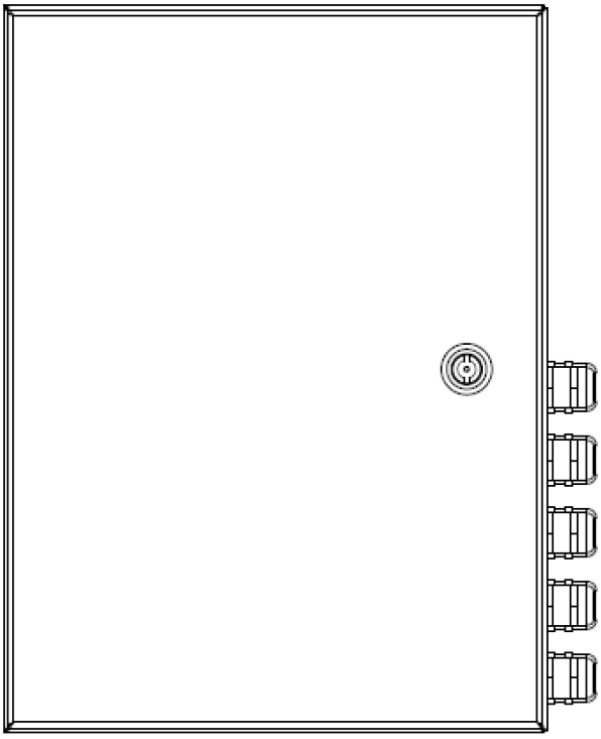
OBELUX Local Controller



User's Manual

Version 1.2

CONTENTS

1 CHANGE LOG

Version	Date:	Description:	Author
0.1	07.05.2016	Document created	AHa
0.9	30.06.2016	Draft version for internal review	AHa
1.0	26.07.2016	Document release	AHa
1.1	24.04.2017	New LC versions added to document	AHa
1.2	24.10.2017	New LC version added. Wiring pictures updated.	AHa

2 ABOUT THIS DOCUMENT

This document describes the Obelux Local Controller (LC) operation for the end-user. This document covers the installation and setup of the LC unit, use of graphical user interface and operation of the unit on a practical level. This document is intended for everyone who needs to install and setup a LC unit for operation.

LHC	Light Head Controller Unit
COM	Controller Module of the Local Controller (LC)
LC	Local Controller
GC	Global controller
GUI	Graphical User Interface
GPS	Global Positioning System

Table 1: Acronyms and Abbreviations

3 ABOUT THIS PRODUCT

Obelux Local Controller (LC) is used for controlling and monitoring a large number of Obelux aviation lights and light controllers. LC offers full system management for different devices, such as lights and visibility sensors which are connected to the same system. LC has a user-friendly color LCD screen for accessing the system locally. It also offers a standard RJ45 and optic fiber connections so that a network of local controllers can be monitored over the Ethernet with the Obelux Global Controller. Global Controller maintains the system state and provides communications link towards customer.

LC is microprocessor-controlled. Application software is stored in the CPU, the central processing unit. The controller board is used in several Obelux products, and some of the connectors and features are not used in the Local Controller application.

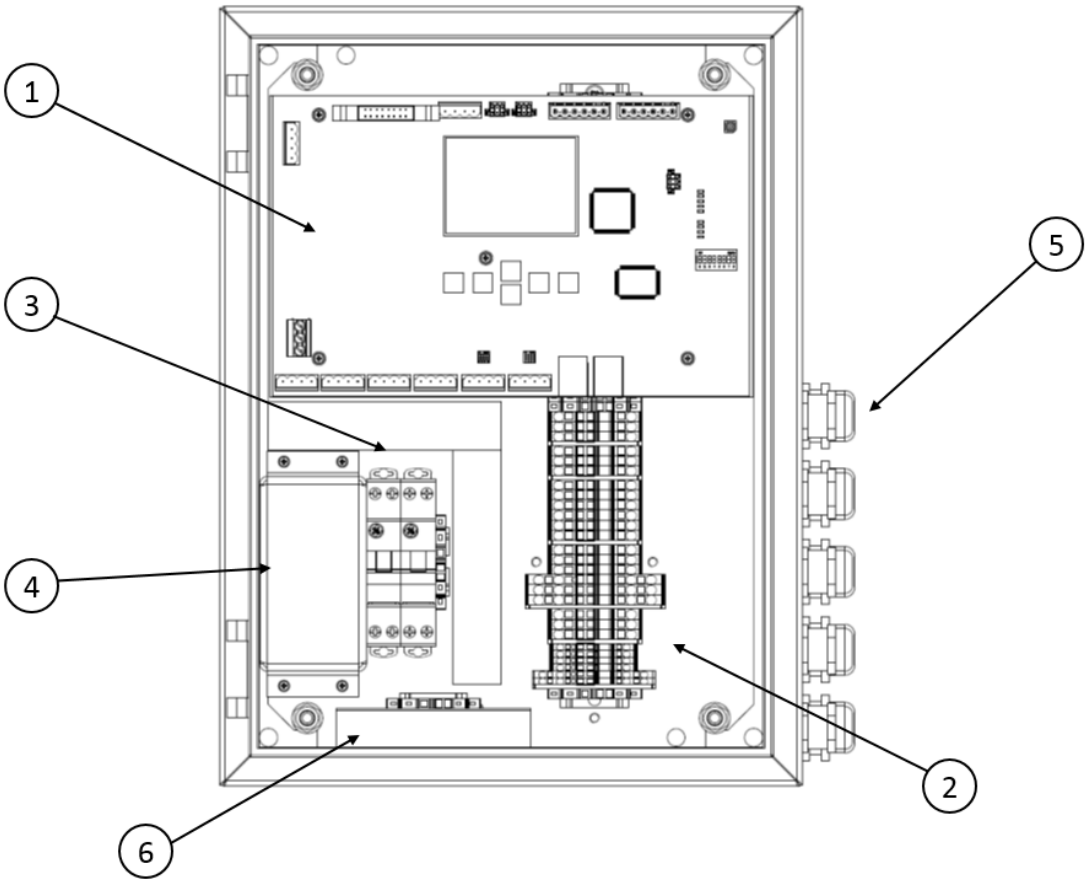


Figure 1: Main functional parts of the Local Controller

1. Controller module (COM)
2. Terminal block connectors
3. Circuit breakers
4. Over voltage protectors
5. Cable glands
6. Ethernet Switch box (Surge protection)

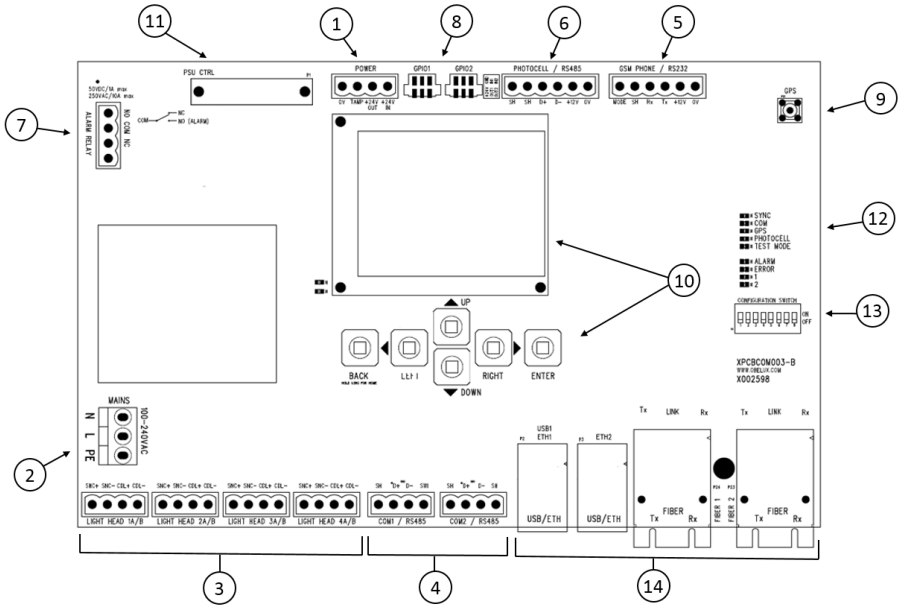


Figure 2: Controller module

1. Power out
2. Main power feed
3. LHC Output connectors (sectors)
4. RS-485 communication connectors
5. External GSM modem connector
6. External photocell connector
7. Alarm relay connector
8. GPIO connectors
9. GPS antenna connector
10. Display and keyboard
11. PSM control connector
12. Status LED indicators
13. Configuration DIP switches (not used in this application)
14. Ethernet LAN connectors (RJ45 and Optic Fibre)

The controller module is used in several Obelux products, and some of the connectors and features are not used in the Local Controller application. Most of the needed connections are wired to the terminal blocks below the Controller module.

3.1 Versions

Obelux LC is available as the following models:

Order code	Operating voltage	Output voltage	Visibility sensor heater relay	Visibility sensor support	Ethernet Connection to SCADA (RJ-45)	Ethernet Connection to SCADA (Optic fibre)
LC-230-E-S	230VAC	230VAC	No	No	Yes	No
LC-230-EF-S	230VAC	230VAC	No	No	No	Yes
LC-230-VE-S	230VAC	230VAC	No	Yes	Yes	No
LC-230-VEF-S	230VAC	230VAC	No	Yes	No	Yes
LC-230-24-VUE-S	230VAC	24VDC	Yes	Yes	Yes	No
LC-024-VE-S	24VDC	24VDC	No	Yes	Yes	No
LC-024-VUE-S	24VDC	24VDC	Yes	Yes	Yes	No
LC-230-ER1-S	230VAC	230VAC	No	No	Yes	No

4 SAFETY INSTRUCTIONS

In this section, you will find general safety instruction for the device. Please read the instructions carefully before installing or using the LC to avoid any personal, environmental or material damages.

