



LED160

LED Marine Lantern

Product Manual

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Document revision history

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1.07	8.11.2023	LTE-M product code updated	JoL
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The document may be updated or changed without notice.

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1. Introduction

The LED160 Full Range Lantern for fixed and floating installations. The new design allows for internal GPS and GSM antennas, which makes the unit very durable and easy to install. Three different lantern options are available, covering a range from 3 Nm up to 12Nm ($T_c = 0,74$)

Standard Features

Standard IALA colors Red, Green, White, Yellow and Blue.

Rugged injection molded aluminum housing.

Programmable with all Sabik wireless programmers.

Easy field installation using junction box with three cable entries.

Extremely low power consumption, suitable for battery operation (with solar charger).

Integrated 16A (max) solar panel charger.

Available with three different optics: High Power (3°), Medium (5°) and Wide (10°).

2. Technical Details

Features

Full Range Lantern for fixed and floating installations with extremely wide intensity range.
 Factory assembled light module fully waterproof, IP68, with PTFE vent for pressure equalization.
 Standard IALA colors Red, Green, White and Yellow.
 Low power consumption, ideal for solar powered systems.
 Integrated 16 ampere PWM solar panel regulator.
 Programming with Bluetooth™ app, infrared Sabik easyProgrammer or USB/IR interface.
 Optionally internal GPS synchronization and LightGuard monitoring.
 Optional night time reduction if operated day and night.

Technical specifications table

Specification	Value
Lens visual/Mechanical diameter	160mm
Lens material	UV stabilized Acrylic (PMMA)
Light Source	High power Light Emitting Diodes
Typical expected life time	≥ 10 years
Weight	3,3 kg
Operating temperature range	-40° – +60°C
Supply Voltage	10 – 32 VDC
Solar panel charger	Integrated 16 Ampere PWM charger
Power consumption LED160	16W
Power consumption LED160H	39W
Degree of protection	IP 68

2.1. Optical performance

Optical performance

	Specification	White	Red	Yellow	Green
LED160H 39W	3°@50% of peak intensity (FWHM)	4300cd			
LED160N 16W	5°@50% of peak intensity (FWHM)	1850cd	1150cd	1200cd	1000cd
LED160W 16W	10°@50% of peak intensity (FWHM)	1100cd	550cd	850cd	550cd

3. Product Identification and Options

Every Sabik unit is supplied with a product label.



Product label

Option matrix for LED160

Product	Options included	Description
LED160 OPT 9L	LightGuard LTE-M + GNSS	Integrated GSM based monitoring including internal GSM/GNSS antennas
LED160 OPT 4L	GNSS sync	Integrated GNSS sync including GNSS antenna
LED160 OPT 11L	Battery control card	Control card for stand-by (emergency) battery

LED160H High Intensity	LED160N Narrow (For fixed structures)	LED160W Wide (For installations on buoys)	Light Colour
LED160H—W03D	LED160-W05D	LED160-W10D	White
	LED160-R05D	LED160-R10D	Red
	LED160-G05D	LED160-G10D	Green
	LED160-Y05D	LED160-Y10D	Yellow

4. Mechanical

The optical lens is made of UV-resistant Acrylic and lantern housing is made of epoxy painted marine grade corrosion resistant aluminium.

There are no serviceable parts inside the optical unit. If the lantern is equipped with Sabik LightGuard, and you must install/change the SIM card or service parts inside the lantern – please contact SPX Aids to Navigation for instructions.

The lantern is fitted with a detachable bird deterrent spike.

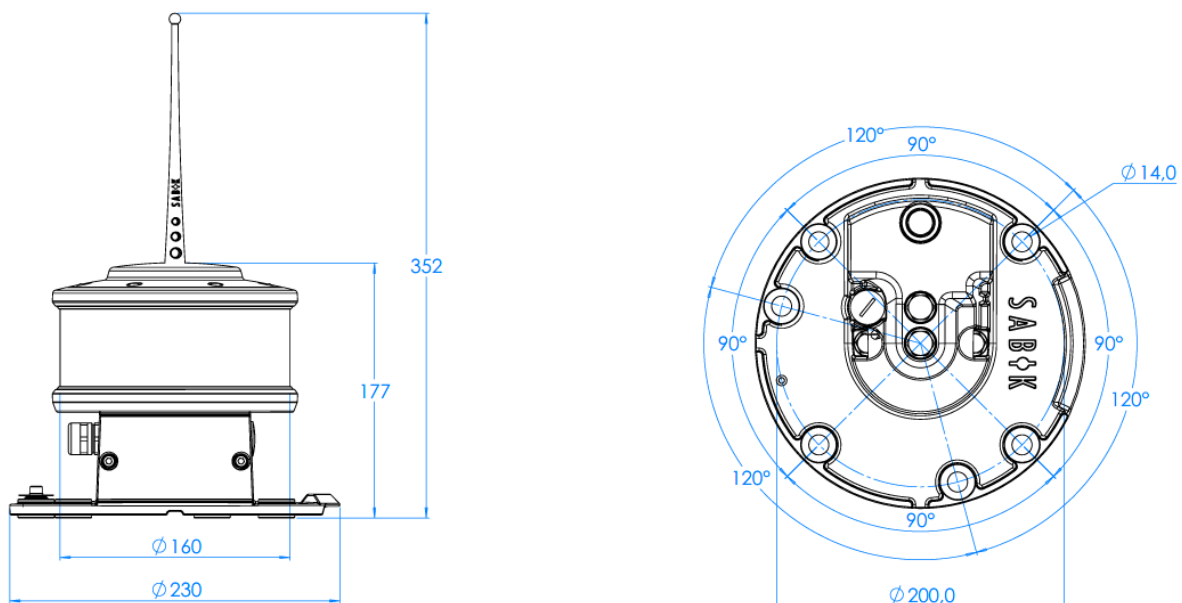
The optical unit is fully waterproof, and pressure tested at factory before shipment.

Pressure equalisation is arranged through two PTFE membranes, mounted on the bottom of the assembly, without the risk of letting moisture into the lantern. One membrane for the LED enclosure and one for the junction box.



4.1. Mounting

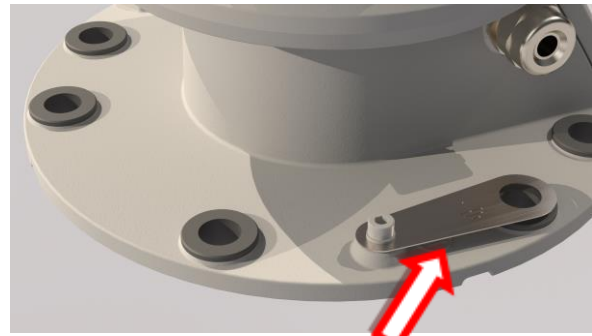
The LED160 unit is suitable for fixed and floating installations (buoys). The mounting flange supports installation on structures using 3 x M12 bolts or 4 x M12 bolts on a 200mm radius, a common mounting arrangement for marine lanterns.



The mounting bolt holes should be covered with plastic insulators upon installation, to prevent galvanic contact with the mounting platform as well as protect the painting on the mounting flange during installation.

5. Electrical

The LED160 lantern can be operated on solar system, or on mains power system using an AC/DC converter. The built-in solar panel regulator makes it easy to use solar power for the lantern. In section 5.2 the connection of various type of power supplies are explained. To utilize the solar facility a 3 wire system is required. It is also possible to use a primary battery for backup. The LED160 is delivered with a standard cable. The LED160 comes fitted with an integrated junction box with up to 3 cable entries. Two threaded entries on the sides of the base and one entry in the base plate. Use appropriate cable glands to ensure water proofing.



Follow the instructions below when connecting/changing cables.

First connect the Protective earth (PE)!

1. Prepare the leads
2. Use a 4mm Allen key to open the junction box.
3. Connect the leads using a spring loaded connector tool or a small flat headed screw driver.
4. Test the connections by gently pulling the leads.
5. Adjust the cable length and tighten the cable gland using a 22mm wrench or an adjustable wrench.
6. Close the junction box (without damaging the gasket)



5.1. Solar Charger

A programmable solar panel regulator capable of handling up to 16A is integrated in the lantern, enabling the lantern to control solar panel charging directly without the need to install an external charger. The charger settings are programmable by the user enabling the lantern to be connected to various types of batteries and also battery voltages. **Please note that, if the charging current is over 8A, you should use a cable with 2,5mm² wires.**

The solar panel charger is a series charging regulator with temperature compensation (built-in sensor). The solar panel output is controlled by Pulse Width Modulation (PWM) in order to optimize the charging process. In the tables below you can find the typical settings for both lead acid and open cell nickel cadmium types of batteries in 12 and 24 volt systems.

For other types of batteries and other types of nominal voltages, please consult your battery manufacturer for the corresponding values. Please note that the parameters of the solar panel is not visible in the easyProgrammer.

