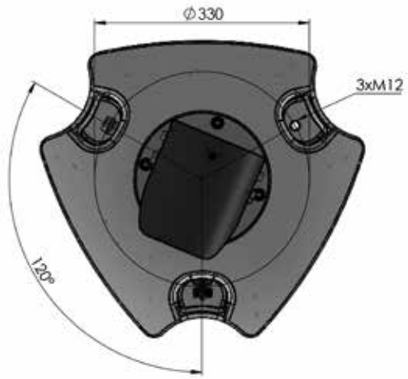
VRLA Battery
Maintenance free Lead acid battery with a designed lifetime of 7 years.

Programming with PC
Using Sabik USB interface.

Sabik Easy Programmer
User friendly and compact wireless two way programmer.

Technical Specification SCLS 100





Optical performance

Maximum fixed intensity				
At full power 3 W	3.000 cd	3.000 cd	5.000 cd	4.000 cd

Main Technical Specification

Lens visual/Mechanical diameter	100 mm
Lens material	UV stabilized Polycarbonate
Light source	Light Emitting Diodes (LEDs)
Vertical divergence	4° @ 50 % (±1°) and 8° @ 10 % (±2°)
Solar modules	3 x 11 W
Battery	VRLA GEL-Type, 60Ah/12V
Weight	37 Kg
Overall height	756 mm
Overall width	500 mm dia.
Installation	3 x M10 on 330 mm dia.
Power consumption	At full power 3 W

Order Overview SCLS 100

Option matrix

OPT 1: Optical Feedback System	Integrated LED performance measurement
OPT 4: GPS sync	GPS sync including GPS antenna
OPT 7: External GPS	External GPS antenna
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

SCLS100 with VRLA Battery	
Red	SCLS 100R
Green	SCLS 100G
Yellow	SCLS 100Y
White	SCLS 100W

Enclosure colour gray by default.
Other colours have to be ordered separately.

SCLO 200M

Self-contained LED light with 14 NM Range

- **Range up to 14 NM (Tc=0,74) 22 NM (Tc=0,85)**
- **Standard IALA colours Red, Green, White and Yellow**
- **Light module of rugged aluminium housing and body of UV resistant polyethylene**
- **Light horizontally and vertically adjustable in the field**
- **Integrated flasher with day-light switch and solar charger**
- **Ventilated battery compartment**
- **Solar panels well protected with tempered glass in front**
- **Adjustable intensity and range**
- **Programmable with Sabik standard IR programming devices**
- **Light can be programmed and controlled up to 50 meter distance with a smart phone using Sabik Bluetooth Control**
- **Optionally integrated GPS synchronization**
- **Optionally integrated GSM/GPS remote monitoring**

Aluminium housing
The light enclosure Is made from marine grade aluminium.

Sun shield
Protects lens from dust and bird droppings

PTFE
Vent for pressure release in the back of the lantern.

Precision alignment
A gun sight can be used for precision alignment to the center line of the range.

Light beam adjustment
The direction of the light beam can be adjusted with 3 bolts. The 3 axis adjustment system enables both vertical and horizontal alignment.

Level indicator
The integrated level indicator makes horizontal levelling easy.

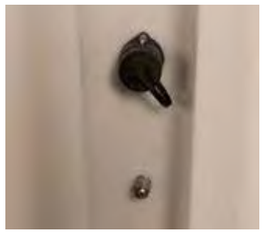
Sabik Easy Programmer
User friendly and compact wireless two way programmer.

Bluetooth® Control
Lantern can be programmed and controlled up to 50 meters distance with standard android and iOS mobile phones.

Installation
The bottom plate supports installation on structure using 3xM10 Bolts on a 330mm radius.

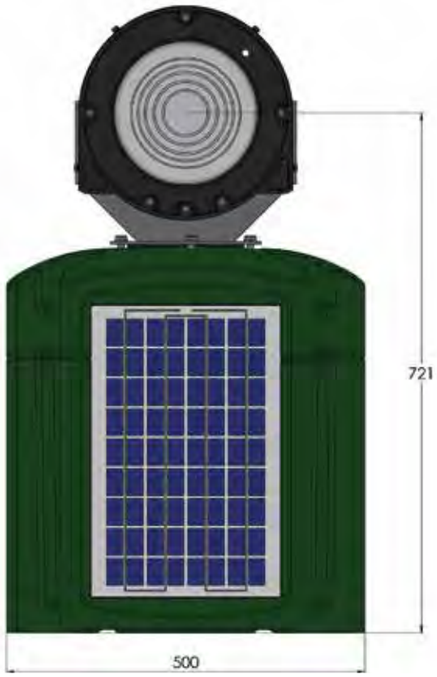
Solar Modules
Solar modules with tempered glass front well integrated with the PE-Housing.

VRLA Battery
Maintenance free Lead acid battery with a designed life-time of of 7 years.



Auxiliary connector
Enables external charging or additional solar module.

Technical Specification SCLO 200M



Optical performance

Maximum fixed intensity				
At full power	7000 cd	7000 cd	7000 cd	13000 cd

Main Technical Specification

	up to 3 Nautical miles	up to 4 Nautical miles
Lens visual/Mechanical diameter	203 W	
Lens material	UV stabilized Polycarbonate	
Light source	Light Emitting Diodes (LEDs)	
Vertical divergence	8° @ 50% (±1°) of peak intensity	
Unit lifetime	Up to 10 years	
Weight	39 kg	
Overall height	870 mm	
Overall width	500 mm dia	
Power consumption	4W at full intensity	
Light unit degree of protection	IP 66	
Solar Modules	3 x 11W	
Battery	VRLA GEL-Type, 60Ah/12V	
Installation	3 x M10 on 330 mm dia	

Order Overview SCLO 200M

Option matrix

OPT 4: GPS sync	Integrated LED performance measurement
OPT 7: External GPS	External GPS antenna for OPT 4 and OPT 9
OPT 9: LightGuard GSM + GPS	Integrated GSM based monitoring including GSM/GPS antennas
OPT 10: LightGuard GSM	Integrated GSM based monitoring including GSM antenna
OPT 11: Control card	Control card for secondary battery
OPT 12: Aux card with I/O	Aux card including I/O ports
OPT 13: Aux card with RS485 and I/O	Aux card including RS 485 and I/O port
Shock & Tilt Sensor	Integrated 3-axis G sensor for tilt and shock sensing

Product codes

Product	Colour
SCLO 200MW	white
SCLO 200MR	red
SCLO 200MG	green
SCLO 200MY	yellow

Product code example: SCLO 200MR.7-9

- ***SCLO 200MR*** is Sabik code for SCLO 200M in red
- ***7-9*** is a selection of option 7 with external GPS antenna and option 9 with GSM/GPS monitoring

Remote Monitoring and Control

Remote monitoring has become standard for monitoring and control of aids-to-navigation. The new communication technologies make integration of reliable remote monitoring and control even on minor aids-to-navigation possible. Real-time information about the state of operation of aids-to-navigation increases safety and enables a more efficient planning of maintenance resources.

The ability to remotely monitor and control your LED lanterns and signals also saves costs and time when unnecessary trips to field can be avoided.