4.1 General considerations

Install device observing manufactures installation guide

Use only cables and connectors specified by the manufacture

Keep your device away from heat sources, dust, smoke or other harmful substances

Do not add or remove any components inside the device unless otherwise approved by the manufacture

Do not spill food or other liquids on device

If you have any error situation with the device, do not try to fix it by yourself, contact your reseller.

4.2 Environmental considerations

The European Parliament and the Council of European Union issued directive 2012/19/EU to contribute to sustainable production and consumption by, as a first priority, the prevention of WEEE and, in addition, by the re-use, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste and to contribute to the efficient use of resources and the retrieval of valuable secondary raw materials.

Obelux aviation obstacle light products sold inside European Union can be returned to manufacturer if no local WEEE separate collection and re-use services are available. Please contact Obelux for details.

Obelux does not refurbish returned items but forwards them to authorized WEEE treatment facility.

4.3 Personal considerations

HIGH VOLTAGE! Device contains high voltage which is very dangerous to human beings. Any direct contact to high voltage could lead to serious injury, worst case even death.

5 INSTALLATION

5.1 Device installation

Mount the device to the selected mounting point using quality made fasteners. When the cabin door is open, check that there is no inflow of water (incl. hail and snow) into the cabinet. Make sure that all unused glands or gland holes are plugged shut.

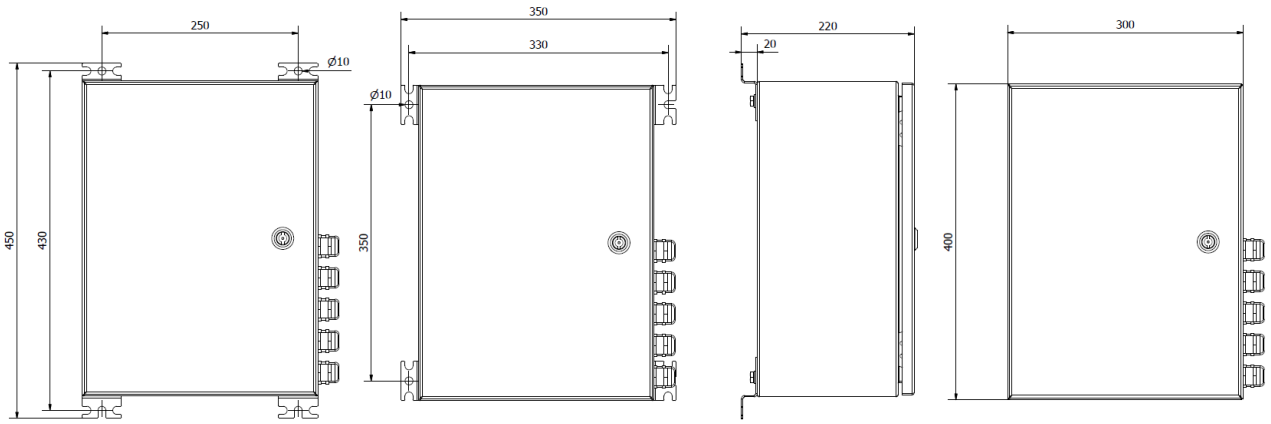


Figure 3: Cabin dimensions

5.2 Wiring

Route cables using cable glands on the bottom side of the controller. Connect the cable wires securely to appropriate terminal block connectors. There are two different size cable glands used on the cabin:

Cable gland 5 x M25 for 11-17 mm cable diameter

Cable gland 5 x M20 for 6-13 mm cable diameter

Follow the illustration below to achieve desired EMC protection.

Please follow these instructions when routing cable via a cable gland:

1. Partially expose the braided screen by removing the outer sheath of the cable at a length of approx. 10 mm.
2. Insert the cable through the dome nut and the gland body until the contact spring is pressed against the braided screen.

5.3 LC-230 versions

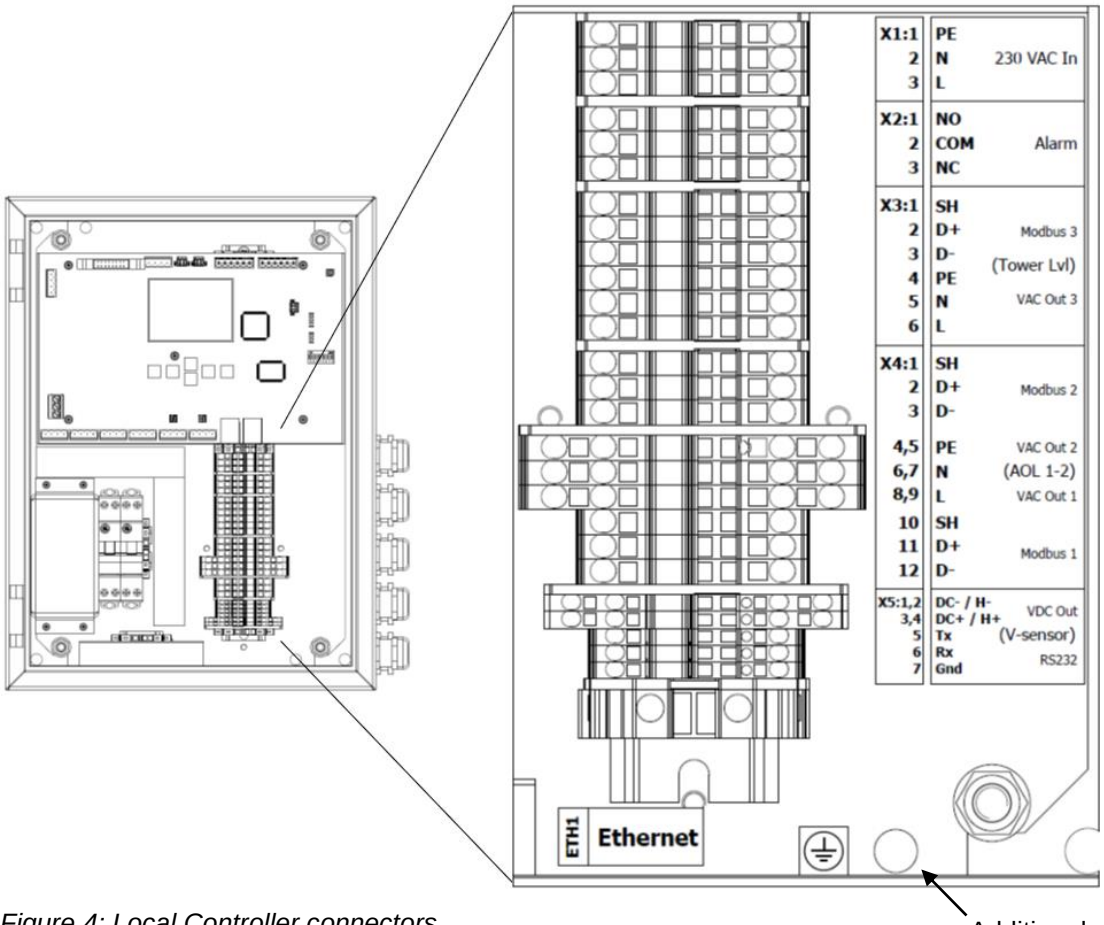


Figure 4: Local Controller connectors

5.3.1 230 VAC In

Number	Mark	Description	Information
X1:1	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X1:2	N	Neutral terminal	Colour typically blue
X1:3	L	Live terminal	Colour typically brown

Connector is push in terminal block.

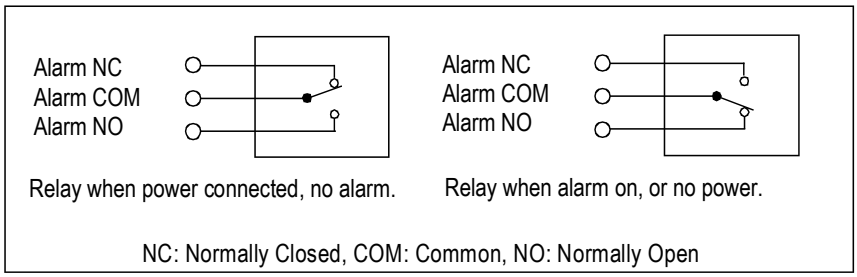
Conductor cross-section 0.14mm² - 2.5mm²

5.3.2 Alarm

Number	Mark	Description	Information
X2:1	NO	Normally Open	In alarm, connected with COM
X2:2	COM	Common	Common relay contact
X3:3	NC	Normally Connected	During normal operations, connected with COM

Unused alarm relay connectors can be left floating i.e. no wiring there is required. When LC is without power and when it starts (reboots), the relay signals an alarm. Alarm relay state changes during start-up process if there are no pending alarms to be signalled. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²



5.3.3 Tower Lvl (Modbus3, VAC Out 3)

Number	Mark	Description	Information
X3:1	SH	Shield	Shield
X3:2	D+	Data+	RS485 non-inverting pin
X3:3	D-	Data-	RS485 inverting pin
X3:4	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X3:5	N	Neutral terminal	Colour typically blue
X3:6	L	Live terminal	Colour typically brown