Charger Setting	Recommended Settings, 12V System	
	VR Lead Acid (default)	Nickel Cadmium
Cut In Voltage	13,8 Volts	14,8 Volts
Cut Out Voltage	14,4 Volts	15,2 Volts
Temperature Compensation	-10 mV/°C	-10 mV/°C

Charger Setting	Recommended Settings, 24V System	
	VR Lead Acid	Nickel Cadmium
Cut In Voltage	27,6 Volts	29,6 Volts
Cut Out Voltage	28,8 Volts	30,4 Volts
Temperature Compensation	-10 mV/°C	-10 mV/°C

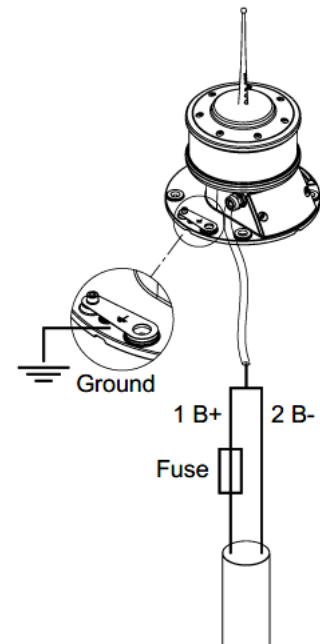
5.2. Various Power Supplies

In this section a number of application examples are provided to assist choosing the right configuration.

5.2.1. Primary Battery

Even though the minimum operating voltage of the lantern is 10V, it should not be connected to a primary battery with a nominal voltage of less than 12V to allow for voltage drop when being discharged.

If the primary battery used does not have an internal fuse an external one must be included in the system.



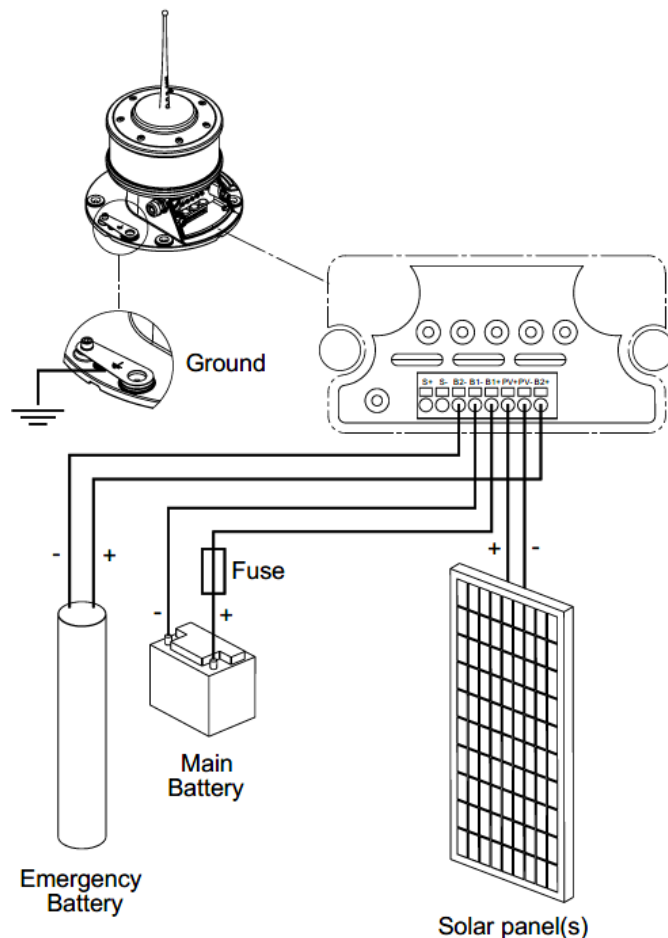
5.2.2. Solar Battery with Photovoltaic

The maximum allowed solar panel current is 16A and must not be exceeded.

It is recommended to install a 16 A fuse as close to the battery as possible. Long cables will result in an energy loss due to the voltage drop in the cable.

If the charging current is over 8A, you should use 2,5mm² cables.

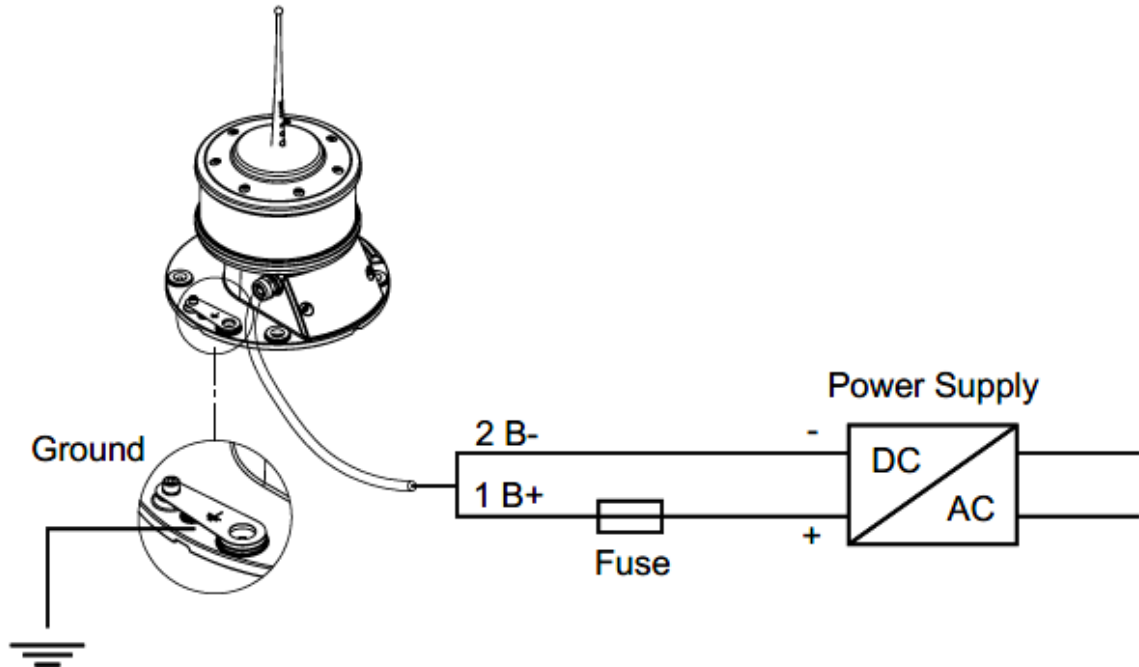
For correct charging functionality, the corresponding solar panel charging parameters should be set in accordance with the battery technology used. See chapter 5.1 for recommended values for lead acid and Nickel Cadmium batteries.



5.2.3. Other DC Power Supply

When using AC/DC main operated power supplies, special attention should be paid to make sure that the power supply selected is capable of powering the unit.

Especially the ripple, the transient current capability and inductance should be checked against the requirement of the lantern.



6. Programming

Programming the lantern can be done using the Bluetooth™ app or Sabik easyProgrammer. In the following chapters, you will find programming instruction for the Bluetooth app.

6.1. Bluetooth™ Control App, Quick Guide

The lantern is equipped with Bluetooth as standard. A legacy infrared port is also provided. The infrared port is compatible with Sabik easyProgrammer.

Bluetooth Control App

The Product is designed for programming and controlling Sabik Bluetooth® enabled lanterns using a simple user-friendly interface. The Android or iPhone app can be downloaded and installed to Bluetooth® 4.0 (Bluetooth® Smart) capable smart phone. The useable range between lantern and phone is usually more than 10m (the range is depending on type of lantern) and maximum up to 50m. The energy consumption of the Bluetooth® chip is very low. These instructions are for Android devices but the instructions for iPhone are very similar.



Standard Features and requirements

The lantern settings can be read to your phone for monitoring purposes. If you have the access rights you also can make changes and send them to the lantern. You cannot store the settings on your phone.

Installation

The app can be downloaded from Apple (<http://store.apple.com>) or Google (<https://play.google.com>) for free. Observe, that you may have to register yourself before downloading. The app is free of charge.

Installation

Follow the instructions on Google or Apple Store

Registration

For the application to be able to work, you have to register your application using a valid user name and a password. Please contact your dealer to obtain these. This procedure has only to be done once.

Launching the application

After the installation, you should find an icon for the Bluetooth® app. You may relocate it if necessary.