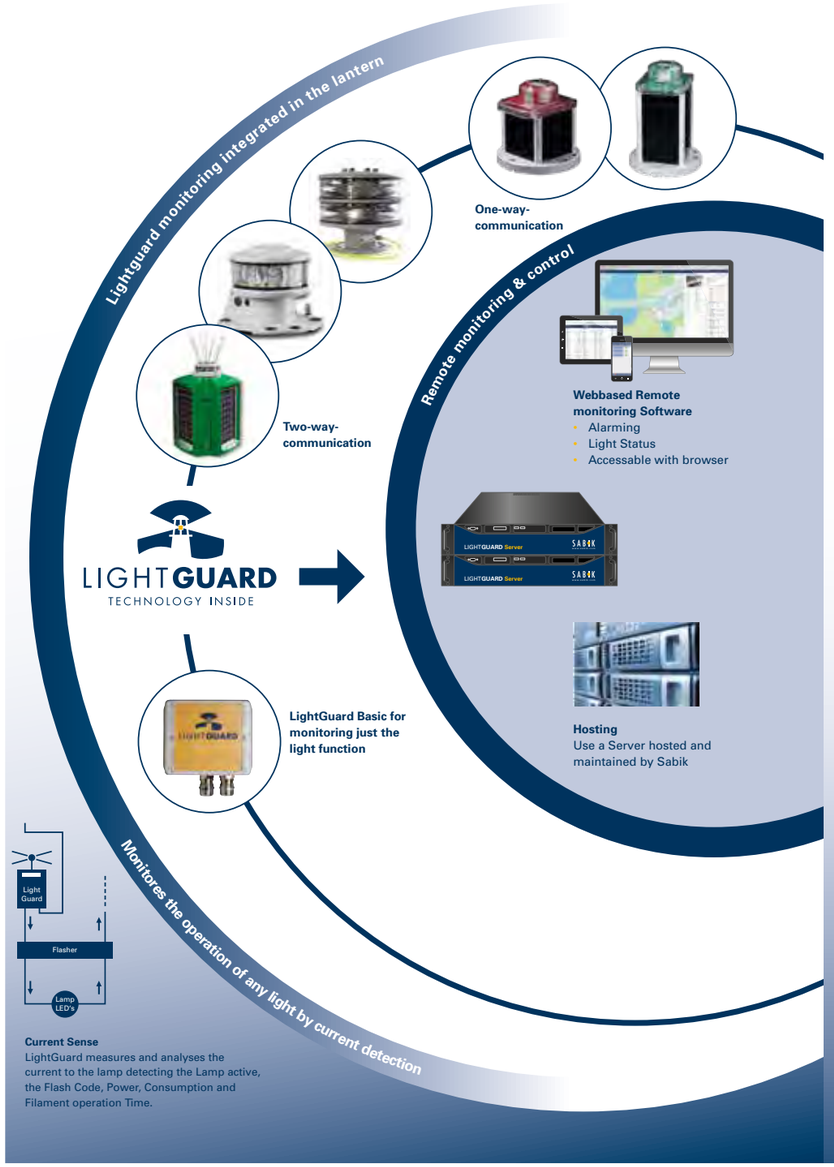
Our product line for remote monitoring and control is called LightGuard Monitor. It can be supplied integrated in Sabik lights or installed on existing aids-to-navigation. We also offer Bluetooth® Control for advanced programming of your lantern up to 50 meters away.

LightGuard

Remote Monitoring and Control of Aids to Navigation

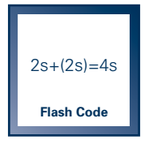
LightGuard is the Carmanah/SABIK product family for remote monitoring and control of all kinds of fixed and floating Aids-to-Navigation. LightGuard is based on extensive experience with different remote monitoring technologies and approaches. The key elements in the LightGuard concept are:

- **Reliable**
  Fewer interfaces, fewer problems! LightGuard monitoring is either directly integrated to the controller of the lantern or it uses current monitoring to determine the status of the light
- **Simple to Install**
  LightGuard can be delivered fully integrated into most Carmanah/ Sabik lights. Other manufacturers' lanterns and previous generations of Sabik lanterns can be monitored with LightGuard by monitoring the current to the lantern. No serial interfacing or communication protocols are needed
- **Simple to use**
  In most cases no special configuration is necessary. If configuration is needed, it can easily be done with a user friendly Windows software. With the software it is possible to print or save documentation of the configuration made
- **Reporting**
  LightGuard can report valuable information about the AtoN to e-mail addresses and to your LightGuard system



LightGuard Functions (availability depending on LightGuard product)

LightFunction
Basic information about the state of the light; active or inactive



Flash Code
On flashing beacons the LightGuard can report the actual flash code running based on the measured supply current to the light

Energy
Ampere-hour counting; lantern consumption and solar system production

Voltage
Battery voltage and temperature

Position
The exact position of the AtoN is calculated with an algorithm to achieve a precision within 2 meters

Off Location
Alarm if the AtoN moves outside of the defined boundaries

Astronomical Clock
Sunrise and sunset times of the location are used to either activate the light or to monitor the photocell

Binary Report
Binary messages including detailed status information sent to LightGuard Base station for presentation on e.g. LightGuard Monitor

SMS Report
Receive text messages on mobile phone with AtoN status information and use the mobile phone to send commands to the AtoN

LightGuard Monitor

Intelligent Remote Control

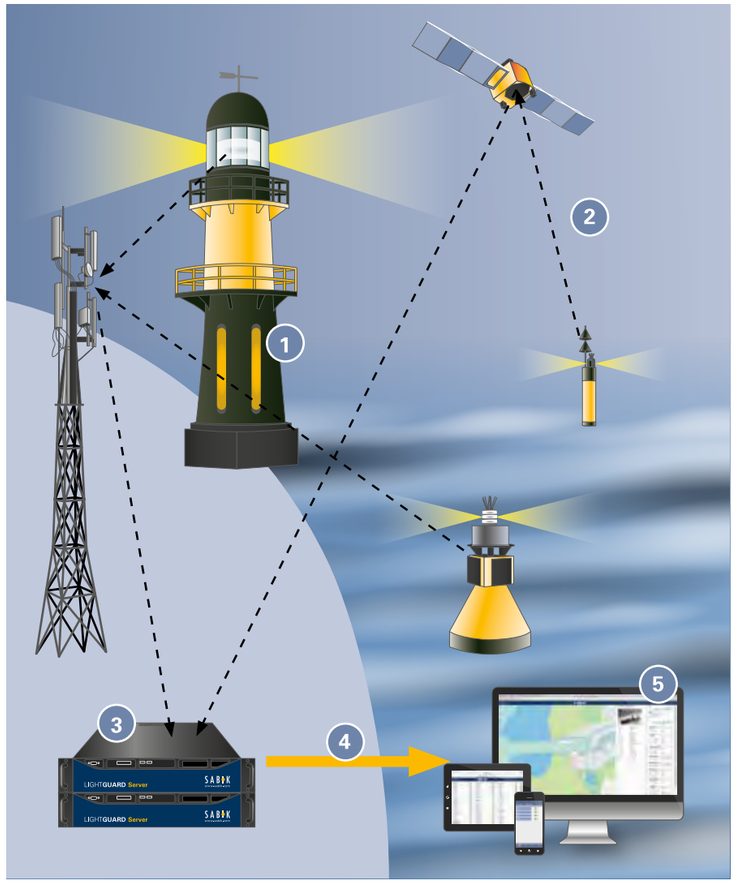
LightGuard Monitor is an intelligent web-based software solution for monitoring fixed and floating aids to navigation.