Connectors for the tower level lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.3.4 AOL 1-2 (Modbus1, Modbus2 and VAC out 1-2)

Number	Mark	Description	Information
X4:1	SH	Shield	Shield
X4:2	D+	Data+	RS485 non-inverting pin
X4:3	D-	Data-	RS485 inverting pin
X4:4,5	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X4:6,7	N	Neutral terminal	Colour typically blue
X4:8,9	L	Live terminal	Colour typically brown
X4:10	SH	Shield	Shield
X4:11	D+	Data+	RS485 non-inverting pin
X4:12	D-	Data-	RS485 inverting pin

Connectors for the two nacelle lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.3.5 V-sensor (RS232 and 24VDC out)

Number	Mark	Description	Information
X5:1	DC-	Negative	Negative connector for 24VDC out
X5:3	DC+	Positive	Positive connector for 24VDC out
X5:2	H-	Negative	Heater negative
X5:4	H+	Positive	Heater positive
X5:5	Tx	Tx	Transmitted data
X5:6	Rx	Rx	Received data
X5:7	GND	Ground	Ground

This connector is only in versions with visibility sensor support. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 1.5mm²

5.3.6 Ethernet LAN connector (ETH1)

Two RJ-45 connectors and two optic fiber connectors (only -F versions). One RJ45 connector is on the switch box on the bottom of the LC cabin. This connection has a surge protection against voltage spikes. The other connector is on the COM board. Optic fiber connectors are on the COM board. Connector locations can be seen in the Figure 2.

5.3.7 Additional device grounding point

M8 size bolt (with nut included) for additional grounding.

5.4 LC-230-024 versions

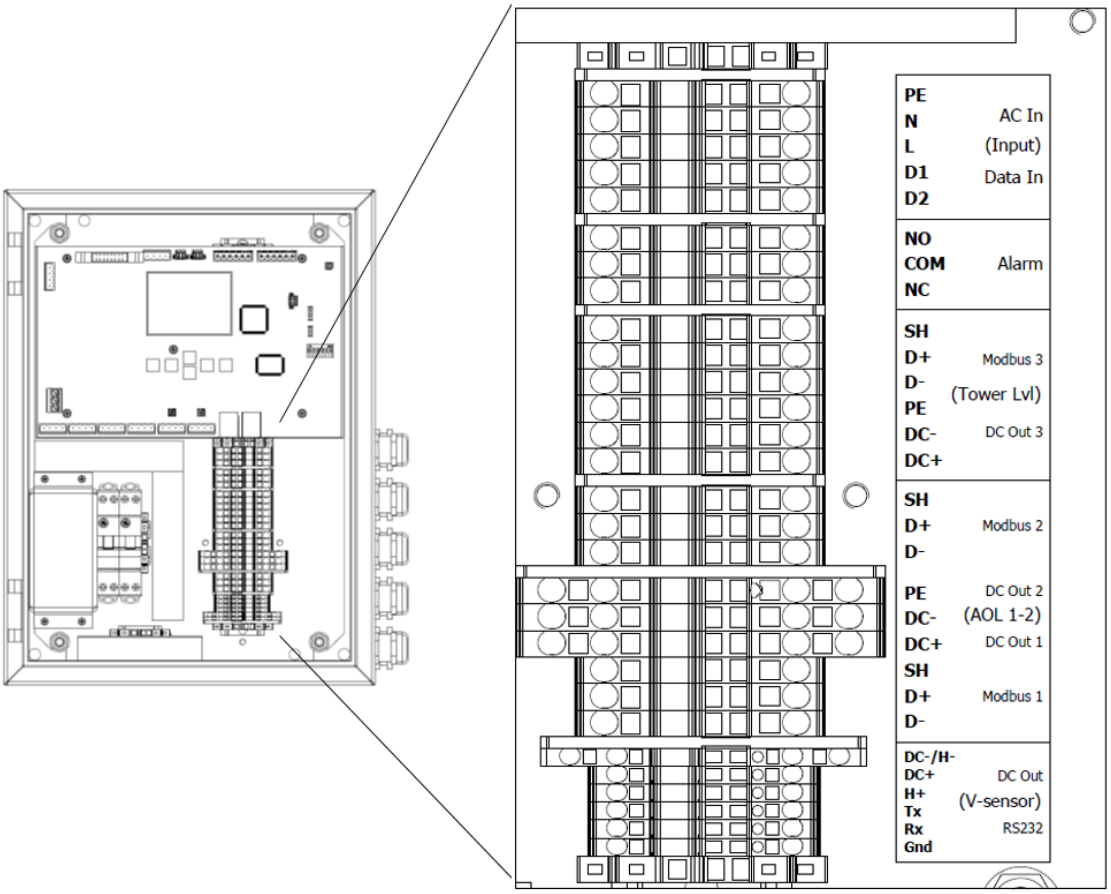


Figure 5: Local Controller connectors

5.4.1 230 VAC In

Mark	Description	Information
PE	Protective earth	PE line is typically indicated with yellow/green colour.
N	Neutral terminal	Colour typically blue
L	Live terminal	Colour typically brown
D1	Data1	UPS Charger control signal 1
D2	Data2	UPS Charger control signal 2

Connector is push in terminal block.

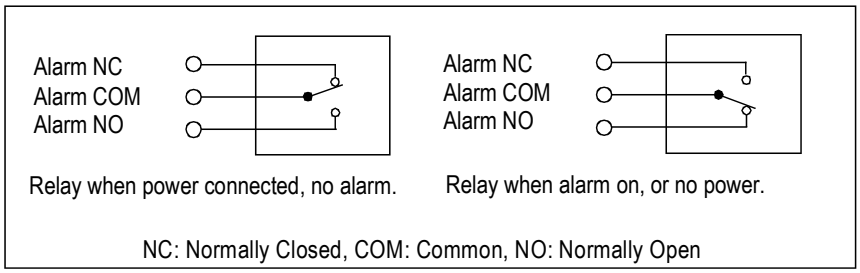
Conductor cross-section 0.14mm² - 2.5mm²

5.4.2 Alarm Relay Output

Mark	Description	Information
NO	Normally Open	In alarm, connected with COM (Common)
COM	Common	Common relay contact
NC	Normally Connected	During normal operations, connected with COM (Common)

Unused alarm relay connectors can be left floating i.e. no wiring there is required. When LC is without power and when it starts (reboots), the relay signals an alarm. Alarm relay state changes during start-up process if there are no pending alarms to be signalled. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²



5.4.3 Tower level (Modbus3)

Mark	Description	Information
SH	Shield	Shield
D+	Data+	RS485 non-inverting pin
D-	Data-	RS485 inverting pin
PE	Protective earth	PE line is typically indicated with yellow/green colour.
DC-	Negative	Negative connector for 24VDC out
DC+	Positive	Positive connector for 24VDC out

Connectors for the tower level lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.4.4 AOL 1-2 (Modbus1, Modbus2 and DC out 1-2)

Mark	Description	Information
SH	Shield	Shield
D+	Data+	RS485 non-inverting pin
D-	Data-	RS485 inverting pin
PE	Protective earth	PE line is typically indicated with yellow/green colour.
DC-	Negative	Negative connector for 24VDC out
DC+	Positive	Positive connector for 24VDC out

Connectors for the two nacelle lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.4.5 V-sensor (RS232 and 24VDC out)

Mark	Description	Information
DC-	Negative	Negative connector for 24VDC out
DC+	Positive	Positive connector for 24VDC out
H-	Negative	Heater negative
H+	Positive	Heater positive
Tx	Tx	Transmitted data
Rx	Rx	Received data
GND	Ground	Ground

This connector is only in versions with visibility sensor support. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 1.5mm²

5.4.6 Ethernet LAN connector

Two RJ-45 connectors and two optic fiber connectors (only -F versions). One RJ45 connector is on the switch box on the bottom of the LC cabin. This connection has a surge protection against voltage spikes. The other connector is on the COM board. Optic fiber connectors are on the COM board. Connector locations can be seen in the Figure 2.