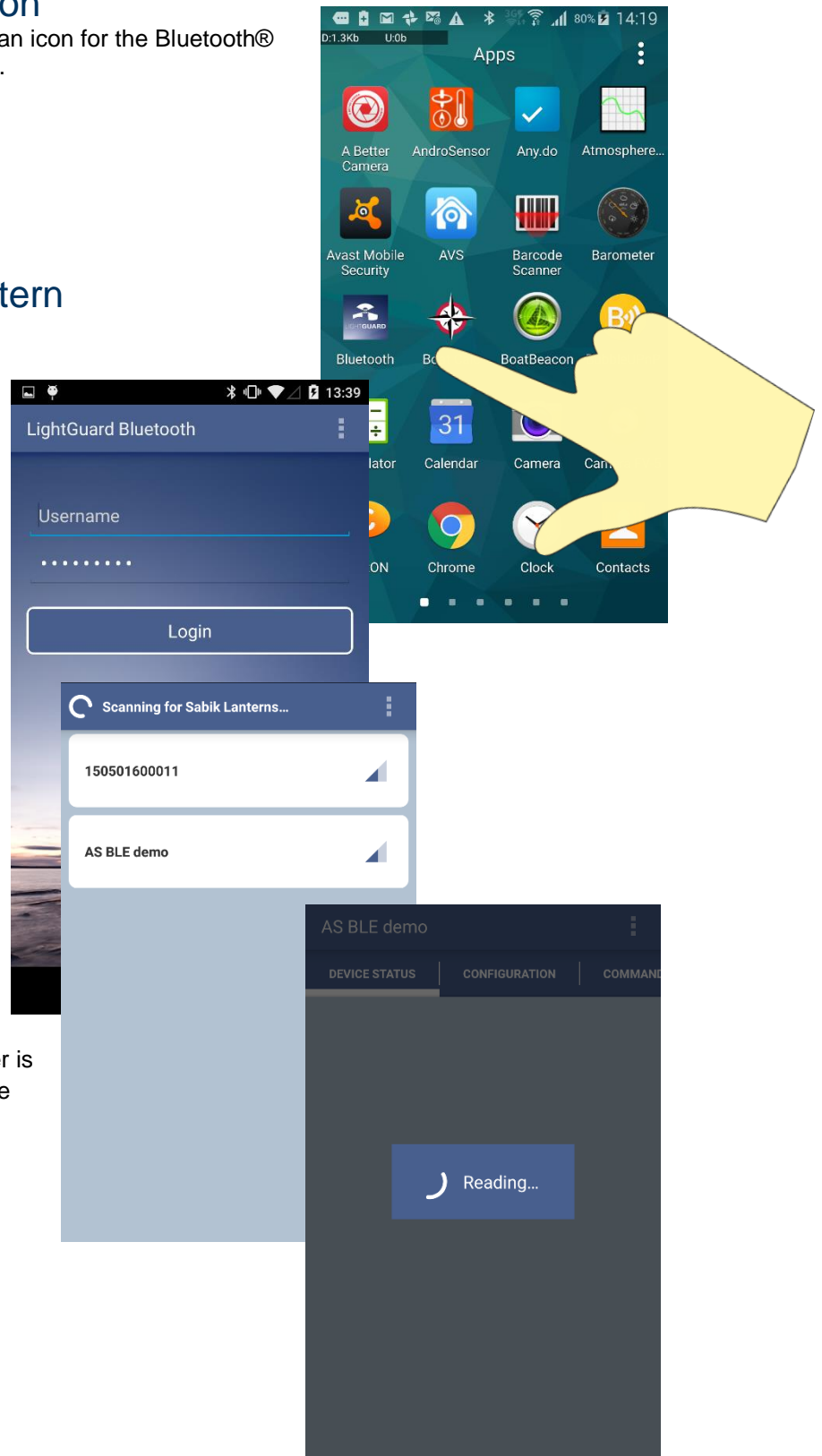
Login and selecting lantern

Fill in your user name and password and tap “Login”.
-if you don't have a user name and password, please contact your dealer to obtain these.

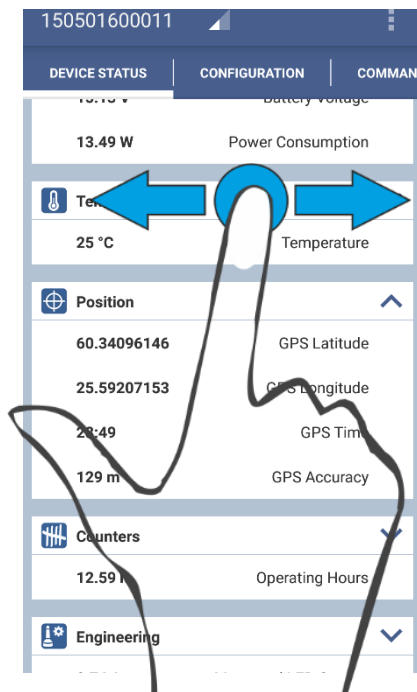
This information is stored in your device. Next time you will be logged in just by tapping the “Login” button unless you explicitly have logged out.

After successful log-on, the app will search for Sabik lanterns within Bluetooth® range and display them in a list. Any lantern which is connected to another user will not be shown in the list.

The lantern serial number is the default Bluetooth® name. This name can be changed using the application. This default serial number is also printed on the lantern. Tap on the name to select it.

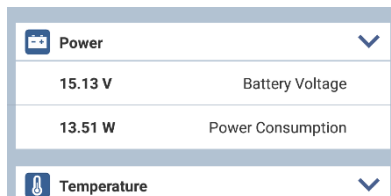



User interface

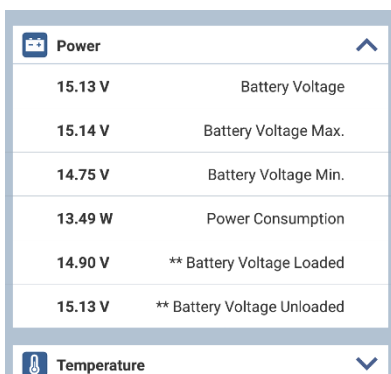



The interface labels are loaded from the lantern, so only the parameters relevant to this lantern are displayed. For instance, if there is no GPS function in the lantern, none are displayed in the application. The pages shows the standard settings.

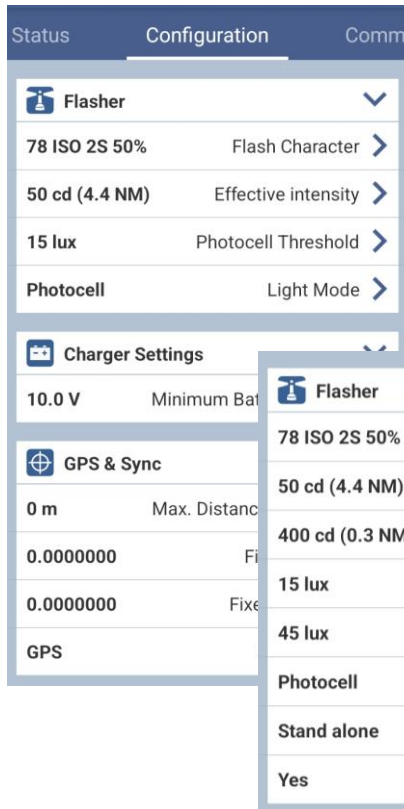
The user interface is divided into screens. (DEVICE STATUS, CONFIGURATION, COMMANDS and ABOUT) To select a screen, swipe the screen to the right or left or tap a screen tab.



The Screens are divided into expandable blocks (Light, Power, Temperature etc.).For advanced settings, you have to expand the blocks. To expand a block just tap the  symbol near the right edge

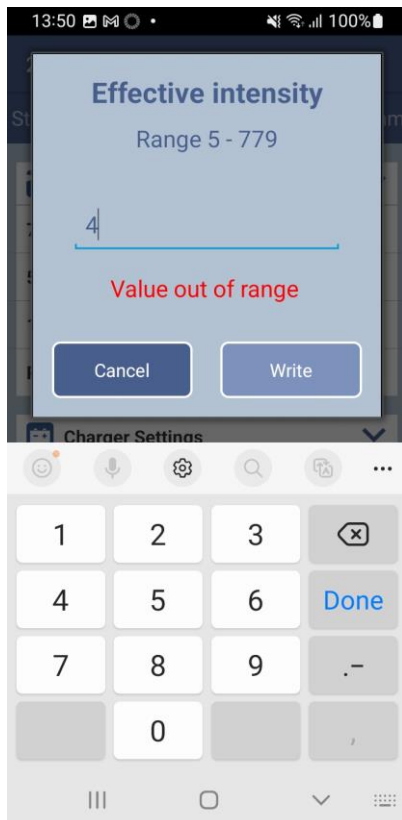


Expanded view for advanced settings. Tap the  symbol to collapse.



On the **CONFIGURATION** page, you can change the lanterns configuration by tapping the small >-shaped symbol on the right side of the setting's name.

If needed, expand a block by tapping tap the **∨** symbol near the right edge and the advance view will appear.



When, for example, LED Intensity is selected, you will be able to adjust the intensity by writing the effective intensity in candela. The lantern will calculate the needed peak intensity depending on the flash duration.

Please note that the candela range (from 5 cd to 779 cd in the example) will vary depending on the chosen flash character.

Tap Cancel to cancel or Write to send the updated value to lantern. The edited parameter is immediately stored in the lantern and the new value flashes briefly after it has verified by the lantern.

If the set value is too high or low, a warning message is shown and the value cannot be stored.

Pages

On the pages you will find information about the lantern, change settings and send commands. Observe that if your lantern do not have a specific module installed, then there is no information about that module.

DEVICE STATUS

Here you will find information about the Light, Power, Temperature, Position, Counters and Engineering values. You cannot make any changes to the lantern from this page. Observe, that some values/settings may not be available in your lantern.