Optionally, it can also be used to monitor marine traffic using real-time AIS data on a real ENC chart. For the purposes of fleet management, specific ships can be permanently marked thus enabling them to be tracked easily. LightGuard Monitor is therefore also suitable for monitoring shipping and temporary navigation lights on offshore wind farm construction sites.

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 mobile access to the data of your monitored stations. SMC-enabled SABIK lights facilitate two-way communication via GSM.

With a special superuser access, it is then possible to set up, program or test new stations. Carmanah lights enable one-way communication via GlobalStar satellite. You decide whether your data is stored on a secure SABIK server, a local server close by or even on your own server. With a primary server and a secondary server, there are always two spare data stores no matter what.



1. Fixed or floating AtoNs with LightGuard outstation hardware installed
2. Data is transmitted via GSM or Satellite to land based communication network
3. All data is delivered to the LightGuard server
4. LightGuard Monitor issues alarm messages to officer on duty in case of an critical event
5. LightGuard Monitor uses a web-based software interface to display the determined data on a PC or tablet or displays them on a smartphone

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 (with GSM) 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 in 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 stations, these include e.g. marine charts with a variable degree of image detail or satellite images.

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

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

LightGuard Basic

LightGuard Basic is a compact remote monitoring outstation unit for floating and fixed AtoNs. The unit monitors light operation and identifies the flash code by measuring the light current. Light synchronization is available with integrated GPS position monitoring. Additional digital input and analogue input can be used to monitor external

equipment such as RACON, door switch or batteries. A digital power output can be used to control a light or even to generate the flash code.

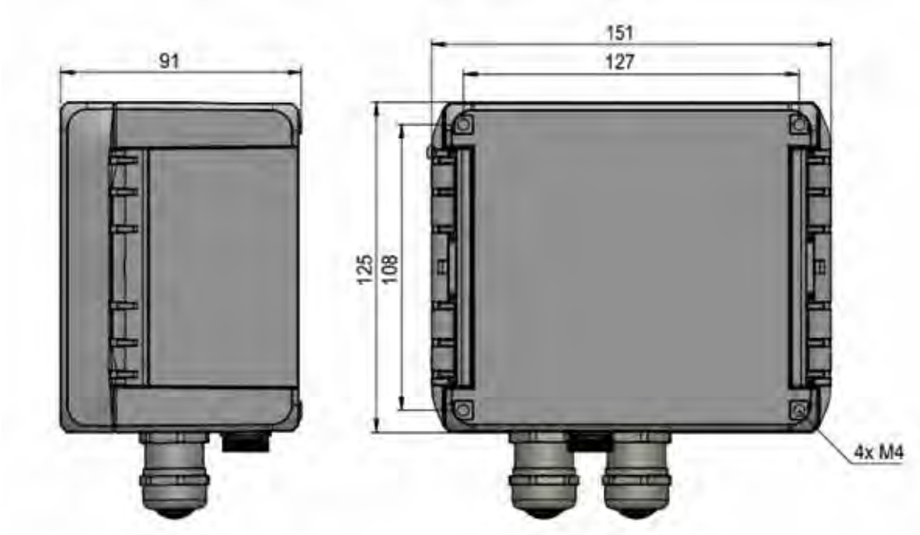
- **Easy installation**
- **Waterproof enclosure**
- **Mount on wall, rail or mast**
- **Lantern monitoring by current measurement**
- **Low power consumption**
- **GPS synchronization**
- **Position monitoring**
- **Communication by GSM**
- **Integrated GPS and GSM antennas**
- **Digital I/Os for external equipment**

Main Technical Specification

Supply Voltage	9-36 VDC
Supply Current (12V DC, typical)	50 mA continous operation 20 mA low current
BEACON Out (Flash Code)	2 A / 55 V DC, Galvanic Isolated
Digital Out 1 (Sync Pulse / PWM)	100 mA / 60 VDC Galvanic Isolated
Digital Out 2 (Status / Alarm)	100 mA / 60 VDC Galvanic Isolated
Analogue In	0 to 30 VDC
Current Input	0,05 – 5 A
Digital Input	60 VDC max. Galvanic Isolated
Serial Port	1 x RS232/ 9600 Baud, 1 x RS485/ 9600 Baud (MODBUS RTU slave)
Ambient Temperature	Operating: -25 to 55 °C, Storage: -40 to 85 °C
Degree of protection	IP66
EMC	IEC 60945, IEC61000-4-2/3/4/6/11

Product Codes

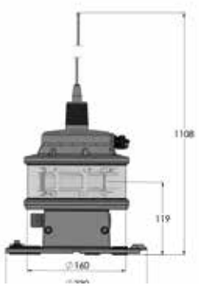
LGB-GPS	LightGuard Basic with GPS (for synchronization)
LGB-GSM	LightGuard Basic with GPS and GSM modem for data transmission

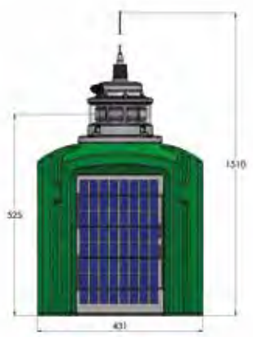


Sabik lanterns with integrated AIS

Automatic Identification System

- **Products that can be supplied with integrated AIS are LED 160 AIS, SC 160 I AIS and SC 160 II AIS**
- **Available in two models Type 1 (FATDMA) and Type 3 (RATDMA)**
- **Real time monitoring of the AtoN installation using VHF Maritime mobile band**
- **AIS transponder integrated in the top part of the lantern**
- **Integrated GPS antenna and VHF antenna included**
- **Extremely low power consumption when used as Type 1 <45mW with 1 message/3 minutes (about 0,09 Ah/day)**
- **Support both message 21 and message 6**
- **Support for up to 10 virtual AtoNs**





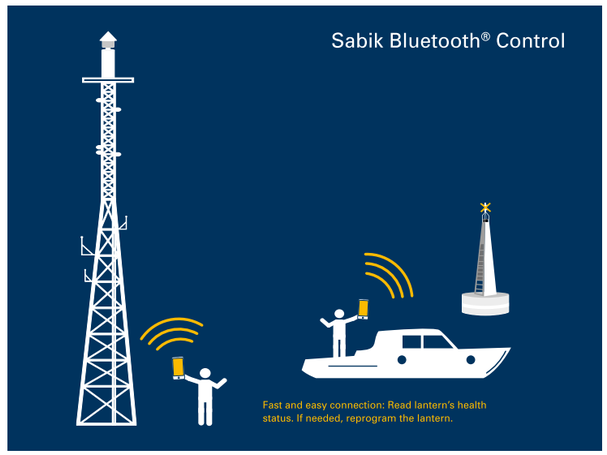
LED 160 AIST1	SC 160 I AIST1	SC 160 II AIST1
LED 160 AIST3	SC 160 I AIST3	SC 160 II AIST3

Sabik Bluetooth® Control

Mobile application for programming and control of marine lanterns

SABIK BLUETOOTH® CONTROL is an advanced mobile app for programming and control of the marine lantern. You can read and program the lantern even from 50 meters distance.

- **Saves time and costs of the maintenance trips**
- **Easy and safe to check the status of the lantern from the vessel or quay**
- **Convenient and fast to check the battery status of the products in the warehouse**
- **No need for a separate programmer, only a smartphone with the app**



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 location on buoys and fixed structures.
The unit comes with GPS antenna integrated in the housing but an 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)**
- **Optional sensor board for met/hyd sensors**
- **Support messages #6, #7, #8, #12, #13, #14, #20, #21, #25**
- **Support up to 10 messages**
- **Wide voltage range from 10 to 32 VDC**
- **Approved by the Federal Maritime and Hydrographic Agency (BSH)**

The military spec connectors are all located in a protected area under the unit and can be wired through a tube for field protection.