5.5 LC-024 versions

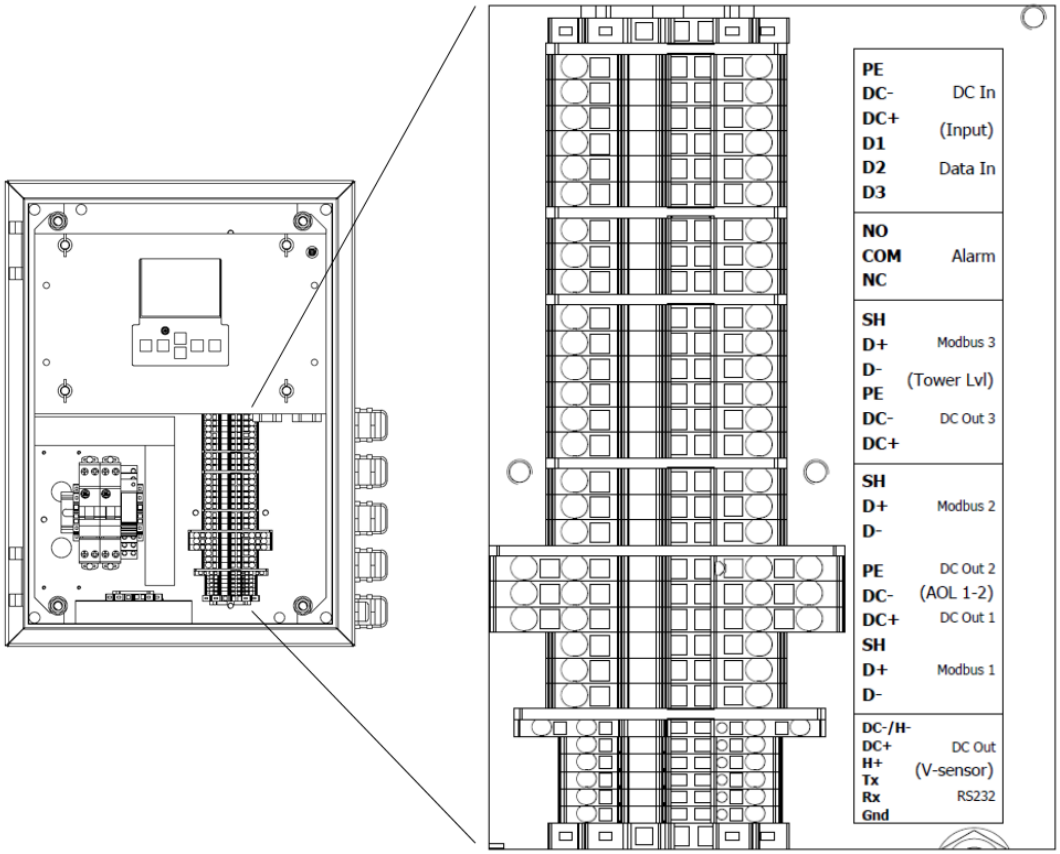


Figure 6: Local Controller connectors

5.5.1 Input (DC In and Data In)

Mark	Description	Information
PE	Protective earth	PE line is typically indicated with yellow/green colour.
DC-	Negative	Negative connector for 24VDC in
DC+	Positive	Positive connector for 24VDC in
D1	Data1	UPS Charger control signal 1
D2	Data2	UPS Charger control signal 2
D3	Data3	UPS Charger control signal 3

Connector is push in terminal block.

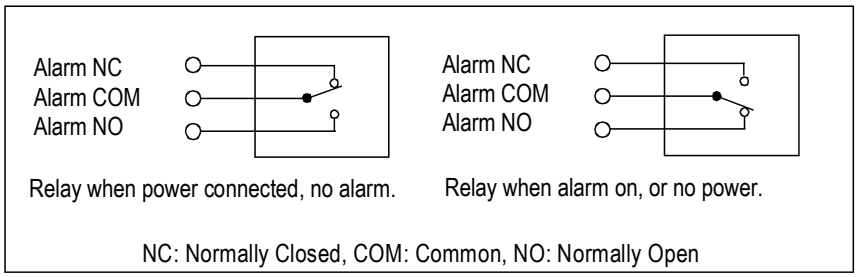
Conductor cross-section 0.14mm² - 2.5mm²

5.5.2 Alarm Relay Output

Mark	Description	Information
NO	Normally Open	In alarm, connected with COM (Common)
COM	Common	Common relay contact
NC	Normally Connected	During normal operations, connected with COM (Common)

Unused alarm relay connectors can be left floating i.e. no wiring there is required. When LC is without power and when it starts (reboots), the relay signals an alarm. Alarm relay state changes during start-up process if there are no pending alarms to be signalled. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²



5.5.3 Tower level (Modbus3 and DC out 3)

Mark	Description	Information
SH	Shield	Shield
D+	Data+	RS485 non-inverting pin
D-	Data-	RS485 inverting pin
PE	Protective earth	PE line is typically indicated with yellow/green colour.
DC-	Negative	Negative connector for 24VDC out
DC+	Positive	Positive connector for 24VDC out

Connectors for the tower level lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.5.4 AOL 1-2 (Modbus1, Modbus2 and DC out 1-2)

Mark	Description	Information
SH	Shield	Shield
D+	Data+	RS485 non-inverting pin
D-	Data-	RS485 inverting pin
PE	Protective earth	PE line is typically indicated with yellow/green colour.
DC-	Negative	Negative connector for 24VDC out
DC+	Positive	Positive connector for 24VDC out

Connectors for the two nacelle lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.5.5 V-sensor (RS232 and 24VDC out)

Mark	Description	Information
DC-	Negative	Negative connector for 24VDC out
DC+	Positive	Positive connector for 24VDC out
H-	Negative	Heater negative
H+	Positive	Heater positive
Tx	Tx	Transmitted data
Rx	Rx	Received data
GND	Ground	Ground

This connector is only in versions with visibility sensor support. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 1.5mm²

5.5.6 Ethernet LAN connector

Two RJ-45 connectors and two optic fiber connectors (only -F versions). One RJ45 connector is on the switch box on the bottom of the LC cabin. This connection has a surge protection against voltage spikes. The other connector is on the COM board. Optic fiber connectors are on the COM board. Connector locations can be seen in the Figure 2.

5.6 LC-230-ER1-S version

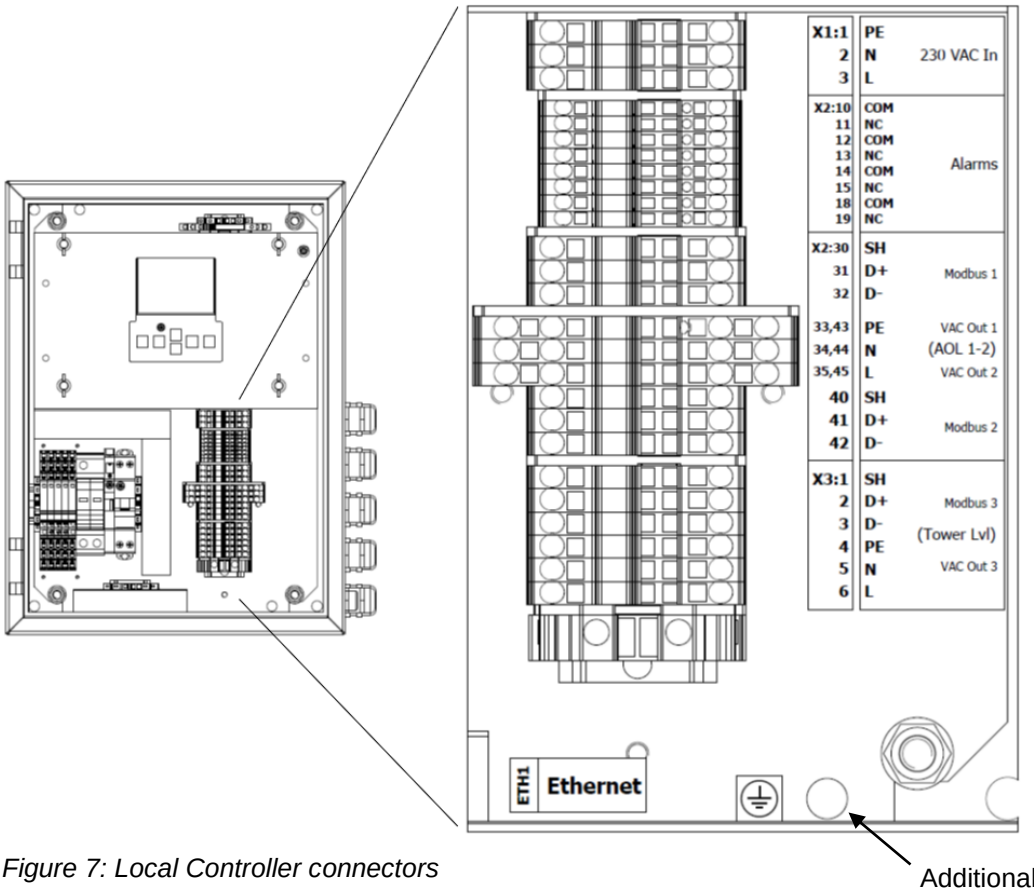


Figure 7: Local Controller connectors

5.6.1 230 VAC In

Number	Mark	Description	Information
X1:1	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X1:2	N	Neutral terminal	Colour typically blue
X1:3	L	Live terminal	Colour typically brown

Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.6.2 Alarms

Number	Mark	Information
X2:10 X2:11	COM NC	X2:10,11: Mains circuit breaker status (circuit closed when breaker is ON)
X2:12 X2:13	COM NC	X2: 12,13: OVP status (normally closed, circuit open when any of OVP devices is broken)
X2:14 X2:15	COM NC	X2:14,15: Alarms (normally closed, circuit open when alarm)
X2:18 X2:19	COM NC	X2: 18,19: Day / night status (closed during night, open during day and twilight)

Connector is push in terminal block.

Conductor cross-section 0.14mm² - 1.5mm²

5.6.3 AOL 1-2 (Modbus1, Modbus2 and VAC out 1-2)

Number	Mark	Description	Information
X2:30	SH	Shield	Shield
X2:31	D+	Data+	RS485 non-inverting pin
X2:32	D-	Data-	RS485 inverting pin
X2:33,43	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X2:34,44	N	Neutral terminal	Colour typically blue
X2:35,45	L	Live terminal	Colour typically brown
X2:40	SH	Shield	Shield
X2:41	D+	Data+	RS485 non-inverting pin
X2:42	D-	Data-	RS485 inverting pin

Connectors for the two nacelle lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.6.4 Tower Lvl (Modbus3 and VAC out 3)

Number	Mark	Description	Information
X3:1	SH	Shield	Shield
X3:2	D+	Data+	RS485 non-inverting pin
X3:3	D-	Data-	RS485 inverting pin
X3:4	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X3:5	N	Neutral terminal	Colour typically blue
X3:6	L	Live terminal	Colour typically brown

Connectors for the tower level lights power and data. Connector is push in terminal block.