Light

Light Status:	Shows the current light status, Active/Idle
Lantern Health Status:	Any possible error or warning is shown in the health status
Photocell Value:	Shows the real-time photocell value
Day-to-Night:	Latest transition time from day mode to night mode
Night-to-Day:	Latest transition time from night mode to day mode

Power

Battery Voltage	Real time battery voltage
Battery Voltage Max	Maximum battery voltage during the last 24h
Battery Voltage Min	Minimum battery voltage during the last 24h
Battery Voltage Avg	Average battery voltage during the last 24h
Power Consumption:	Real time power consumption (measured only when light is lit)

Temperature

Temperature	Real time temperature
Max. Temp. 24h	Maximum temperature during the last 24h
Min. Temp. 24h	Minimum temperature during the last 24h
Avg. Temp 24h	Average temperature during the last 24h

Position (If GPS module installed)

GPS Latitude	Latest measured latitude position
GPS Longitude	Latest measured longitude position
GPS Time	Time of last fix
GPS Accuracy	GPS horizontal dilution of precision

Counters

Operating Hours	Total illumination time
Power Cycle Counter:	Indicates the number of times power has been removed from lantern
System Reset Counter:	Number of reboots

Engineering

Measured LED Current
Measured LED Voltage
Lantern Tilt Angle
LED Max Intensity

CONFIGURATION

On this page you can review and change the values of the Flasher, Charger, GPS & Sync, Tilt and Impact, Dated Shutdown and Bluetooth® Settings. Tap Write button to send new values to the lantern. The advanced settings are shown in *italics*

Flasher

Flash Character:	Select a standard flash character or create a custom flash character.
Effective Intensity:	Set the effective intensity of the lantern. The lantern will automatically adjust the peak intensity according to the IALA Recommendation R0204
Photocell Threshold:	Lantern operating ambient light threshold in lux
Light Mode:	Lantern operating mode (Photocell, Forced Idle, Forced Active or Day Lantern)
<i>Advanced Settings</i>	
<i>Effective day intensity:</i>	<i>Set the effective intensity for day-time use. Please note that Light Mode must be set to "Day Lantern" to activate the feature</i>
<i>Photocell Hysteresis:</i>	<i>Hysteresis setting for turning off the lantern (lux). The light will turn off when the ambient light exceeds the threshold+hysteresis value</i>
<i>Lantern Type:</i>	<i>Lantern Installation Type (Stand alone, Primary or Standby)</i>
<i>Event log:</i>	<i>Enable (Yes) or disable (No) the Event log</i>

Charger Settings

Minimum Battery Voltage:	Minimum Voltage level for light operation.
<i>Advanced Settings</i>	
<i>Cut In Voltage:</i>	<i>Set minimum voltage for start charging.</i>
<i>Cut Out Voltage:</i>	<i>Set voltage for charger to stop charging.</i>
<i>Charging Mode:</i>	<i>Set charging mode (On/Off or PWM charging)</i>
<i>Battery Hysteresis:</i>	<i>Battery reconnecting hysteresis (V)</i>
<i>Battery Temp. Compensation:</i>	<i>Charging temperature compensation (-mV/°C)</i>
<i>Boost Charge Hysteresis:</i>	<i>Set boost charge compensation (V)</i>

GPS & Sync

Max Distance from fixed:	Max drift distance from GPS fix (meters)
Fixed Latitude:	Set fix Latitude
Fixed Longitude:	Set fix Longitude
GPS Check-up Interval:	Set position check-up interval (min).
GPS Check-up Duration:	Set position check-up duration (min)
Sync Setting:	Set lantern Sync mode (Off, Cable, GPS or Cable and GPS)
<i>Advanced Setting</i>	
<i>Sync Delay:</i>	<i>Set Sync Delay (sec)</i>

Tilt and Impact

Tilt angle Limit:	Set maximum allowed tilt angle (deg) before shutdown occurs.
<i>Advanced Setting</i>	
<i>Shutdown if tilted:</i>	Set lantern to shut down if tilted (Yes or No)

Dated Shutdown

Dated Shutdown Enabled: Enable or disable dated shut down (Yes or No)

Advanced Settings

<i>Shutdown Date:</i>	<i>Set date to shut down lantern</i>
<i>Startup Date:</i>	<i>Set date to start up lantern</i>

Bluetooth Settings

Bluetooth Device name: Set lantern's Bluetooth name

Advanced settings

<i>PIN Code Enabled:</i>	<i>Enable or disable lantern PIN code (give PIN code to change setting)</i>
<i>PIN Code:</i>	<i>Set new PIN Code</i>

COMMANDS

Test Lantern

The Test command runs the lantern for 3 minutes in full intensity.

Download event log

This command will download the full event log to your phone. You can now save it or share it.

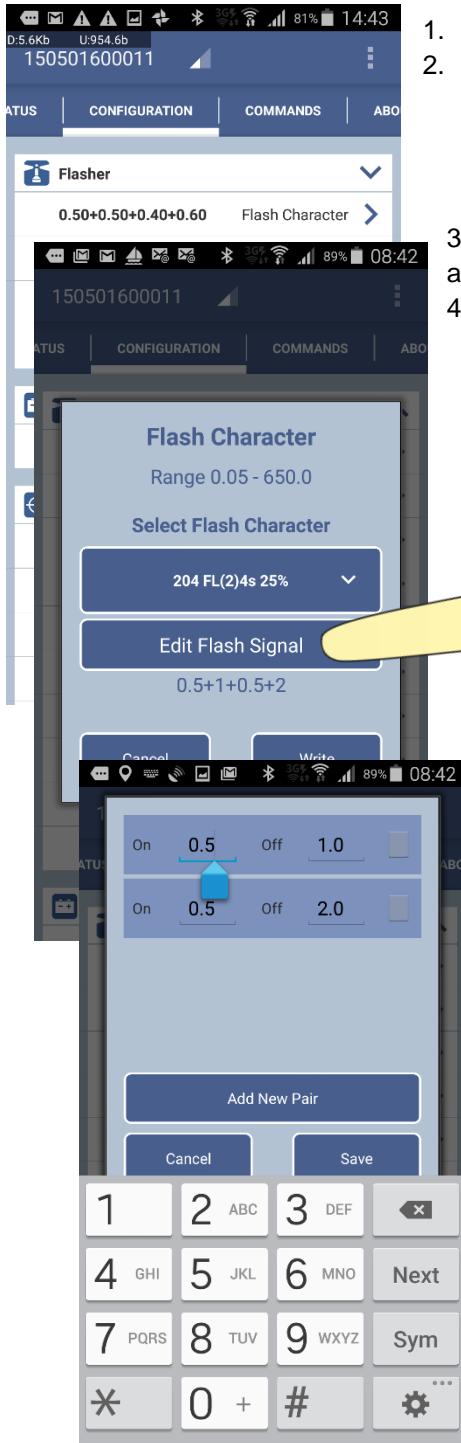
Geofence

This command will set the actual GPS position as the reference point from where position deviation is calculated.

Set RTC

This command will update the lantern internal clock from the mobile. It is used for event log time-stamp and for dated shutdown function. The command is not needed when a lantern is equipped with GPS receiver.

Create a custom Flash Character; Step by Step Instructions



1. Select CONFIGURATION page
2. Tap on > symbol to the right of Flash Character
3. Select an existing Character from the list as a starting point and
4. Tap "Edit Flash Signal" to customize the character.
5. Change the On/Off timing. If needed add a new On/Off Pair or delete an existing pair by tapping the gray X. Tap Save, when done.
6. The new character will be saved as Custom.

6.2. Infrared port and photocell

The combined infrared communication port and Photocell (ambient light sensor) is located in the base of the lantern.

IrDA Programming is done by pointing the Sabik easyProgrammer (SEP) at the IrDA port. Please refer to the SEP product manual for more information.

The photocell senses daylight and starts/stops the flashing cycle accordingly.



6.2.1. Flash Character List

On the following pages you will find the Sabik built-in flash character list where:

Number: Flash character number used by Sabik.

Flash Character: Flash character name.

Duty Cycle: Light on time (seconds) in percent.

Min flash duration: Shortest light on time in one cycle.

FL1...FL9: Light on times in one cycle (seconds).

EC...EC9: Light off times in one cycle (seconds).