The housing is equipped with a pressure release valve to prevent humidity build-up inside unit.

The unit can also be installed flush on a surface using bolts through the flange.

The stainless steel mounting flange supplied with the unit enables easy mounting on poles and handle bars.

Easy-to-use Windows programming interface for setting up unit.

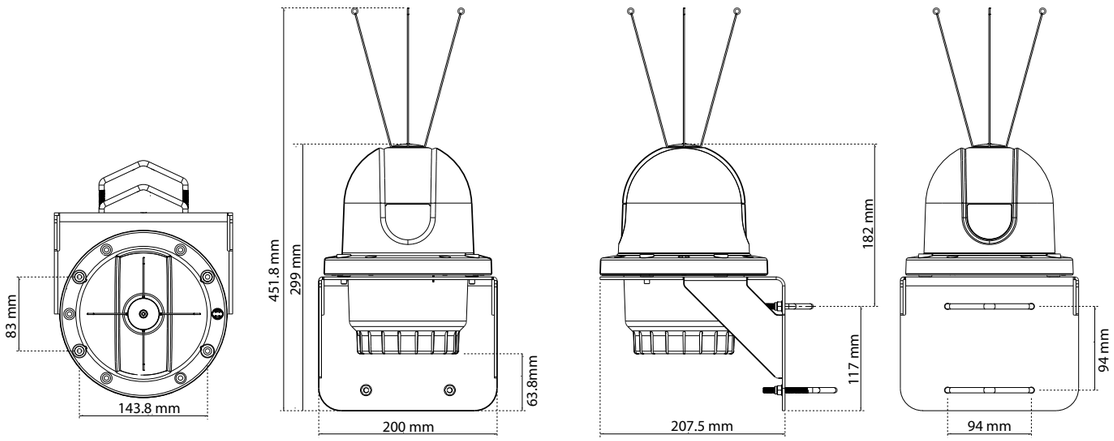
State of the art electronics enables lowest power consumption on market.

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. The LGA unit supports all the standard AIS message types. Advanced functions such as chaining and VDL configuration are also supported.

In standard configuration it can be directly interfaced to a Sabik lantern for updating the lantern health and ON/OFF status in the message 21.

Technical Specification LightGuard AIS for AtoN



Main Technical Specification

PHYSICAL		
Height	284 mm	
Diameter	180 mm	
Weight	1.3 kg without cables and mounting bracket	
ELECTRICAL		
Supply voltage	10 to 32 VDC (absolute min and max)	
Average Power consumption @ 12 VD	**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)
Transmission power output levels	1 W, 2 W, 5 W and 12.5 W	
Configuration interface	USB	
Interfaces to external equipment (standard)	Integrated I/O interface (max 3.3 V) for • Light ON/OFF status • Light health status • Racon health status	
Interfaces to external equipment (with sensor board)	10 user configurable input/output signals 2 isolated analogue inputs 2 non-isolated analogue inputs 1 current sense loop (lamp current) 2 relay driver outputs A bi-directional NMEA0183 serial port An input only NMEA0183 serial port	

ENVIRONMENTAL	
Degree of protection	IPx6 and Ipx7 for water ingress
Operating temperature	-25°C to +55°C
STANDARDS	
Applicable equipment standards	IEC62320-2 ITU-R M.1371-4 IEC61162-1 IEC61162-2 IEC61108-1 IEC60945
Supported messages	#6 – Binary addressed message #7 – Binary acknowledge message #8 – Binary broadcast message #12 – Addressed safety related message #13 – Acknowledgement of received addressed safety related message #14 – Safety related broadcast message #20 – Data link management message #21 – Aids to Navigation report #25 – Single slot binary message
Approvals	BSH approved
INCLUDED IN PACKAGE	AtoN transceiver Stainless steel mounting bracket and fixing Bird deterrent components Power and data cable 2 meters Sensor interface cables included for AIS unit with sensor board Product manual and CD with programming software

Order Overview LightGuard AIS for AtoN

Product code	Description
LGA T1	LightGuard AIS transponder Type 1 (Transmit only)
LGA T1S	LightGuard AIS transponder Type 1 (Transmit only) with sensor board
LGA T3	LightGuard AIS transponder Type 3 (Transmit and receive)
LGA T3S	LightGuard AIS transponder Type 3 (Transmit and receive) with sensor board

Option code	Description
970211	USB AIS ATON Configuration cable
-	Sensor cable

Power Systems

Reliable power supply is essential for lighted aids-to-navigation. We design and deliver power supplies to serve the powering needs of lanterns for almost any location.

The energy sources range from primary batteries to solar/photovoltaic, combined with storage batteries and mains electricity.

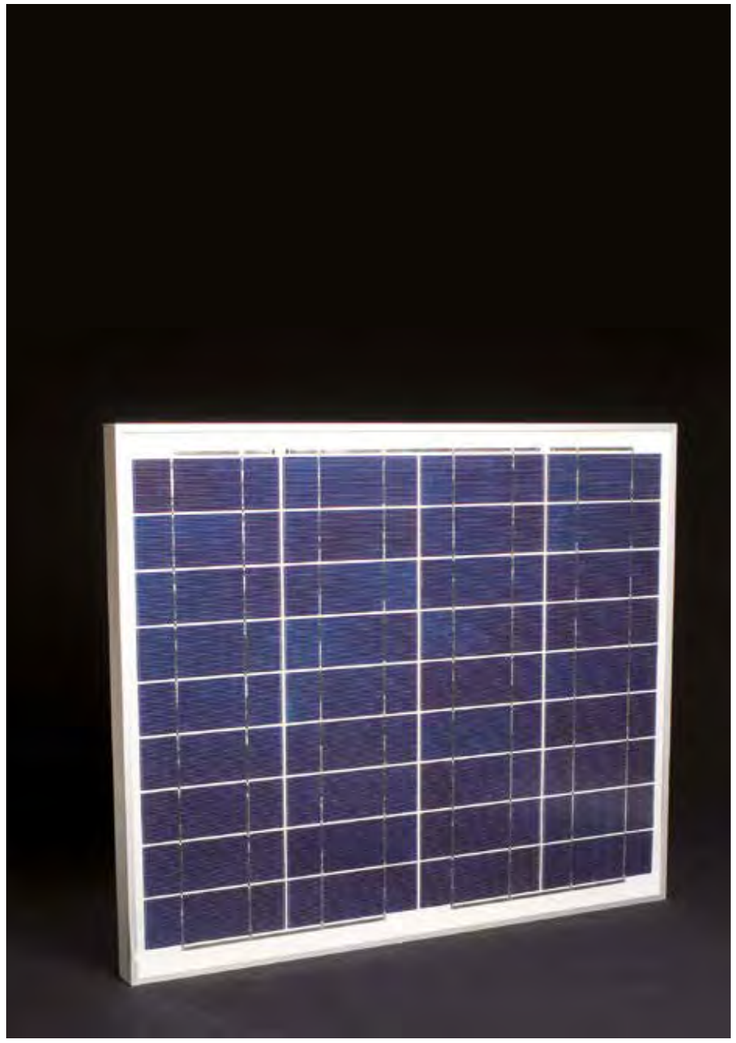
This section presents a careful selection of components needed to build the most reliable power supplies.