Conductor cross-section 0.14mm² - 2.5mm²

5.6.5 Ethernet LAN connector (ETH1)

Two RJ-45 connectors and two optic fiber connectors (only -F versions). One RJ45 connector is on the switch box on the bottom of the LC cabin. This connection has a surge protection against voltage spikes. The other connector is on the COM board. Optic fiber connectors are on the COM board. Connector locations can be seen in the Figure 2.

5.6.6 Additional device ground

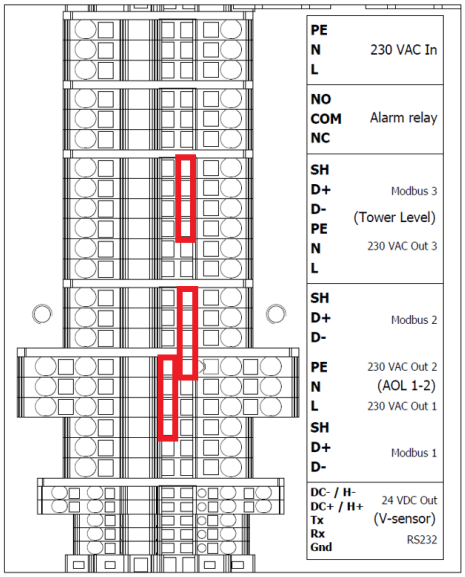
M8 size bolt (with nut included) for additional grounding.

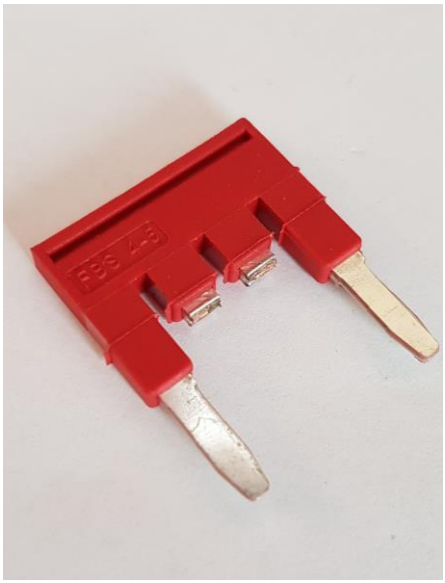
5.7 Light head cable shielding

The outermost shield of the light head cable should be connected to protective earth (PE) from both ends if possible. Normally the cable shield is connected to PE at the cable gland (see chapter 5.2).

In case you are using separate cables for power and Modbus data, the data cable shield (SH) should also be connected to PE. This can be done with the shielding jumper. The shielding jumper will connect the SH to the protective earth (PE). Connection is done only from one end of the cable. If cable shield is connected to the PE from the light head the shielding jumper should not be used.

Connect the shielding jumpers in the following slots.





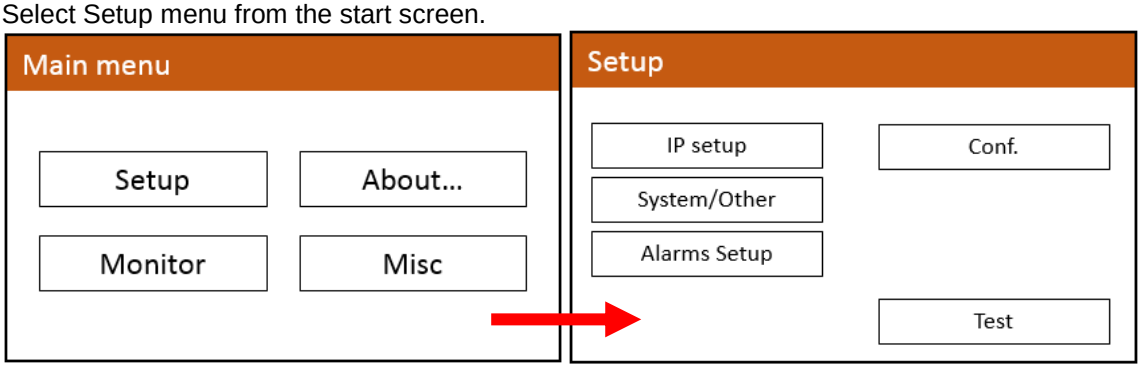
6 CONFIGURATION

This chapter describes the configuration of the LC. The configuration is carried out with COM board's keyboard and display. DIP switches are not used. Arrow buttons on the COM board are used to move in the menus. Enter button selects a menu and back button returns to the previous menu.

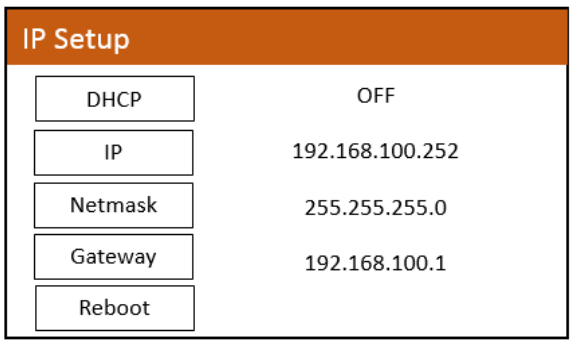
6.1 Quick setup guide

This chapter describes the all necessary steps to setup a Local controller (LC).

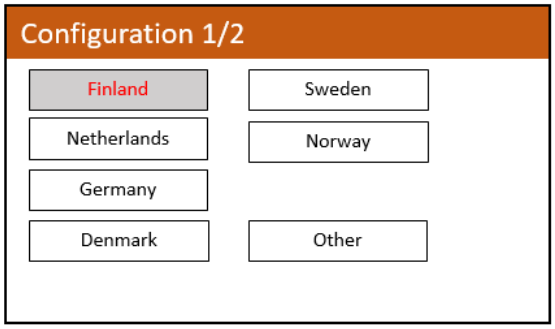
1. Select Setup menu from the start screen.



2. Select IP setup and input the Ethernet settings that you want to use. If you change the DHCP setting you must reset Local Controller by switching off its power. This can be done with the reset button from the same menu.



3. After setting up the IP address, select the Config. menu to configure what sort of lights and control boxes are connected to the LC. You can use a country specific quick setup if one is available for your country. Otherwise select the **Other** menu.



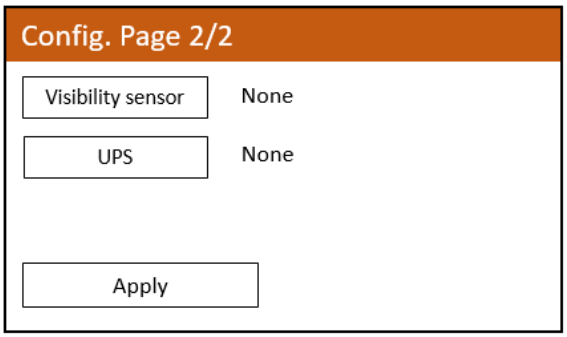
From the country specific quick setup, you can choose the right configuration from few presets. The correct setting depends on the type of light heads and other devices that are connected to your LC.

For example, in the Finland menu you can find the following presets.

Preset name	Nacelle light 1 (Modbus1)	Nacelle light 2 (Modbus2)	Tower lights (Modbus3)
HI1 (1 + 1 + 2)	High intensity light	High intensity light	2 Tower control boxes
LI1 (1 + 1 + 2)	Low intensity light	Low intensity light	2 Tower control boxes

Make sure that correct light heads and control boxes are connected to correct connectors as specified in the wiring chapter. Alarm is raised if there is a problem with the selected setup. Preset will also configure photocell light limits and light flashing rates (FPM).

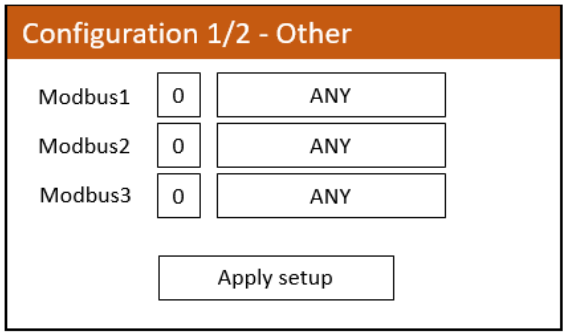
Selecting a preset will open the second page of the Quick Configuration. From the second page, you can select if a visibility sensor or a Obelux UPS is connected to the Local Controller. Select Apply setup to confirm selection.



You can ignore rest of the quick guide. If a ready preset is not available for your application, you need to use the **Other** menu.

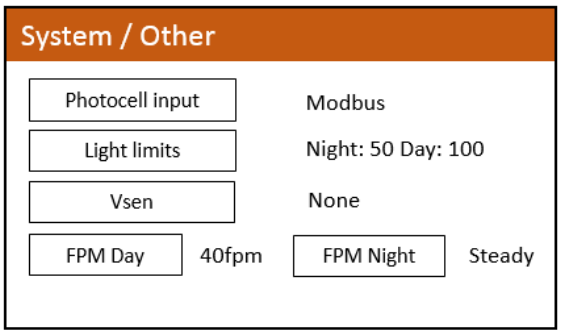
Rest of the presets are explained in more detail in Obelux Configuration Instructions documents.

4. From the **Other** menu, you need to select the number and type of devices for each Modbus connector. Make sure to select the correct device for correct Modbus terminal. Select Apply to confirm selection. Alarm is raised if there is a problem with the selected setup.