Number	Flash Character	Duty cycle	Min ON Time	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
001	Fixed light	100,0%																			
002	Fl(2) 10s	10,0%	2 Fl(2) 10s 10%	0,50	0,5	1	0,5	8													
003	Fl(2) 10s	10,0%	3 Fl(2) 10s 10%	0,50	0,5	1,5	0,5	7,5													
004	Fl(2) 10s	16,0%	4 Fl(2) 10s 16%	0,80	0,8	1,2	0,8	7,2													
005	Fl(2) 10s	20,0%	5 Fl(2) 10s 20%	1,00	1	1	1	7													
006	Fl(2) 10s	20,0%	6 Fl(2) 10s 20%	1,00	1	1,5	1	6,5													
007	Fl(2) 12s	8,3%	7 Fl(2) 12s 8%	0,50	0,5	1	0,5	10													
008	Fl(2) 12s	25,0%	8 Fl(2) 12s 25%	1,50	1,5	2	1,5	7													
009	Fl(2) 15s	13,3%	9 Fl(2) 15s 13%	1,00	1	2	1	11													
010	Fl(2) 5s	20,0%	10 Fl(2) 5s 20%	0,50	0,5	1	0,5	3													
011	Fl(2) 5s	40,0%	11 Fl(2) 5s 40%	1,00	1	1	1	2													
012	Fl(2) 6s	16,7%	12 Fl(2) 6s 17%	0,50	0,5	1	0,5	4													
013	Fl(2) 6s	26,7%	13 Fl(2) 6s 27%	0,80	0,8	1,2	0,8	3,2													
014	Fl(2) 6s	33,3%	14 Fl(2) 6s 33%	1,00	1	1	1	3													
015	Fl(2) 7s	28,6%	15 Fl(2) 7s 29%	1,00	1	1	1	4													
016	Fl(2) 8s	12,5%	16 Fl(2) 8s 13%	0,50	0,5	1	0,5	6													
017	Fl(2) 8s	25,0%	17 Fl(2) 8s 25%	1,00	1	1	1	5													
018	Fl(2+1) 10s	15,0%	18 Fl(2+1) 10s 15%	0,50	0,5	0,7	0,5	2,1	0,5	5,7											
019	Fl(2+1) 12s	20,0%	19 Fl(2+1) 12s 20%	0,80	0,8	1,2	0,8	2,4	0,8	6											
020	Fl(2+1) 12s	25,0%	20 Fl(2+1) 12s 25%	1,00	1	1	1	4	1	4											
021	Fl(2+1) 15s	20,0%	21 Fl(2+1) 15s 20%	1,00	1	2	1	5	1	5											
022	Fl(2+1) 6s	15,0%	22 Fl(2+1) 6s 15%	0,30	0,3	0,4	0,3	1,2	0,3	3,5											
023	Fl(3) 12S	12,5%	23 Fl(3) 12S 13%	0,50	0,5	2	0,5	2	0,5	6,5											
024	Fl(3) 10s	15,0%	24 Fl(3) 10s 15%	0,50	0,5	1,5	0,5	1,5	0,5	5,5											
025	Fl(3) 10s	30,0%	25 Fl(3) 10s 30%	1,00	1	1	1	1	1	5											
026	Fl(3) 12s	20,0%	26 Fl(3) 12s 20%	0,80	0,8	1,2	0,8	1,2	0,8	7,2											
027	Fl(3) 15s	6,0%	27 Fl(3) 15s 6%	0,30	0,3	1,7	0,3	1,7	0,3	10,7											
028	Fl(3) 15s	10,0%	28 Fl(3) 15s 10%	0,50	0,5	1,5	0,5	1,5	0,5	10,5											
029	Fl(3) 20s	7,5%	29 Fl(3) 20s 8%	0,50	0,5	3	0,5	3	0,5	12,5											
030	Fl(3) 9s	26,7%	30 Fl(3) 9s 27%	0,80	0,8	1,2	0,8	1,2	0,8	4,2											
031	Fl(4) 10s	20,0%	31 Fl(4) 10s 20%	0,50	0,5	1	0,5	1	0,5	1	0,5	5									
032	Fl(4) 10s	32,0%	32 Fl(4) 10s 32%	0,80	0,8	1,2	0,8	1,2	0,8	1,2	0,8	3,2									
033	Fl(4) 12s	26,7%	33 Fl(4) 12s 27%	0,80	0,8	1,2	0,8	1,2	0,8	1,2	0,8	5,2									
034	Fl(4) 15s	13,3%	34 Fl(4) 15s 13%	0,50	0,5	1,5	0,5	1,5	0,5	1,5	0,5	8,5									
035	Fl(4) 15s	26,7%	35 Fl(4) 15s 27%	1,00	1	1	1	1	1	1	1	8									
036	Fl(4) 20s	10,0%	36 Fl(4) 20s 10%	0,50	0,5	1,5	0,5	1,5	0,5	1,5	0,5	13,5									
037	Fl(5) 20s	20,0%	37 Fl(5) 20s 20%	0,80	0,8	1,2	0,8	1,2	0,8	1,2	0,8	1,2	0,8	11,2							
038	Fl(5) 20s	25,0%	38 Fl(5) 20s 25%	1,00	1	1	1	1	1	1	1	1	1	11							
039	Fl(6) 15s	20,0%	39 Fl(6) 15s 20%	0,50	0,5	1	0,5	1	0,5	1	0,5	1	0,5	1	0,5	7					
040	FL-*	75,0%	40 FL-* 75%	1,00	5	1	1	1													
041	FL-**	70,0%	41 FL-** 70%	1,00	5	1	1	1	1	1											
042	Fl 1.5s	20,0%	42 Fl 1.5s 20%	0,30	0,3	1,2															
043	Fl 1.5s	33,3%	43 Fl 1.5s 33%	0,50	0,5	1															
044	Fl 10s	5,0%	44 Fl 10s 5%	0,50	0,5	9,5															
045	Fl 10s	10,0%	45 Fl 10s 10%	1,00	1	9															
046	Fl 10s	15,0%	46 Fl 10s 15%	1,50	1,5	8,5															
047	Fl 12s	10,0%	47 Fl 12s 10%	1,20	1,2	10,8															
048	Fl 15s	6,7%	48 Fl 15s 7%	1,00	1	14															
049	Fl 2.5s	12,0%	49 Fl 2.5s 12%	0,30	0,3	2,2															
050	Fl 2.5s	20,0%	50 Fl 2.5s 20%	0,50	0,5	2															
051	Fl 2.8s	10,7%	51 Fl 2.8s 11%	0,30	0,3	2,5															
052	Fl 2s	10,0%	52 Fl 2s 10%	0,20	0,2	1,8															
053	Fl 2s	15,0%	53 Fl 2s 15%	0,30	0,3	1,7															
054	Fl 2s	20,0%	54 Fl 2s 20%	0,40	0,4	1,6															
055	Fl 2s	25,0%	55 Fl 2s 25%	0,50	0,5	1,5															
056	Fl 2s	35,0%	56 Fl 2s 35%	0,70	0,7	1,3															
057	Fl 2s	40,0%	57 Fl 2s 40%	0,80	0,8	1,2															
058	Fl 3s	10,0%	58 Fl 3s 10%	0,30	0,3	2,7															
059	Fl 3s	16,7%	59 Fl 3s 17%	0,50	0,5	2,5															
060	Fl 3s	23,3%	60 Fl 3s 23%	0,70	0,7	2,3															
061	Fl 3s	33,3%	61 Fl 3s 33%	1,00	1	2															
062	Fl 4.3s	30,2%	62 Fl 4.3s 30%	1,30	1,3	3															
063	Fl 4.4s	9,1%	63 Fl 4.4s 9%	0,40	0,4	4															
064	Fl 4s	12,5%	64 Fl 4s 13%	0,50	0,5	3,5															
065	Fl 4s	20,0%	65 Fl 4s 20%	0,80	0,8	3,2															
066	Fl 4s	25,0%	66 Fl 4s 25%	1,00	1	3															
067	Fl 4s	37,5%	67 Fl 4s 38%	1,50	1,5	2,5															
068	Fl 5s	6,0%	68 Fl 5s 6%	0,30	0,3	4,7															
069	Fl 5s	10,0%	69 Fl 5s 10%	0,50	0,5	4,5															
070	Fl 5s	20,0%	70 Fl 5s 20%	1,00	1	4															
071	Fl 5s	25,0%	71 Fl 5s 25%	1,50	1,5	4,5															
072	Fl 6s	8,3%	72 Fl 6s 8%	0,50	0,5	5,5															
073	Fl 6s	10,0%	73 Fl 6s 10%	0,60	0,6	5,4															
074	Fl 6s	16,7%	74 Fl 6s 17%	1,00	1	5															
075	Fl 6s	30,0%	75 Fl 6s 30%	1,50	1,5	3,5															
076	Fl 7.5s	10,7%	76 Fl 7.5s 11%	0,80	0,8	6,7															
077	ISO 10S	50,0%	77 ISO 10S 50%	5,00	5	5															
078	ISO 2S	50,0%	78 ISO 2S 50%	1,00	1	1															
079	ISO 4S	50,0%	79 ISO 4S 50%	2,00	2	2															
080	ISO 5S	50,0%	80 ISO 5S 50%	2,50	2,5	2,5															