Solar Modules

Photovoltaic Modules for Aids-to-Navigation

These high performance modules are developed and optimized for off-grid photovoltaic systems.
The modules have a proven record in hundreds of AtoN installation from arctic to tropic conditions.
They have a high reliability in harsh marine environments.

- **Long-life industrial quality design**
- **Stable frame construction**
- **Stable aluminium frame with mounting and grounding holes**
- **Carefully selected polycrystalline solar cells to reach top performance**
- **Wired in bypass diodes to reduce potential loss of power and damage from partial array shading**
- **Junction box with installation friendly cable fittings**
- **Designed to meet the environmental requirements of IEC61215**



Polycrystalline Modules

Type/Order Code	SNG24	SNG37	SNG50	SNG75	SNG100
Nominal Power	24 W	37 W	50 W	75 W	100 W
Nominal Voltage	18.1 V	18.4 V	18.4 V	18.3 V	18.2 V
Nominal Current	1.32 A	2.01 A	2.71 A	4.09 A	5.50 A
Open Circuit	22.3 V	22.5 V	22.7 V	22.8 V	22.9 V
Short Circuit	1.41 A	2.14 A	2.88 A	4.35 A	5.84 A
Max. Tolerance of P	+10%/-5 %	+10%/-5 %	+10%/-5 %	+10%/-5 %	+10%/-5 %
Dimensions	540x340 mm	420x670 mm	540x670 mm	775x670 mm	1005x670 mm
Weight	2.4 kg	3.5 kg	4.4 kg	6.0 kg	8.0 kg
Max. System Voltage	1000 V	1000 V	1000 V	1000 V	1000 V
Module Technology	Glass-foil-laminate with aluminium frame				
Module Design	Cover material: high transparent solar glass (tempered), 4mm Encapsulation: EVA - Solar Cells - EVA Back material: Tedlar - Polyester - Tedlar, white				
No. and Type of cells	36 pcs. Polycrystalline cells				
Cables/Connection	Plus and minus connectors in junction box				
Bypass Diodes	2 pcs.				
Operation Temperature	-40...+60 °C				
Hail Resistance	25 mm hailstones with 83 km/h				
Wind Resistance	Wind speed 130 km/h with safety factor 3 (corresponds 2,400 Pa)				
Qualification	IEC 61215				

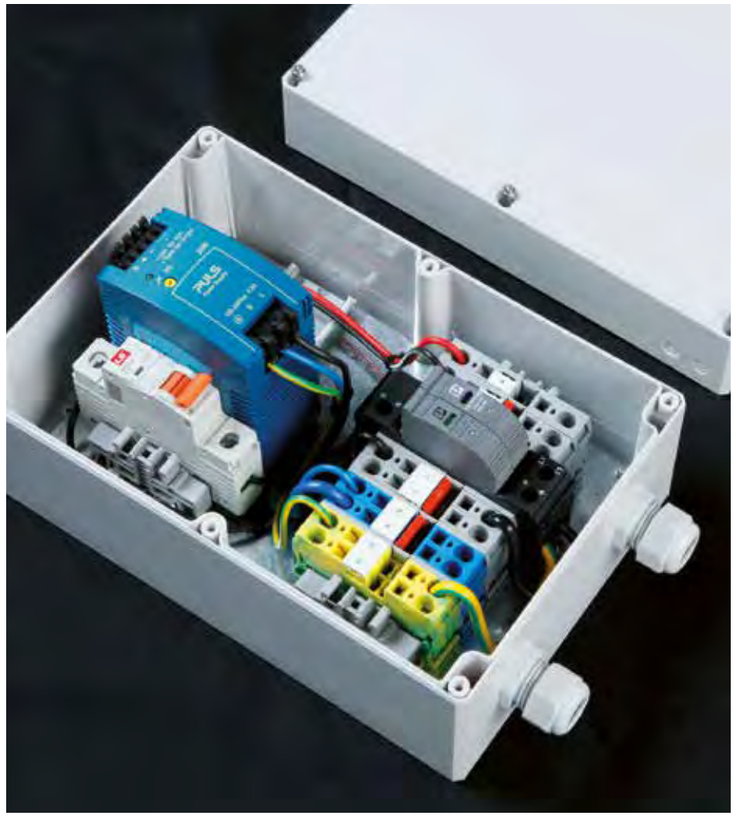
PS 30 and PS 120

Main Power Supplies

Sabik Power Supplies are power converters, which are especially designed to give good electrical protection for lanterns.

The range includes two different sizes 30 VA and 120 VA, both installed in polycarbonate enclosures.

- **Two different sizes available 30W and 120W**
- **Input voltage 100-240VAC output 12VDC (optionally 24VDC)**
- **Equipped with current and over voltage protection**
- **Enclosure suitable for both indoor and outdoor use**
- **Enclosure equipped with two M20 cable glands**



Connection
Screwless terminals

Incoming/Outgoing cables
M20 cable glands

PS 120
120VA power supply

Main Technical Specification

Type/Order Code	PS 30	PS 120
Input Voltage	100 – 240 VAC	100 – 240 VAC
Output Voltage	12 VDC (optionally 24 VDC)	12 VDC (optionally 24 VDC)
Max Output Power	30 W	120 W
Enclosure	Polycarbonate color RAL 7035	Polycarbonate color RAL 7035
Weight	2,1 kg	2.5 kg
Size of enclosure (WxLxD) mm	160x240x121	175x250x150
Degree of protection	IP 66	IP 66

UPS 12

Uninterruptible Power Supply

Uninterruptible Power Supply installed together with lead batteries (gel, AGM or vent) is a solution to give a back up for the lantern if the mains power fails. The UPS unit is installed in a polycarbonate enclosure.

- **Enclosure equipped with a sophisticated battery charger**
- **Suitable for battery sizes 25-150 Ah**
- **Input voltage 180-250VAC**
- **Output voltage 12VDC (optionally 24VDC)**
- **Equipped with current and over voltage protection**
- **Enclosure suitable for both indoor and outdoor use**

Connection
Screwless terminals

Incoming/Outgoing cables
M20 cable glands

Enclosure
Equipped with hinges and latches

Main Technical Specification

Input Voltage	180 – 250 VAC
Output Voltage	12 VDC (optionally 24 VDC)
Total charge current	10 A (6A/24 VDC)
Max Output Power	120 W
Enclosure	Polycarbonate color RAL 7035
Weight	4,5 kg
Size of enclosure (WxLxD) mm	300x300x130
Degree of protection	IP 66

Batteries

Alkaline Primary Batteries

- **Lifting handle**
- **Lifting eye for cranes**
- **Operates in a vacuum**
- **Optional accessories available**

Sabik's range of alkaline buoy batteries have been developed to be used as a single power supply for a light signal on floating or fixed devices in marine environment.

The battery is made of alkaline cells containing 0 % lead or cadmium, classified as environmental friendly. The batteries can be disposed off at regular waste disposal stations. A manufacturer's environment certificate available on request.

The housing is made of corrosion free polyethylene. Both the top and the bottom are welded to the pipe forming a completely waterproof package.

The batteries are supplied with double insulated PVC connection cables. They can even be supplied to be used submerged.