From the second page, you can select if a visibility sensor or a Obelux UPS is connected to the Local Controller. Select Apply setup to confirm selection.

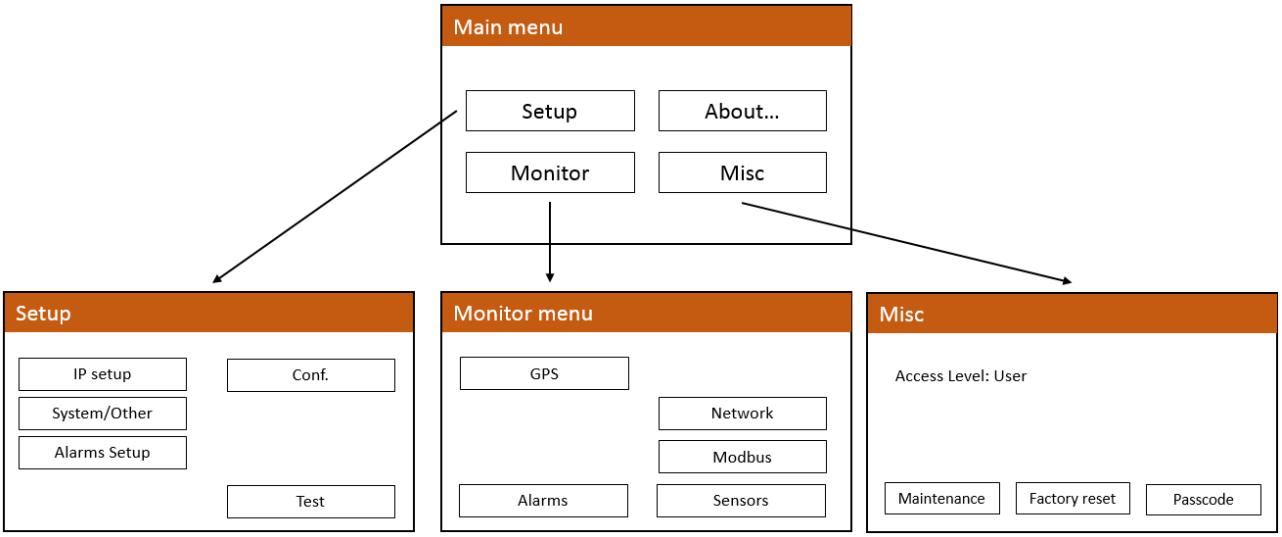
5. From the system menu you can change photocell, visibility sensor and flash rate settings. After this the LC is fully configured and ready to be used.



Photocell input
Photocell input options are the following;
None; No photocell
Modbus; LC is reading data from light head connected in to the Modbus1 connectors.
Local; A dedicated photocell is connected to the Modbus1.
Light limits
Photocell ambient light limits [lux] for night and day can be selected from this menu.
Vsen
Visibility sensor can be enabled and disabled from this menu.
FPM Day / FPM Night
This menu lets you select the flashing rate for the day and night modes.

6.2 Local Controller menus

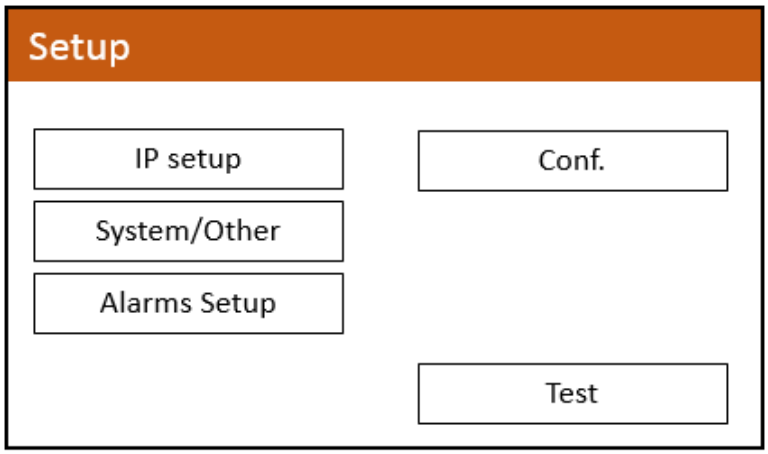
This chapter describes the LC software and menus in more detail.



The LC software is divide in to two main sub-menus. From Setup menu the user can do all system configuration related tasks. In the Monitor sub-menu, the user can monitor the system status including possible faults.

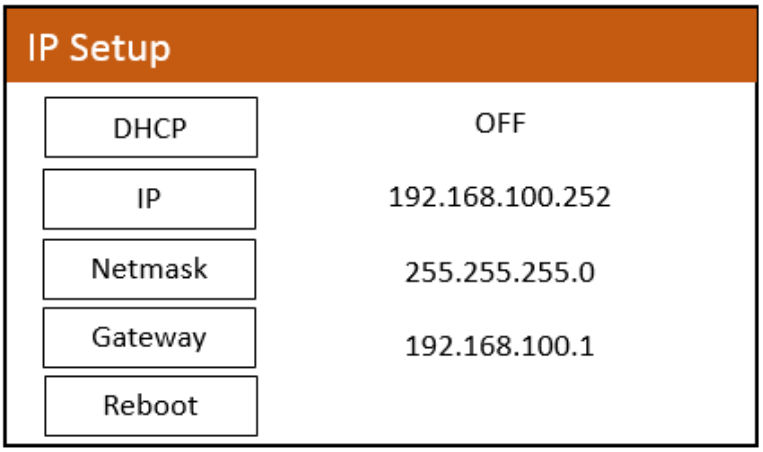
6.3 Setup menu

From the setup menu user can setup IP address, setup slave units, change system settings and enable or disable alarm sources.



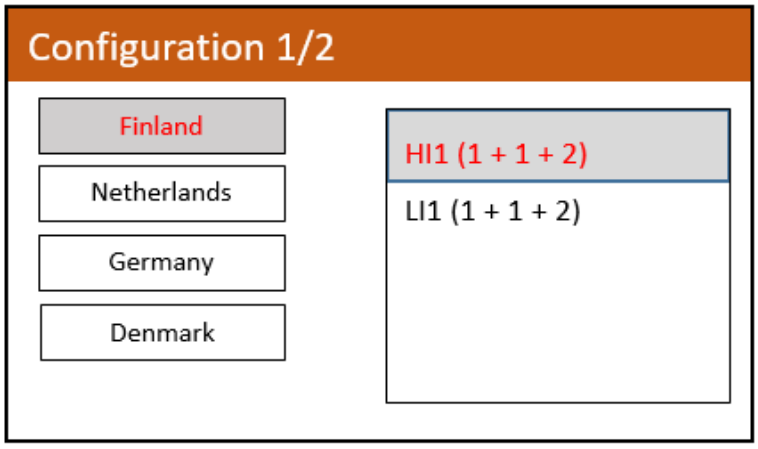
6.3.1 IP Setup

Ethernet settings for the Local Controller are set from IP setup menu. Select Apply to confirm settings. If you change the DHCP setting you must reset Local Controller by switching off its power. This can be done with the reset button from the same menu. The IP address can be checked from the Monitor / Network menu.



6.3.2 Config.

From Config. menu you can configure what sort of lights and control boxes are connected to the LC. You can use a country specific quick setup if one is available for your country. Otherwise you need to use the **Other** menu.



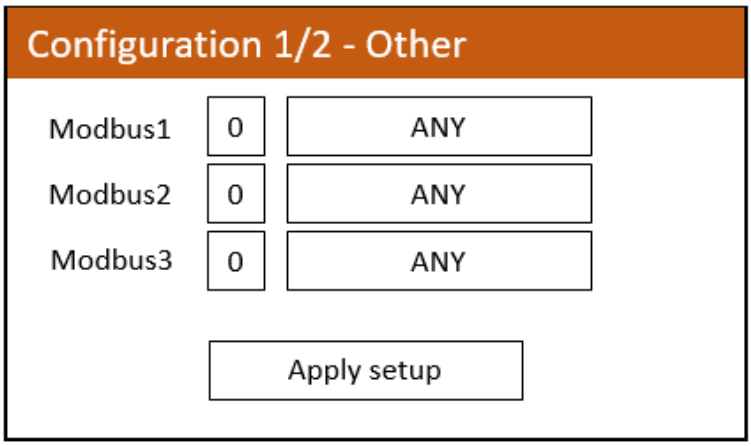
From the country specific quick setup, you can choose the right configuration from few presets. The correct setting depends on the type of light heads and other devices that are connected to your LC.

For example, in the Finland menu you can find the following presets.

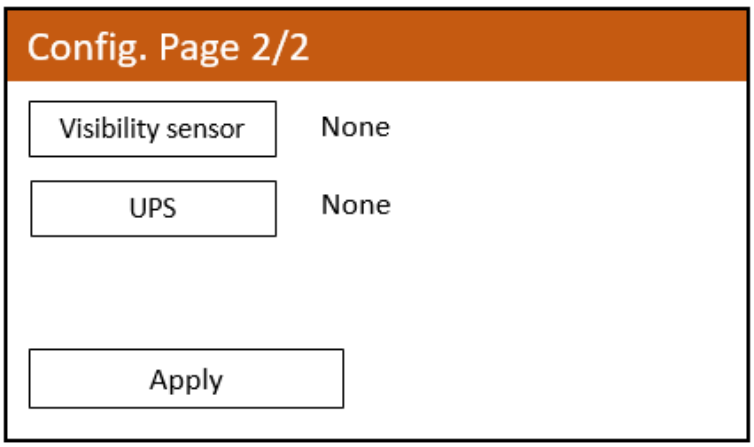
Preset name	Nacelle light 1 (Modbus1)	Nacelle light 2 (Modbus2)	Tower lights (Modbus3)
HI1 (1 + 1 + 2)	High intensity light	High intensity light	2 Tower control boxes
LI1 (1 + 1 + 2)	Low intensity light	Low intensity light	2 Tower control boxes

Make sure that correct light heads and control boxes are connected to correct connectors as specified in the wiring chapter. Alarm is raised if there is a problem with the selected setup. Preset will also configure photocell light limits and light flashing rates (FPM).