Number	Flash Character	Duty cycle		Min ON Time	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
081	ISO 6S	50,0%	81 ISO 6S 50%	3,00	3	3																
082	ISO 8S	50,0%	82 ISO 8S 50%	4,00	4	4																
083	ISO 3S	50,0%	83 ISO 3S 50%	1,50	1,5	1,5																
084	LFL 10S	20,0%	84 LFL 10S 20%	2,00	2	8																
085	LFL 10S	30,0%	85 LFL 10S 30%	3,00	3	7																
086	LFL 10S	40,0%	86 LFL 10S 40%	4,00	4	6																
087	LFL 12S	16,7%	87 LFL 12S 17%	2,00	2	10																
088	LFL 15S	26,7%	88 LFL 15S 27%	4,00	4	11																
089	LFL 5S	40,0%	89 LFL 5S 40%	2,00	2	3																
090	LFL 6S	33,3%	90 LFL 6S 33%	2,00	2	4																
091	LFL 8S	25,0%	91 LFL 8S 25%	2,00	2	6																
092	LFL 8S	37,5%	92 LFL 8S 38%	3,00	3	5																
093	MO(A) 10S	20,0%	93 MO(A) 10S 20%	0,50	0,5	0,5	1,5	7,5														
094	MO(A) 15s	16,7%	94 MO(A) 15s 17%	0,50	0,5	1,5	2	11														
095	MO(A) 6s	21,7%	95 MO(A) 6s 22%	0,30	0,3	0,6	1	4,1														
096	MO(A) 8s	40,0%	96 MO(A) 8s 40%	0,80	0,8	1,2	2,4	3,6														
097	MO(B) 15S	20,0%	97 MO(B) 15S 20%	0,50	1,5	0,5	0,5	0,5	0,5	0,5	0,5	10,5										
098	MO(U) 10S	15,0%	98 MO(U) 10S 15%	0,30	0,3	0,7	0,3	0,7	0,9	7,1												
099	MO(U) 10S	20,0%	99 MO(U) 10S 20%	0,40	0,4	0,6	0,4	0,6	1,2	6,8												
100	MO(U) 10S	25,0%	100 MO(U) 10S 25%	0,50	0,5	0,5	0,5	0,5	1,5	6,5												
101	MO(U) 15S	16,7%	101 MO(U) 15S 17%	0,50	0,5	0,5	0,5	0,5	1,5	11,5												
102	MO(U) 15S	17,3%	102 MO(U) 15S 17%	0,60	0,6	0,3	0,6	0,3	1,4	11,8												
103	MO(U) 15S	22,0%	103 MO(U) 15S 22%	0,70	0,7	0,5	0,7	0,5	1,9	10,7												
104	MO(U) 15S	23,3%	104 MO(U) 15S 23%	0,70	0,7	0,7	0,7	0,7	2,1	10,1												
105	MO(U) 15S	23,3%	105 MO(U) 15S 23%	0,75	0,75	0,45	0,75	0,45	2	10,6												
106	MO(U) 15S	35,5%	106 MO(U) 15S 36%	1,15	1,15	0,73	1,15	0,73	3,03	8,21												
107	MO(U) 15S	39,3%	107 MO(U) 15S 39%	1,30	1,3	0,7	1,3	0,7	3,3	7,7												
108	MO(U) 15S****	21,0%	108 MO(U) 15S**** 21%	0,75	0,75	0,15	0,75	0,15	1,65	11,55												
109	MO(U) 15S*	15,0%	109 MO(U) 15S* 15%	0,45	0,45	0,45	0,45	0,45	1,35	11,85												
110	MO(U) 15S**	17,0%	110 MO(U) 15S** 17%	0,55	0,55	0,35	0,55	0,35	1,45	11,75												
111	MO(U) 15S***	18,0%	111 MO(U) 15S*** 18%	0,60	0,6	0,3	0,6	0,3	1,5	11,7												
112	MO(U) 10S	10,0%	112 MO(U) 10S 10%	0,20	0,2	0,8	0,2	0,8	0,6	7,4												
113	OC 10S	70,0%	113 OC 10S 70%	7,00	7	3																
114	OC 10S	75,0%	114 OC 10S 75%	7,50	7,5	2,5																
115	OC 15S	66,7%	115 OC 15S 67%	10,00	10	5																
116	OC 3S	66,7%	116 OC 3S 67%	2,00	2	1																
117	OC 3S	83,3%	117 OC 3S 83%	2,50	2,5	0,5																
118	OC 4S	75,0%	118 OC 4S 75%	3,00	3	1																
119	OC 5S	60,0%	119 OC 5S 60%	3,00	3	2																
120	OC 5S	80,0%	120 OC 5S 80%	4,00	4	1																
121	OC 5S	90,0%	121 OC 5S 90%	4,50	4,5	0,5																
122	OC 6S	66,7%	122 OC 6S 67%	4,00	4	2																
123	OC 6S	75,0%	123 OC 6S 75%	4,50	4,5	1,5																
124	OC 6S	83,3%	124 OC 6S 83%	5,00	5	1																
125	Q 1.2S	25,0%	125 Q 1.2S 25%	0,30	0,3	0,9																
126	Q 1.2S	41,7%	126 Q 1.2S 42%	0,50	0,5	0,7																
127	Q 1.2S	50,0%	127 Q 1.2S 50%	0,60	0,6	0,6																
128	Q 1S	20,0%	128 Q 1S 20%	0,20	0,2	0,8																
129	Q 1S	30,0%	129 Q 1S 30%	0,30	0,3	0,7																
130	Q 1S	40,0%	130 Q 1S 40%	0,40	0,4	0,6																
131	Q 1S	50,0%	131 Q 1S 50%	0,50	0,5	0,5																
132	Q 1S	80,0%	132 Q 1S 80%	0,80	0,8	0,2																
133	Q(2) 10S	10,0%	133 Q(2) 10S 10%	0,50	0,5	1,5	0,5	7,5														
134	Q(2) 10S	12,0%	134 Q(2) 10S 12%	0,60	0,6	0,4	0,6	8,4														
135	Q(2) 5S	12,0%	135 Q(2) 5S 12%	0,30	0,3	0,7	0,3	3,7														
136	Q(2) 6S	10,0%	136 Q(2) 6S 10%	0,30	0,3	0,7	0,3	4,7														
137	Q(2) 6S	11,7%	137 Q(2) 6S 12%	0,35	0,35	0,7	0,35	4,6														
138	Q(3) 10S	9,0%	138 Q(3) 10S 9%	0,30	0,3	0,7	0,3	0,7	0,3	7,7												
139	Q(3) 10S	10,5%	139 Q(3) 10S 11%	0,35	0,35	0,65	0,35	0,65	0,35	7,65												
140	Q(3) 10S	18,0%	140 Q(3) 10S 18%	0,60	0,6	0,6	0,6	0,6	0,6	7												
141	Q(4) 10S	12,0%	141 Q(4) 10S 12%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	6,7										
142	Q(4) 12S	10,0%	142 Q(4) 12S 10%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	8,7										
143	Q(4) 15S	9,3%	143 Q(4) 15S 9%	0,35	0,35	0,7	0,35	0,7	0,35	0,7	0,35	11,5										
144	Q(4) 20S	10,0%	144 Q(4) 20S 10%	0,50	0,5	0,5	0,5	0,5	0,5	0,5	0,5	16,5										
145	Q(4) 6S	26,7%	145 Q(4) 6S 27%	0,40	0,4	0,6	0,4	0,6	0,4	0,6	0,4	2,6										
146	Q(5) 10S	15,0%	146 Q(5) 10S 15%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	5,7								
147	Q(5) 20S	7,5%	147 Q(5) 20S 8%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	15,7								
148	Q(5) 20S	12,5%	148 Q(5) 20S 13%	0,50	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	15,5								
149	Q(5) 7S	21,4%	149 Q(5) 7S 21%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	2,7								
150	Q(6) 10S	18,0%	150 Q(6) 10S 18%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	4,7						
151	Q(6)+LFL 15S	25,3%	151 Q(6)+LFL 15S 25%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	2	7				
152	Q(6)+LFL 15S	21,0%	152 Q(6)+LFL 15S 21%	0,35	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	1,05	7,95				
153	Q(6)+LFL 15S	37,3%	153 Q(6)+LFL 15S 37%	0,60	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	2	5,8				
154	Q(9) 15S	18,0%	154 Q(9) 15S 18%	0,30	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	0,7	0,3	6,7
155	Q(9) 15S	21,0%	155 Q(9) 15S 21%	0,35	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	0,65	0,35	6,65
156	Q(9) 15S	36,0%	156 Q(9) 15S 36%	0,60	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	4,8
157	VQ 0.5S	30,0%	157 VQ 0.5S 30%	0,15	0,15	0,35																
158	VQ 0.5S	40,0%	158 VQ 0.5S 40%	0,20	0,2	0,3																
159	VQ 0.6S	33,3%	159 VQ 0.6S 33%	0,20	0,2	0,4																
160	VQ 0.6S	50,0%	160 VQ 0.6S 50%	0,30	0,3	0,3	</															