Order Overview Batteries

Standard Batteries in polyethylene tube

Type	AL 14-18	AL 18-12	AL 18-15	AL 18-7,5	AL 40-24	AL 20-18	AL 23-18	AL 25-15	AL 25-18	AL 25-12	AL 40-12
Voltage	18 V	12 V	15 V	7.5 V	24 V	18 V	18 V	15 V	18 V	12 V	12 V
Capacity	200 Ah 220 Ah	300 Ah	340 Ah	600 Ah	780 Ah	415 Ah	660 Ah	850 Ah	720 Ah	1620 Ah	1560 Ah
Weight	20 kg	25 kg	50 kg	30 kg	120 kg	42 kg	60 kg	79 kg	65 kg	125 kg	112 kg
L x B	140 x 690 mm 140 x 760 mm	180 x 760 mm	180 x 1010 mm	180 x 760 mm	400 x 515 mm	200 x 760 mm	230 x 850 mm	242 x 1100 mm	242 x 850 mm	242 x 1620 mm	400 x 512 mm

Other types are available upon request. Technical specifications are subject to changes without prior notice.

Main Technical Specification

Housing	Polyethylene pipe, welded ends
Lifting handle	Plastic, metal handle upon request
Connections	Screw connections or plugs
Cables	Double insulated PVC cable
Temperature Range	From -30° C to +50° C
Environment	For marine environment
Cell type	Alkaline Heavy Metal free Alkaline primary
Self discharge	About 5 % per year
Storage temperature	± 0... + 20° C

Standard Batteries in metal case

Type	AL 26-21
Voltage	21 V
Capacity	160 Ah
Weight	17 kg
L x B	140 x 140 mm

Sonnenschein Solar Batteries

Valve regulated lead acid batteries for solar systems

The Sonnenschein Solar battery range is very powerful and reliable in rough application conditions. The batteries are used in fixed and floating solar powered Aids to Navigation worldwide.

- **Lifetime expectancy in excess of 7 years**
- **800 cycles according to IEC 896-2**
- **Recyclable**
- **Maintenance-free (no topping up)**
- **Gel technology with grid plate providing longer lifetime than AGM or flooded batteries**
- **Proof against deep discharge**
- **Gel battery with considerably reduced risk of acid spills**
- **Robust mechanical design, built-in handles for easy handling**

Main Specifications/Order Overview

Type/Order Code	Nom. voltage	Nominal capacity C100 1.80 Vpc	Discharge current I100	Length (l)	Width (b/w)	Height up to top of cover (h1)	Height incl. connectors (h2)	Weight
	V	Ah	A	max. mm	max. mm	max. mm	max. mm	approx. kg
S12/6.6 S	12	6.60	0.06	152	65.5	94.5	98.4	2.60
S12/17 G5	12	17.0	0.17	181	76.0	–	167	6.10
S12/27 G5	12	27.0	0.27	167	176	–	126	9.60
S12/32 G6	12	32.0	0.32	197	132	160	184	11.1
S12/41 A	12	41.0	0.41	210	175	–	175	14.6
S12/60 A	12	60.0	0.60	261	136	208	230	19.0
S12/85 A	12	85.0	0.85	353	175	–	190	26.8
S12/90 A	12	90.0	0.90	330	171	213	236	30.0
S12/130 A	12	130	1.30	286	269	208	230	39.0
S12/230 A	12	230	2.30	518	274	216	238	67.0

Sunica Ni-Cd Batteries

Sunica Nickel Cadmium batteries for solar systems

The Sunica Ni-Cd batteries are the first choice for solar systems when performance in cold conditions, a long lifetime, and a low life cycle cost is the target. The battery chemistry is ideal for solar applications with a very low daily discharge and only one major discharge per year in the winter. The modular design offers good flexibility to build battery banks to suit customer needs.
The Sunica batteries have a proven track record of performance since the 1970's in demanding industrial applications.

- **Lifetime expectancy in excess of 20 years, up to 8000 cycles to 15 %**
- **Battery design and gas recombination pocket optimised for photovoltaic applications**
- **Limited maintenance, typically once every four years**
- **Excellent performance in temperatures below -20°C (-4°F)**
- **Temperature range -50°C to +70°C (-58°F to 158°F)**
- **Resistant to over- and undercharging and complete discharge**
- **No premature capacity loss (sulphation) when cycled at low state of charge**
- **Large capacity range 45 Ah – 1110 Ah**
- **Used batteries are returned to manufacturer for 100 % recycling**

Main Specifications/Order Overview

Type/ Order Code	Capacity		Height		Width		Length per block												Weight		Internal resistance *	Cell connection bolt per pole
	C_{120} 120 h 1.0 V Ah	C_5 5 h 1.0 V Ah	mm	in	mm	in	1 cell mm	in	2 cell mm	in	3 cell mm	in	4 cell mm	in	5 cell mm	in	6 cell mm	in	per cell kg	lb	m0hm	
SUN+ 50	50	45	405	15.9	195	7.7			63	2,5	88	3.5	112	4.4	137	5.4	162	6.4	3.2	7.1	5.04	M6
SUN+ 100	100	95	405	15.9	195	7.7			85	3.9	121	4.8	156	6.1	192	7.6	228	9.0	4.9	10.8	2.55	M8
SUN+ 150	150	140	405	15.9	195	7.7			109	4.3	157	6.2	204	8.0	252	9.9	300	11.8	6.2	14.7	1.73	M10
SUN+ 200	200	185	405	15.9	195	7.7			133	5.2	193	7.6	252	9.9	312	12.2	372	14.6	8.4	18.5	1.31	M10
SUN+ 250	250	235	405	15.9	195	7.7			159	6.3	232	9.1	304	11.9	377	14.8	450	17.7	9.9	21.8	1.03	M10
SUN+ 305	305	280	405	15.9	195	7.7			183	7.2	268	10.6	352	13.8	437	17.2	522	20.5	11.5	25.3	0.86	M10
SUN+ 355	355	325	405	15.9	195	7.7			228	9.0	336	13.2							15.1	33.2	0.74	2xM10
SUN+ 405	405	375	405	15.9	195	7.7			252	9.9	372	14.6							16.8	37.0	0.65	2xM10
SUN+ 455	455	420	405	15.9	195	7.7			278	10.9	411	16.1							18.3	40.3	0.58	2xM10
SUN+ 505	505	470	405	15.9	195	7.7			304	11.9	450	17.7							19.8	43.6	0.51	2xM10
SUN+ 555	555	515	405	15.9	195	7.7	171	6.7											21.4	47.1	0.47	2xM10
SUN+ 610	610	560	405	15.9	195	7.7	183	7.2											23.0	50.7	0.43	2xM10
SUN+ 660	660	610	405	15.9	195	7.7	207	8.1											26.5	58.4	0.40	3xM10
SUN+ 710	710	650	405	15.9	195	7.7	219	8.6											28.2	62.1	0.37	3xM10
SUN+ 760	760	700	405	15.9	195	7.7	232	9.1											29.7	65.4	0.35	3xM10
SUN+ 810	830	768	405	15.9	195	7.7	243	9.6											34.5	76.1	0.32	3xM10
SUN+ 860	860	800	405	15.9	195	7.7	256	10.0											32.9	72.5	0.30	3xM10
SUN+ 910	910	840	405	15.9	195	7.7	268	10.5											34.5	76.0	0.29	3xM10
SUN+ 960	960	890	405	15.9	195	7.7	291	11.4											38.1	83.9	0.27	4xM10
SUN+ 1015	1015	940	405	15.9	195	7.7	304	11.9											39.6	87.3	0.26	4xM10
SUN+ 1065	1065	980	405	15.9	195	7.7	315	12.4											41.2	90.8	0.25	4xM10
SUN+ 1115	1115	1030	405	15.9	195	7.7	327	12.8											42.9	94.5	0.23	4xM10
SUN+ 1170	1170	1080	405	15.9	195	7.7	352	13.8											46.3	102.0	0.22	4xM10
SUN+ 1215	1215	1120	405	15.9	195	7.7	352	13.8											46.0	101.0	0.22	4xM10
SUN+ 1270	1270	1170	405	15.9	195	7.7	352	13.8											49.5	109.0	0.21	5xM10
SUN+ 1320	1320	1220	405	15.9	195	7.7	387	15.2											51.3	113.0	0.20	5xM10
SUN+ 1370	1370	1260	405	15.9	195	7.7	400	15.7											52.7	116	0.19	5xM10
SUN+ 1420	1420	1300	405	15.9	195	7.7	412	16.2											54.4	119.9	0.19	5xM10
SUN+ 1470	1470	1350	405	15.9	195	7.7	425	16.7											55.9	123.0	0.18	5xM10
SUN+ 1520	1520	1400	405	15.9	195	7.7	437	17.2											57.5	126.7	0.17	5xM10
SUN+ 1570	1570	1450	405	15.9	195	7.7	462	18.2											61.0	134.0	0.17	5xM10
SUN+ 1620	1620	1500	405	15.9	195	7.7	472	18.5											62.8	138.4	0.16	6xM10
SUN+ 1670	1670	1550	405	15.9	195	7.7	485	19.1											64.2	142.0	0.16	6xM10
SUN+ 1720	1720	1600	405	15.9	195	7.7	497	19.5											65.9	145.2	0.15	6xM10
SUN+ 1775	1775	1650	405	15.9	195	7.7	510	20.1											67.4	149.0	0.15	6xM10
SUN+ 1830	1830	1700	405	15.9	195	7.7	522	20.5											69.0	152.1	0.14	6xM10