From the **Other** menu, you need to select the number and type of devices for each Modbus connector. Make sure to select the correct device for correct Modbus terminal. Select Apply to confirm selection. Alarm is raised if there is a problem with the selected setup.

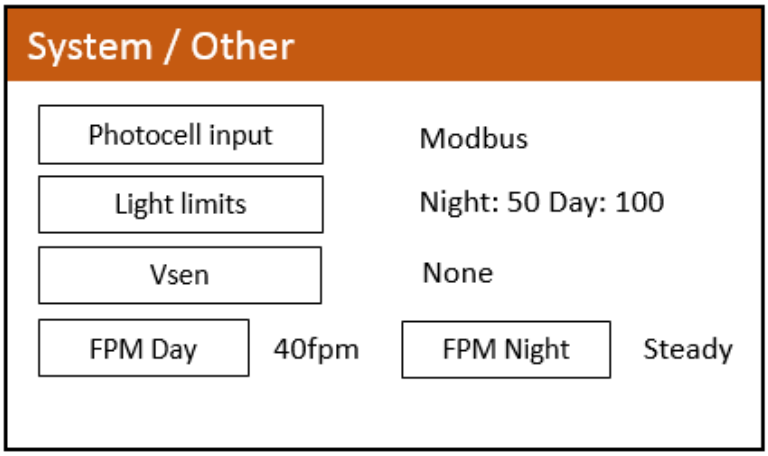


Selecting a preset will open the second page of the Quick Configuration. From the second page, you can select if a visibility sensor or a Obelux UPS is connected to the Local Controller. Select Apply setup to confirm selection.



6.3.3 System / Other

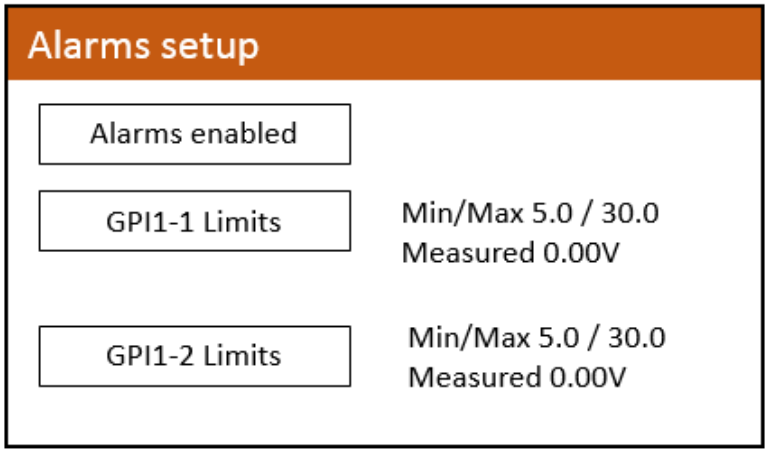
From the system menu you can change photocell, visibility sensor and flash rate settings. After this the LC is fully configured and ready to be used.



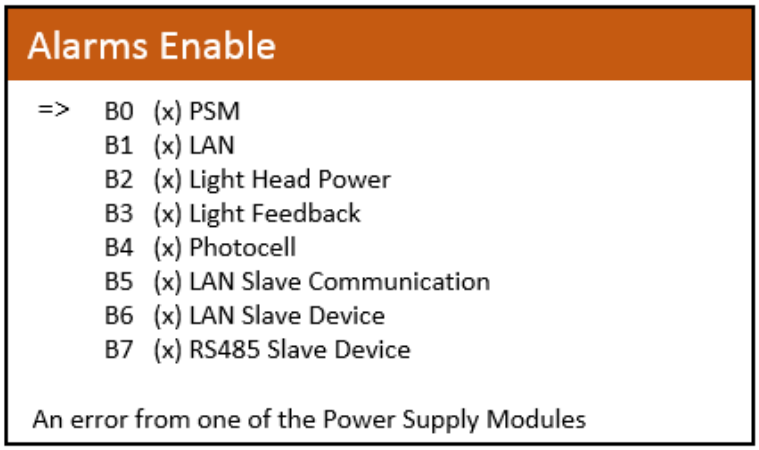
Photocell input
Photocell input options are the following;
None; No photocell
Modbus; LC is reading data from light head connected in to the Modbus1 connectors.
Local; A dedicated photocell is connected to the Modbus1.
Light limits
Photocell ambient light limits [lux] for night and day can be selected from this menu.
FPM Day / FPM Night
This menu lets you select the flashing rate for the day and night modes.

6.3.4 Alarms setup

From the Alarms setup menu, the user can enable or disable certain alarm sources. It is not typically necessary to adjust the alarm settings.



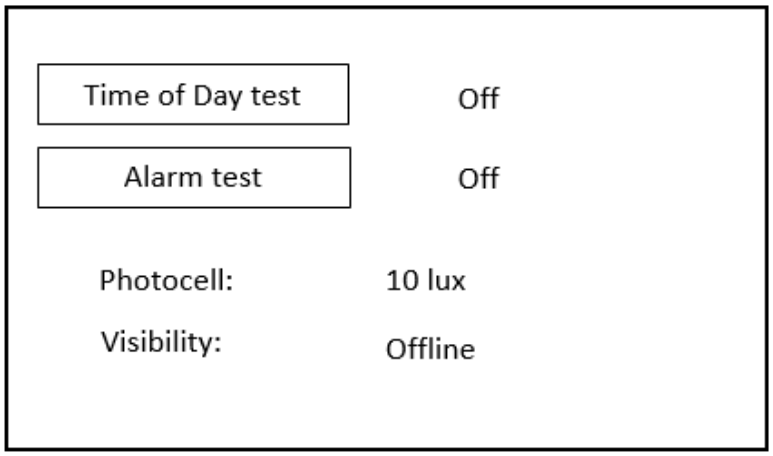
To disable an alarm source, uncheck the (x) mark in front of the alarm with the Enter button. Alarm source is described in more detail in the bottom of the screen.



B0 PSM	An error from one of the Power Supply Modules
B1 LAN	HTTP server or LAN error
B2 Light Head Power	Light head power draw is erroneous
B3 Light Feedback	Light head may not be lit up correctly
B4 Photocell	Photocell is not working properly
B5 LAN Slave Communication	LAN Slave device is not answering calls
B6 LAN Slave Device	LAN Slave device has an error condition
B7 Modbus Device	RS485 Slave device has an error condition
B8 Modbus Communication	RS485 bus communication fault
B9 Lamp Life 80	Light Head is at 80% of specified usage hours
B10 Lamp Life 100	Light Head is at 100% of specified usage hours
B11 GPI1-1	Voltage of GPI is out of range
B12 GPI1-2	Voltage of GPI is out of range
B13 Visibility Sens.	Visibility sensor malfunction
B14 Modem	GSM/GPRS/3G modem malfunction
B15 GPS Fix	No GPS fix for a long time
B16 GPS HW	GPS receiver is silent
B17 Ext I/O	External I/O module is not responding
B18 Reserved	Reserved
B19 Test	Alarm activated from test menu
B20 CPU	CPU hardware has found a fatal error
B21 UDP Time sync	Too many time synch master sources
B22 Master Communication	Device does not receive guidance from a master unit

6.3.5 Test menu

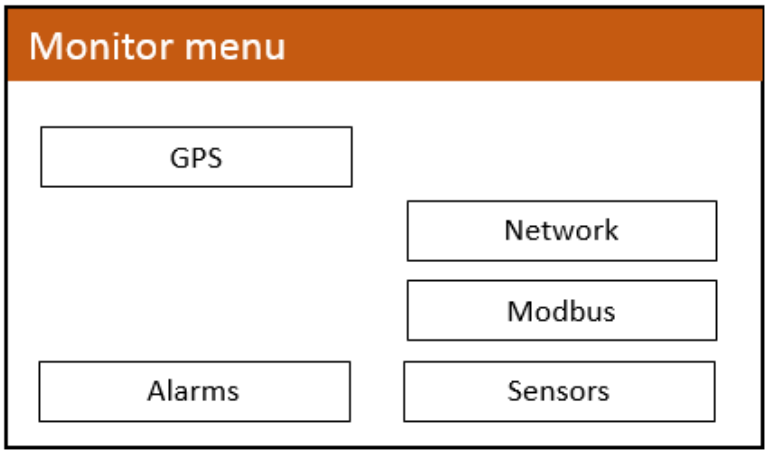
This menu contains several test modes to test system installation and functionality. Active test modes are disabled after 24 hours. In other words, the LC will return to normal operation after 24 hours. The menu also displays data and status of the photocell and visibility sensor.



Time of Day test
In Time of Day test mode, you can set the lights to day, twilight or night intensity.
Alarm test
Alarm test activates alarm relay(s).

6.4 Monitor menu

From monitor menu you can monitor the system status.