Number	Flash Character	Duty cycle		Min ON Time	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
161	VQ(3) 5S	9,0%	161 VQ(3) 5S 9%	0,15	0,15	0,35	0,15	0,35	0,15	3,85												
162	VQ(3) 5S	12,0%	162 VQ(3) 5S 12%	0,20	0,2	0,3	0,2	0,3	0,2	3,8												
163	VQ(3) 5S	18,0%	163 VQ(3) 5S 18%	0,30	0,3	0,3	0,3	0,3	0,3	3,5												
164	VQ(6)+LFL 10S	32,0%	164 VQ(6)+LFL 10S 32%	0,20	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	2	5				
165	VQ(6)+LFL 10S	38,0%	165 VQ(6)+LFL 10S 38%	0,30	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	2	4,4				
166	VQ(9) 10S	13,5%	166 VQ(9) 10S 14%	0,15	0,15	0,35	0,15	0,35	0,15	0,35	0,15	0,35	0,15	0,35	0,15	0,35	0,15	0,35	0,15	0,35	0,15	5,85
167	VQ(9) 10S	18,0%	167 VQ(9) 10S 18%	0,20	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	0,3	0,2	5,8
168	VQ(9) 10S	27,0%	168 VQ(9) 10S 27%	0,30	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	4,9
169	Q(2) 7S	14,3%	169 Q(2) 7S 14%	0,50	0,5	1	0,5	5														
170	FI(2) 5s	12,0%	170 FI(2) 5s 12%	0,30	0,3	0,4	0,3	4														
171	FI(2) 10s	10,0%	171 FI(2) 10s 10%	0,50	0,5	0,7	0,5	8,3														
172	FI(5) 20s	12,5%	172 FI(5) 20s 13%	0,50	0,5	1	0,5	1	0,5	1	0,5	1	0,5	13,5								
173	FI(2) 10s	20,0%	173 FI(2) 10s 20%	1,00	1	2	1	6														
174	FI 4s	10,0%	174 FI 4s 10%	0,40	0,4	3,6																
175	FI(2) 5s	16,0%	175 FI(2) 5s 16%	0,40	0,4	0,6	0,4	3,6														
176	Mo(A) 8s	30,0%	176 Mo(A) 8s 30%	0,40	0,4	0,6	2	5														
177	FI 2.5s	40,0%	177 FI 2.5s 40%	1,00	1	1,5																
178	FI(3+1) 20 s	10,0%	178 FI(3+1) 20 s 10%	0,50	0,5	1,5	0,5	1,5	0,5	4,5	0,5	10,5										
179	FI(3+1) 20 s	12,0%	179 FI(3+1) 20 s 12%	0,60	0,6	1,4	0,6	1,4	0,6	4,4	0,6	10,4										
180	FI(3+1) 20 s	13,0%	180 FI(3+1) 20 s 13%	0,65	0,65	1,35	0,65	1,35	0,65	4,35	0,65	10,35										
181	FI(3+1) 20 s	14,0%	181 FI(3+1) 20 s 14%	0,70	0,7	1,3	0,7	1,3	0,7	4,3	0,7	10,3										
182	FI(3+1) 20 s	16,0%	182 FI(3+1) 20 s 16%	0,80	0,8	1,2	0,8	1,2	0,8	4,2	0,8	10,2										
183	FI(2) 7s	14,3%	183 FI(2) 7s 14%	0,50	0,5	1,5	0,5	4,5														
184	FI(3) 9s	16,7%	184 FI(3) 9s 17%	0,50	0,5	1,5	0,5	1,5	0,5	4,5												
185	LFL 11s	18,2%	185 LFL 11s 18%	2,00	2	9																
186	FI(6+1) 15s	33,3%	186 FI(6+1) 15s 33%	0,50	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	2	7				
187	Mo (0) 12s	37,5%	187 Mo (0) 12s 38%	1,50	1,5	0,5	1,5	0,5	1,5	6,5												
188	Mo (0) 15s	30,0%	188 Mo (0) 15s 30%	1,50	1,5	0,5	1,5	0,5	1,5	9,5												
189	Q 1S	25,0%	189 Q 1S 25%	0,25	0,25	0,75																
190	Q (3) 4.6s	19,6%	190 Q (3) 4.6s 20%	0,30	0,3	0,7	0,3	2	0,3	1												
191	FI 7.5s	6,7%	191 FI 7.5s 7%	0,50	0,5	7																
192	FI (4) 11s	18,2%	192 FI (4) 11s 18%	0,50	0,5	1,5	0,5	1,5	0,5	1,5	0,5	4,5										
193	FL (3) 21s	7,1%	193 FL (3) 21s 7%	0,50	0,5	1,5	0,5	4,5	0,5	13,5												
194	FL (3) 6s	25,0%	194 FL (3) 6s 25%	0,50	0,5	0,5	0,5	0,5	0,5	3,5												
195	FL(3)10s	15,0%	195 FL(3)10s 15%	0,50	0,5	0,5	0,5	0,5	0,5	7,5												
196	FL(9)15s	30,0%	196 FL(9)15s 30%	0,50	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	6,5
197	OC(2)6s	66,7%	197 OC(2)6s 67%	1,00	3	1	1	1														
198	OC(3)8s	62,5%	198 OC(3)8s 63%	1,00	3	1	1	1	1	1												
199	OC(4)10s	60,0%	199 OC(4)10s 60%	1,00	3	1	1	1	1	1	1	1										
200	FL(2)6s	16,7%	200 FL(2)6s 17%	0,50	0,5	1,5	0,5	3,5														
201	FL(1)8s	6,3%	201 FL(1)8s 6%	0,50	0,5	7,5																
202	FL(3)15s	6,0%	202 FL(3)15s 6%	0,30	0,3	1,7	0,3	1,7	0,3	10,7												
203	FL(2)5s	8,0%	203 FL(2)5s 8%	0,20	0,2	0,8	0,2	3,8														
204	FL(2)4s	25,0%	204 FL(2)4s 25%	0,50	0,5	1	0,5	2														
205	FL(2)4.5s	13,3%	205 FL(2)4.5s 13%	0,30	0,3	1	0,3	2,9														
206	FL(3)10s	15,0%	206 FL(3)10s 15%	0,50	0,5	1,5	0,5	1,5	0,5	5,5												
207	FL(3)15s	10,0%	207 FL(3)15s 10%	0,50	0,5	1,5	0,5	1,5	0,5	10,5												
208	Mo(B)16s	25,0%	208 Mo(B)16s 25%	0,50	1,5	0,5	0,5	0,5	1,5	0,5	0,5	10,5										
209	Q 1s	15,0%	209 Q 1s 15%	0,15	0,15	0,85																
210	FI(2+1) 10s	18,0%	210 FI(2+1) 10s 18%	0,60	0,6	0,6	0,6	1,8	0,6	5,8												
211	MO(U) 15S	13,3%	211 MO(U) 15S 13%	0,40	0,4	0,5	0,4	0,5	1,2	12												
212	Q 1.2S	16,7%	212 Q 1.2S 17%	0,20	0,2	1																
213	Q(3) 10S	6,0%	213 Q(3) 10S 6%	0,20	0,2	1	0,2	1	0,2	7,4												
214	Q(6)+LFL 15S	44,0%	214 Q(6)+LFL 15S 44%	0,60	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	3	4,8				
215	VQ(3) 5S	12,0%	215 VQ(3) 5S 12%	0,20	0,2	0,4	0,2	0,4	0,2	3,6												
216	VQ(6)+LFL 10S	48,0%	216 VQ(6)+LFL 10S 48%	0,30	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	3	3,4				
217	VQ(9) 10S	18,0%	217 VQ(9) 10S 18%	0,20	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	5
218	OC (3) 12S	62,5%	218 OC (3) 12S 63%	1,50	4,5	1,5	1,5	1,5	1,5	1,5												
219	OC(4) 12S	66,7%	219 OC(4) 12S 67%	1,00	5	1	1	1	1	1	1	1										
220	FL(3) 12S	25,0%	220 FL(3) 12S 25%	1,00	1	1,5	1	1,5	1	6												
221	FL(4) 15S	26,7%	221 FL(4) 15S 27%	1,00	1	1,5	1	1,5	1	1,5	1	6,5										
222	FL(5) 20S	25,0%	222 FL(5) 20S 25%	1,00	1	1,5	1	1,5	1	1,5	1	1,5	1	9								
223	MO(A)	33,3%	223 MO(A) 33%	1,00	1	3	7															
224	FL(5) 20S SADO	12,5%	224 FL(5) 20S SADO 13%	0,50	0,5	1,5	0,5	1,5	0,5	1,5	0,5	1,5	0,5	11,5								
225	FL(4) 15S	13,3%	225 FL(4) 15S 13%	0,50	0,5	2	0,5	2	0,5	2	0,5	7										
226	FL(5) 20S	12,5%	226 FL(5) 20S 13%	0,50	0,5	2	0,5	2	0,5	2	0,5	9,5										
227	Q(6)+LFL 15S	28,0%	227 Q(6)+LFL 15S 28%	0,20	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	3	4,8				
228	Q(9) 15S	12,0%	228 Q(9) 15S 12%	0,20	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	1	0,2	5,2
229	VQ(6)+LFL 10S	42,0%	229 VQ(6)+LFL 10S 42%	0,20	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2	0,4	3	3,4				
230	OC 2s	62,5%	230 OC 2s 63%	1,25	1,25	0,75																

7. Periodic Maintenance

The LED160 is a robust lantern, which requires no maintenance, except for periodical lens cleaning. To maintain a good light output and achieve a long service life, it is advisable to visually inspect the lantern whenever visiting the site.

Mechanical inspection and maintenance:

- Clean the metal parts on the lantern
- Check the lens and clean it with a damp cloth (Do NOT use any solvents!)
- Check the mounting bolts and the plastic washers for damage and replace if necessary.
- Check and clean the roof and bird spike if necessary
- Check the lantern for leakage (condensation through the lens)

Functional inspection and maintenance:

- Check that the lantern turns on by covering the ambient light photocell
- Check visually that the LEDs are equal and uniform intensity when lit
- Read controller values with a programmer and check the status (note that values can also be saved in the PDA programmer)
- Check battery voltage with the programmer. If battery voltage is low, replace the battery

8. Replacing the light unit

There are no user serviceable parts inside the lantern. For servicing of the light source, SIM card or GPS/GSM unit – please contact Sabik or distributor near you.

9. Troubleshooting (Q&A)

Q: I covered the photocell, but the lantern does not turn on.

A1: Read controller values with the programmer and check status. The battery voltage is below the minimum programmed value. Replace the battery.

A2: The dated shut-down feature may be enabled. Re-programme to disable shut-down feature

A3: Read controller values with the programmer and check status. The day light sensor setting or read value is abnormal. Re-programme if setting is wrong. Return the lantern for service if the read value is wrong.