SBE 86/SBE86SS

Battery Enclosure with mechanical support

SBE Battery enclosures with support is a robust solution developed for marine environments. The enclosures are produced of hot moulded fiberglass reinforced polyester or stainless steel (AISI 304). Both enclosures are durable and produced from corrosion resistant materials.

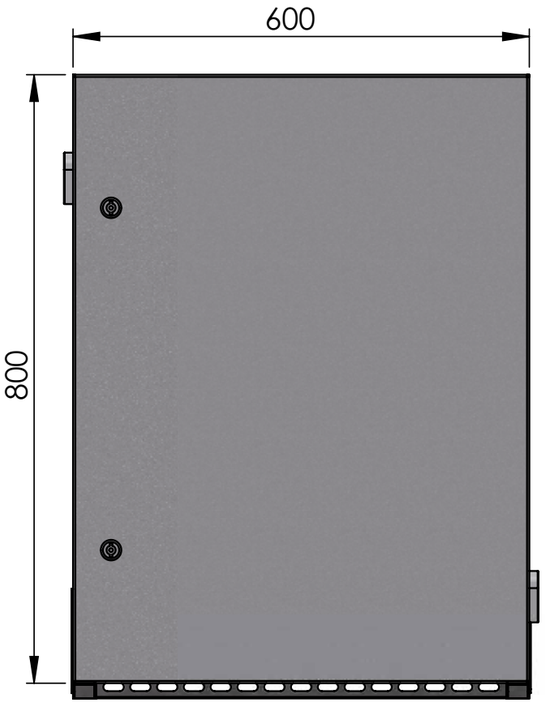
- **The enclosures can carry different battery technologies e.g. lead-acid, nickel-cadmium**
- **The enclosures are ventilated**
- **Support has a hot-dip galvanized surface treatment**
- **The enclosure together with the support makes the design extremely robust**
- **Installation friendly because the support can be pre-installed to the wall**
- **Door equipped with »DIN 3mm« locks, the door can be padlocked**

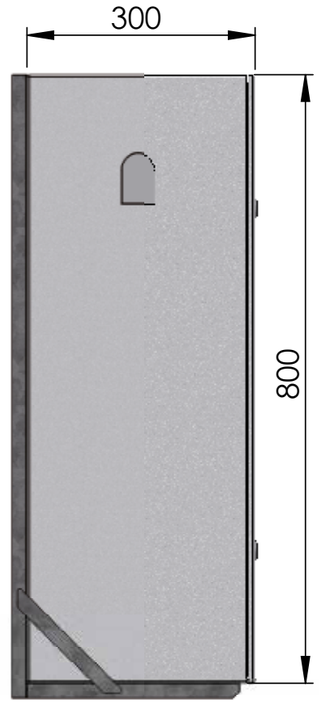
Installation
Support structure with a variety of installation options.

Lock
The door can be padlocked.

Control unit
Space for control unit in upper part of the enclosure.

Ventilator
The enclosure is equipped with two ventilators.





Main Technical Specification

Size of Enclosure	800 x 600 x 300 mm (hxwxd)
Degree of protection	IP 34
Battery installation area	560x250mm
Weight	GRP 27 kg / Stainless steel 43 kg
Temperature range	-40°C...+140°C

SBE 68SS

Battery Enclosure with mechanical support

SBE Battery enclosure with support is a robust solution developed for marine environments. The enclosure is produced of durable and corrosion resistant stainless steel (AISI 304).

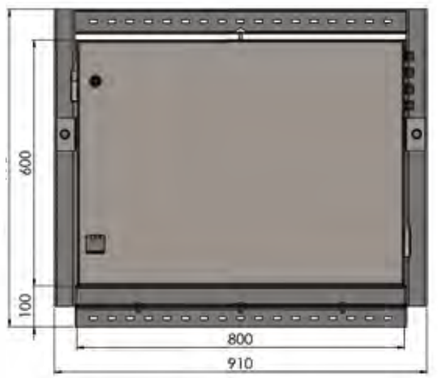
- **The enclosure can carry different battery technologies e.g. lead-acid, nickel-cadmium**
- **The enclosure is ventilated**
- **Support made of corrosion resistant stainless steel**
- **The enclosure together with the support makes the design extremely robust**
- **The new detachable support is installation-friendly: The support can be pre-installed on the wall and the enclosure lifted single-handed.**
- **Door equipped with DIN 3-Key locks, the door can be padlocked**
- **New support mechanism enables installing even into uneven surfaces**

Installation
Support mechanism enables installing even into uneven surfaces.

Space
Orientation of the enclosure offers more space for the batteries.

Lock
The door can be padlocked.

Ventilator
The enclosure is equipped with ventilators.



Versatile mounting possibilities

Main Technical Specification

Size of Enclosure	600 x 800 x 300 mm
Degree of protection	IP 34
Battery installation area	760 x 250 mm
Weight	47 kg
Temperature range	-40°C...+140°C

Engineering

We provide tailored solutions to customise our high-quality lanterns to meet specific customer requirements. This way we can guarantee a correct and simple use of the many components needed for the correct marking of waterways. Mechanical and electrical interfaces are planned and adapted in close cooperation with our subcontractors and other project partners.