6.4.1 GPS

On GPS sub-menu there is a list about GPS information received from GPS satellite. Current date and time (UTC), receiver location in latitude and longitude is shown on the GPS menu. GPS status can be one of the following:

GPS not installed; module is not installed
GPS Error; GPS receiver not responding
GPS No Fix; insufficient signal for GPS fix
GPS OK; GPS module working and has GPS fix

6.4.2 Alarms

Menu displays alarm status. Clear button will clear old alarms (OK* → OK)

OK; No alarm
Warning; Close to alarm limit
Fault; Alarm Active from subsystem
OK*; Subsystem has had an alarm. Alarm condition has since disappeared.

6.4.3 Network

On network status sub-menu there is a list about network settings and status. List shows LC IP address, subnet mask and default gateway.

GC link; Global Controller is connected to this device

Time RX; Device is receiving network time broadcast

6.4.4 Modbus

On Modbus sub-menu there is a list of devices connected to the Modbus connectors and their status information. More information is available by selecting the device from the list.

6.4.5 Sensors

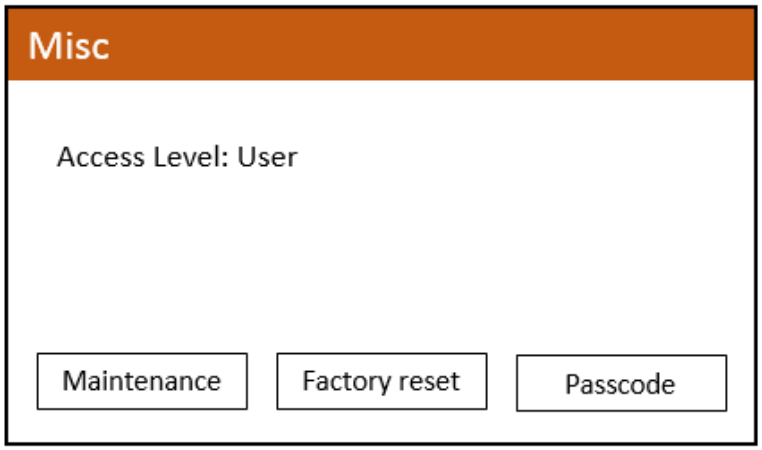
On Sensors sub-menu there is information about the photocell and visibility sensors. The menu also displays the GPIO status information.

6.5 Misc menu

Contents of the *Maintenance* menu is not covered in this manual. Accessing this menu is necessary only in special cases. Obelux can give more information about this menu if needed.

Factory reset button is normally hidden. COM board DIP 7 and DIP 8 need to be switched on in order for the button to appear. DIP switch location can be seen in the Figure 2. *Factory reset* button will reset the LC to its factory settings.

All LC functionality is not available for the normal user. Entering a valid passcode will give access to these settings.



6.6 About menu

About menu shows different information about Local Controller SW version and copyright.

7 OPERATION

Obelux Local Controller (LC) is used for controlling and monitoring a large number of Obelux aviation lights and light controllers. It can also be used to connect visibility sensors into system. In typical installation in wind turbine environment, one Local Controller is installed in each nacelle to control aviation obstruction lights. LC communicates with the aviation lights and tower control boxes with RS485 (Modbus) bus. Visibility sensor is connected to the LC with RS232 bus. There are typically several Local Controllers in a system.

The Obelux Global Controller communicates with Local Controllers over an Ethernet connection. Global Controller reads visibility sensor and photocell data from the Local Controllers. Based on this data it can adjust the time of day mode of the system and adjust the brightness of the lights. Secondly, the Global Controller can keep a journal i.e. record of system events on the site, providing the log files.

If there is no Global Controller connected to the system Local Controllers will operate independently.

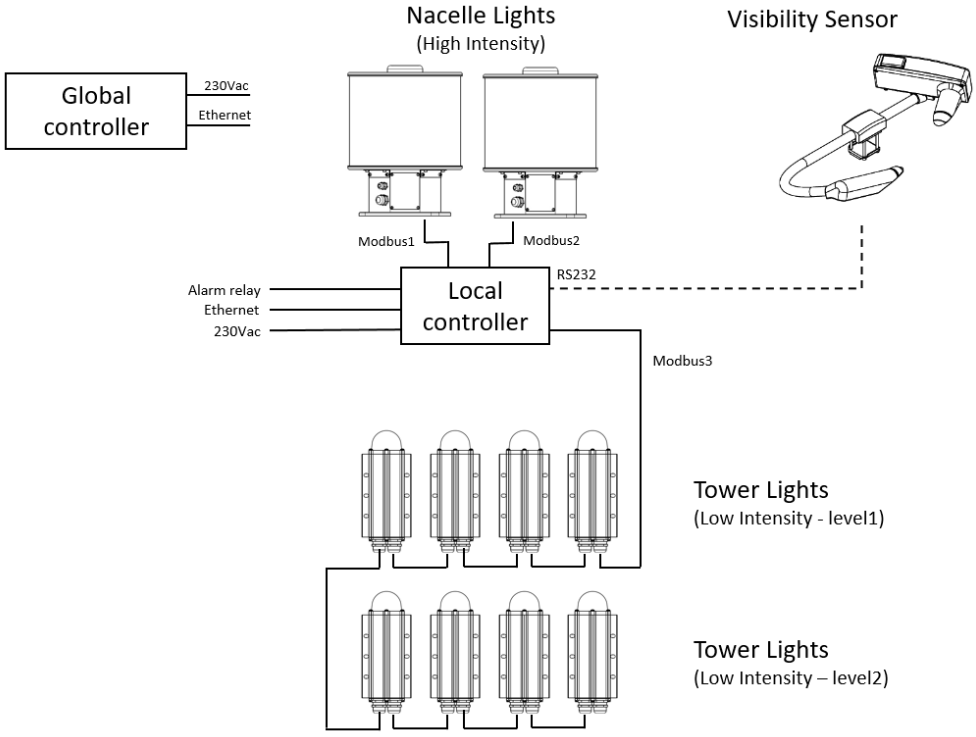


Figure 8: Typical use case for Local Controller in wind turbine environment

7.1 Start-up

The LC software makes series of start-up initializations when system is powered on. All status LED indicators are set on and off during start-up process. Start-up takes few seconds.

7.2 Time synchronization

Nacelle lights connected to the Local Controller have their own GPS module. Light heads synchronize their clocks to GPS time (UTC). Because of this all light heads flash simultaneously all over the world. The timing difference from one system to another is less than ±2 millisecond.

7.3 Time of day synchronization and photocell

The LC reads the integrated photocell of the aviation light connected to the Modbus1 connectors. Photocell measures the ambient light in lux. Global controller (GC) reads the photocell value from the Local Controller. Depending on the ambient light level the GC changes all the system lights between day, twilight and night modes. If there is no GC used in the system, each Local Controller will operate independently. They change their time of day mode based in the photocell information they receive from the aviation light in the Modbus1 connector of each LC.

Time of day information is sent with 10 seconds interval. Different thresholds for day, twilight and night modes can be set from the Setup/System menu.

7.4 Visibility sensor

Depending on the site configuration, a visibility sensor can be connected to the system via Local Controller**.** Based on the visibility data the Global Controller will adjust the brightness of lights in the system. Brightness of the lights will be changed between 10%, 30% and 100% of the maximum brightness.

7.5 UPS

Some of the Local Controller versions support the reading of Obelux UPS status signals. By configuring the UPS to the Local Controller, the LC can read UPS status information with some basic GPIO signals. Available status signals vary between different UPS models. GPIO status information can be read from Monitor/Sensors menu.

7.6 Status collection and reporting

The LC unit collects light head statuses and reports possible errors via alarm relay output or Web API. GUI can be used to see more detail; which light head or controller is causing the alarm and why. Same information is also available from the Global Controller. Status collection is done with 60 seconds interval via Ethernet.

B0 PSM	An error from one of the Power Supply Modules
B1 LAN	HTTP server or LAN error
B2 Light Head Power	Light head power draw is erroneous
B3 Light Feedback	Light head may not be lit up correctly
B4 Photocell	Photocell is not working properly
B5 LAN Slave Communication	LAN Slave device is not answering calls
B6 LAN Slave Device	LAN Slave device has an error condition
B7 Modbus Slave Device	RS485 Slave device has an error condition
B8 Modbus Communication	RS485 bus communication fault
B9 LH Life 80	Light Head is at 80% of specified usage hours
B10 LH Life 100	Light Head is at 100% of specified usage hours
B11 GPI1-1	Voltage of GPI is out pf range
B12 GPI1-2	Voltage of GPI is out of range
B13 Visibility Sens.	Visibility sensor malfunction
B14 Modem	GSM/GPRS/3G modem malfunction

7.7 Status LEDs

This chapter describes the behavior of the on-board status LED indicators during normal and alarm situation.

SYNC

This LED will flash in sync with light heads.

COM (Green)

This LED indicates data communication status between Local Controller and aviation light. If there is an error in communication, LED will be set on along with the ALARM LED.

GPS (Green)

This LED indicates GPS operation status. In normal operation this LED is off if GPS is disabled. If GPS is enabled and the signal is detected, LED is set on. It may take few minutes to detect GPS signal. If GPS signal is lost or valid UTC time is not received, LED will be switched off.

PHOTOCELL (Green)

This LED indicates that photocell is connected and working

ALARM (Red)

Alarm led is used when there is an active alarm

TEST MODE, ERROR, 1, 2

Not used