A4: Read controller values with the programmer and check status. There is a LED failure error. Return the lantern for service.

Q: I covered the photocell, but the lantern does not turn on and I cannot read controller values with the programmer.

A: Check the battery cables for damage or short-circuit. Replace the battery.

Q: I covered the photocell, but the lantern does not turn on and I cannot read controller values with the programmer even though I replaced the battery.

A: Return the lantern for service.

Q: The lantern seems to work normally, but I cannot read it with the programmer.

A1: Locate the IR eye on your programmer and on the lantern. Place them facing each other.

A2: Try to shade out the sun and put the programmer close to the lens during read process.

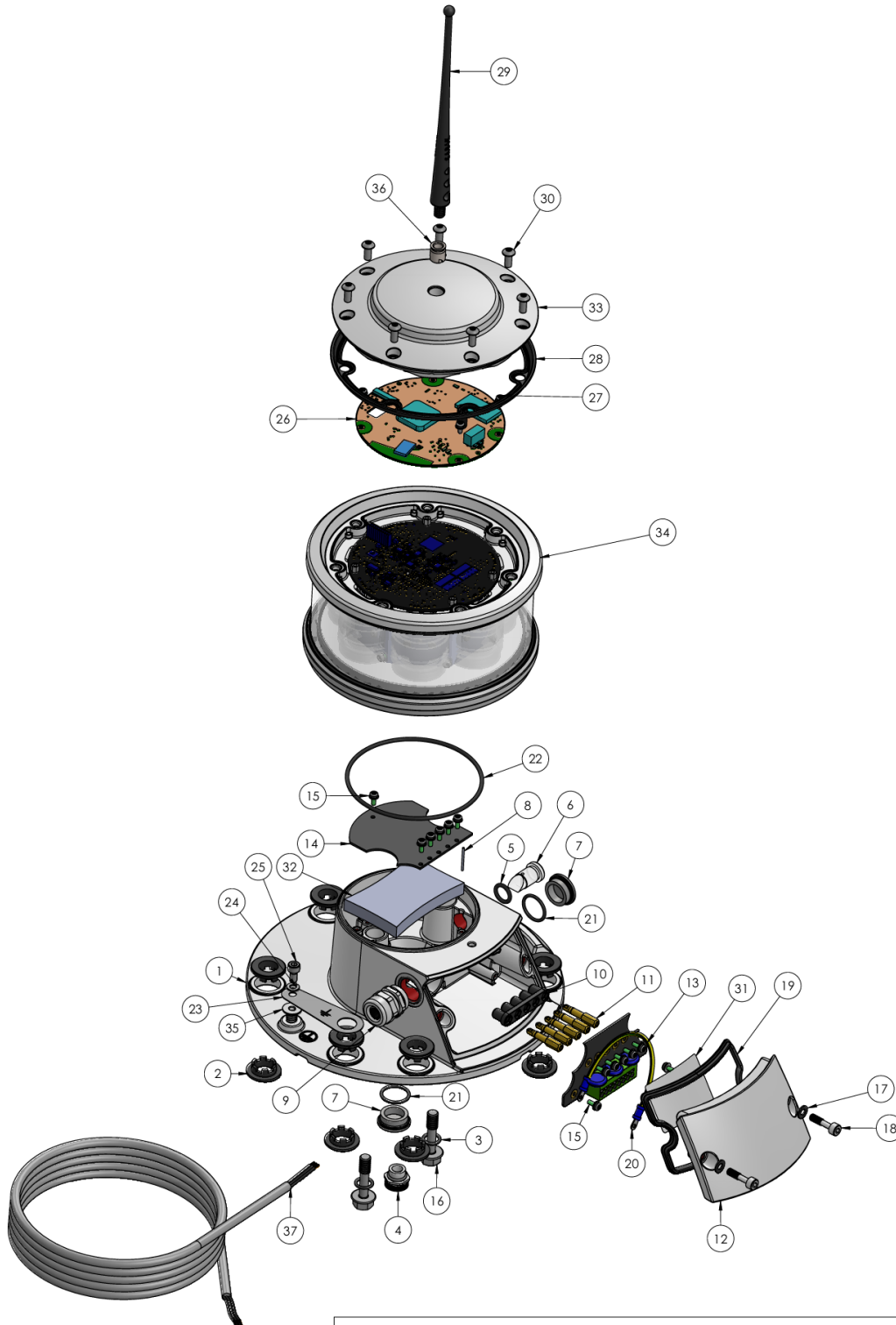
A3: Try different angles when reading, the light beam might block out the IR sensor of the programmer.

Q: There is moisture inside the lantern. Where is the leakage?

A1: Check that the PTFE vent is free and not blocked with bird droppings, which might prevent the lantern from breathing. Replace the vent if required.

A2: Return the lantern for service – the unit should not be opened in field conditions and attempts to repair should not be undertaken unless appropriate product training has been obtained.

APPENDIX A) Explosion view and part list



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FIRST ANGLE
PROJECTION



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TITLE: LED160 NW		REV: A
DOCUMENT NUMBER: M100544		
PRODUCT / PROJECT NAME: LED160		
DESIGNER: Sisi	DATE: 07.07.2022	
MATERIAL:		
SURFACE FINISH:		
SCALE:	SHEET 1/2	SIZE: A2

Part	Document Number	Sabik code	Title	Material	Manufacturer	Manufacturer PN	Revision	Qty
1	M100044	860010	LED 160 Base	AlSi10Mg			0	1
2	M100046	644940	Bottomplate grounding bushing	PA6			0	12
3	M101429	813118	O-ring 10x2	FPM			-	2
4	M100063	810261	Venting system M12x1,5 short	PA	Bimed	SBVPB-11	-	2
5	M100064	860017	O-ring 11x2,5	EPDM			0	1
6	M100026	860016	Light tube	PMMA			0	1
7	M100065	591120	Screw Plug M20x1,5	Brass, Nickel Plated	LAPP	52103125		2
8	M100067	644335	LED 160 Pin 1,5x20 DIN7	A4			0	1
9	M100066	591100	Cable gland M20x1,5	NI/MS			-	1
10	M100069	860013	LED 160 Insulating block	Nylon 6 : Radilon S RV300 (Black)			0	1
11	M100068	860012	LED 160 Contact bushing	Brass			A	5
12	M100045	860011	LED 160 Base junction box	AlSi10Mg			0	1
13	M100070	911123	LED 160 CB card	PCBA			0	1
14	M100071	911122	LED160 AILS AISIO (Default) LED160 AILS AUXBATT (opt 11L)	PCBA			-	1
15	M100039	611326	Torx M3x8mm KOMBI 7985+6905+6902A	A4			-	13
16	M100060	860015	Hexagon flange bolt M8x35 DIN 6921 A4	A4			0	2
17	M100073	634824	Washer M5 DIN 125	PA Black			-	2
18	M100072	860018	Hexagon socket head cap screw M5x20 DIN6912 A4	A4			0	2
19	M100293	860014	Base cover gasket	TPE: Thermolast K TC4 GPZ (Black)			0	1
20	M100294	860019	LED 160 Grounding cable	1,5mm ² 2x Abiko ring terminal, M3			0	1
21	M100150	813119	O-ring 18x2mm	FPM 75sh.	Tiivistekeskus	OR 18,0 x 2,0 FPM	-	3
22	M100295	813136	O-ring 94,92x2,62mm	EPDM			0	1
23	M100296	M100296	Grounding plate	A4			0	1
24	M100057	636382	Spring lock washer M5 DIN127	A4			-	1
25	M100235	619285	Hexagon socket head cap screw M5x10 DIN912	A4			-	1
26	M100008	911126 M101874 911128	LED160 BT (Default) LED160 GPS_BT_AIS_20PIN (OPT 4L) LED160 BT_GPS_GSM (OPT 9L) LG Globarstar LED160 PCBA	PCBA			-	1
27	M100037	611325	Torx M3x6mm KOMBI 7985+6905+6902A	A4	Würth elektronik	9999008163	-	4
28	M100016	860006	LED 160 Hat cover gasket	TPE: Thermolast K TC4 GPZ (Black)			0	1
29	M100024	860004	Bird Spike PC/ABS	PC/ABS Cycoloy C1200HF, Black			A	1
30	M100042	618011	Button head Torx-Pin M5x12mm ISO 7380	A4	Würth Elektronik Oy	9999041053005 5000	-	7
31	M100539	821295A 821296	LED160 AuxBatt Sticker (OPT9L) LED160 AISIO Sticker	HERMA /PP white			-	1
32	M100538	820143	Damp desiccant bag 10g	Silica gel			-	1
33	M100015	860007	LED160 Hat cover	Bayblend T65 XF, RAL7035			0	1
34	M100589		LED160 NW LightUnit Subassy				A	1
35	M100301		Grounding insert M5	A4			0	1
36	M100025	620152	LED 160 Tappex trisert	A4			0	1
37	M130708	715601A	Cable 3x1,5mm ²	ÖLFLEX-Cable 400P 3x1,5mm ²				1

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FIRST ANGLE PROJECTION

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DESIGNER: SiSi DATE: 07.07.2022

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