- **Project management**
- **Aids to navigation design**
- **Electrical design and documentation**
- **Mechanical design, support structures**
- **Control systems**
- **Power management and supply**


Certificate
Awarded to
Oy Sabik Ab
ISO 9001:2008


BUREAU VERITAS Certification
Certification
Awarded to
Oy Sabik Ab
ISO 14001:2004

Quality and Environmental Policy

We are in the business of increasing and maintaining safety on land and sea. Reliability is at the core of our operations. As such, safety is and remains our main driver. Through our long experience and vigorous testing we provide high quality products made to defy the harshest environmental conditions, such as strong winds and high waves, drifting ice, hail, severe temperature fluctuations and months without daylight, never faltering and thus effectively preventing possible hazards.

Customer satisfaction is our second core value. Our success is only possible if our customers can rely on repeat performance. We continuously develop our products to be technically, functionally and economically competitive and of the highest quality in the industry. We are committed to meeting and even exceeding the expectations of our customers to ensure their satisfaction with our products.

Continuous learning and development underscores our business. We believe that technical skills and knowledge of our staff play a central role in satisfying the ever growing needs of our customers. We highly value personnel who are motivated towards continuous improvement and we support career ongoing development and training for our technical and support staff.

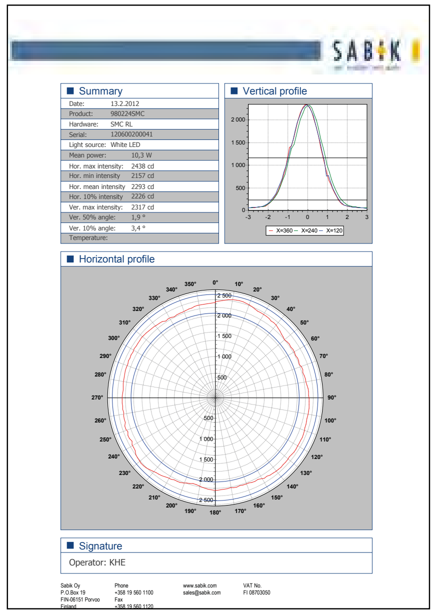
We are able to execute to high standards by rigorously testing all equipment. We test lanterns for their optical performance as well as for the technical requirements set by the customer, by the industry and by our own internal standards. Carmanah and Sabik are both members of IALA and Sabik Marine actively participates in the work of IALA and in national technology development activities.

IALA


IALA
SABIK OY
(Finland)
Industrial member of IALA
Membre industriel de l'AISM
Miembro industrial de la IALA

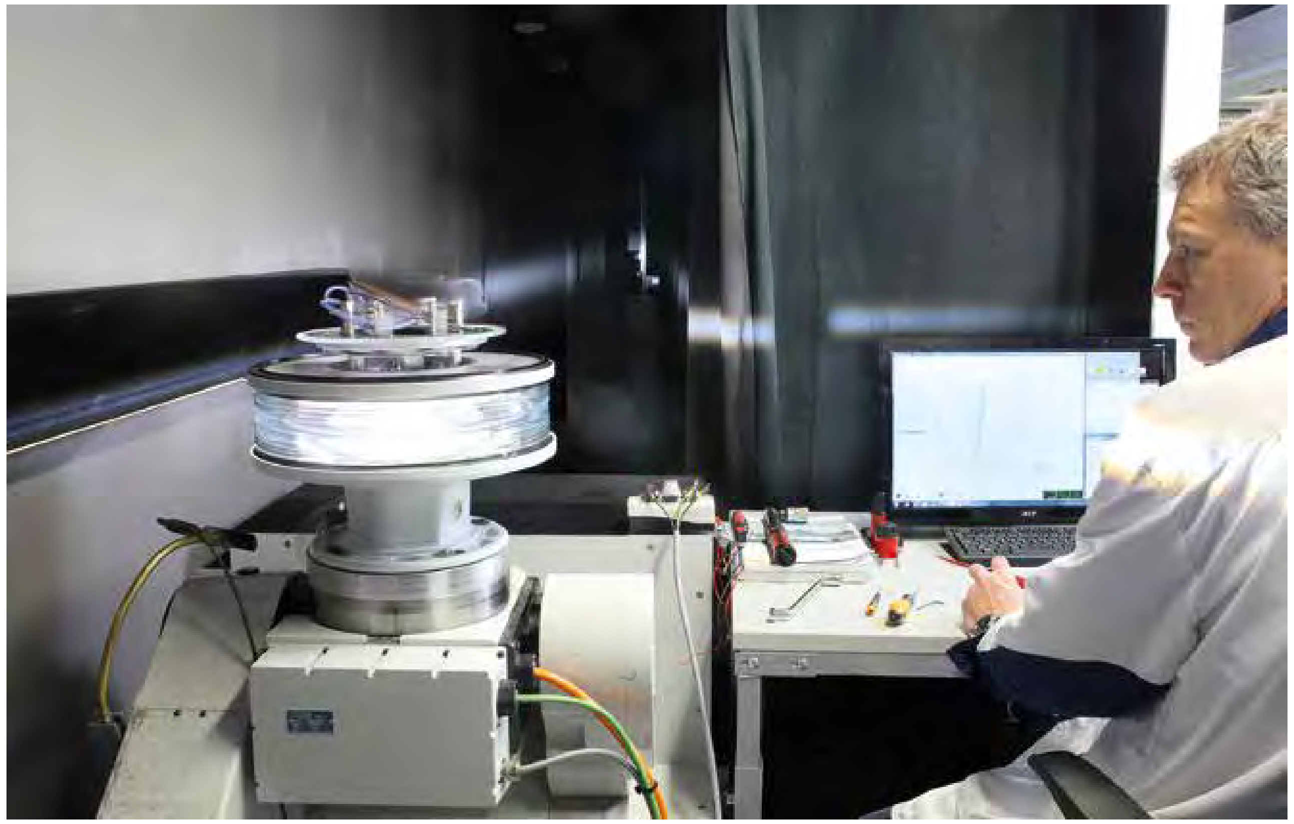

IALA
Carmanah Technologies Corp
(Canada)
Industrial member of IALA
Membre industriel de l'AISM
Miembro industrial de la IALA

We are continuously developing our products to be technically, functionally and economically competitive and of the highest quality in the industry. These performance improvements also contribute to sustainability. Lower energy consumption results in longer service intervals, longer battery replacement intervals, less need to visit remote sites, and smaller power supply components. All of this leads to a lower life-cycle cost.



Sabik Optical measurement range

Our commitment to quality is demonstrated by the fact that we measure the optical performance of all lanterns leaving the factory. Our optical measurement ranges are used for quality control but also as tools for continuous improvement. Data of each measured lantern are stored and can be retrieved for control and development purposes.



NOMINAL RANGE FOR NIGHT TIME

Table 1 Night time nominal range table (rounded off to the nearest nautical mile)

Range	Intensity	
	T=0,74	T=0,85
(NM)	(cd)	(cd)
1	1	1
2	5	4
3	15	10
4	36	21
5	75	38
6	147	64
7	270	102
8	477	157
9	816	234
10	1361	340
11	2225	484
12	3578	678
13	5675	937
14	8894	1278
15	13797	1726
16	21213	2310
17	32362	3068
18	49029	4046
19	73821	5304
20	110535	6914
21	164682	8968
22	244243	11580
23	360745	14890
24	530806	19074
25	778327	24349

NOMINAL RANGE FOR DAY TIME (Bright, overcast weather condition)

Table 2 Day time nominal range table (rounded off to the nearest nautical mile)

Range	Intensity
(NM)	(cd)
1	4650
2	25050
3	76200
4	182000
5	386000
6	752000
7	1383000
8	1383000
9	4180000
10	6970000

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