Local Controller

for Obelux Aviation Lights

User's Manual

Version 1.4

30.01.2025

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1 CHANGE LOG

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0.1	07.05.2016	Document created.	AHa
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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
1.3	18.11.2022	Various cosmetic changes throughout the whole document. Added sections 4.2, 8 and 9. Updated sections 4, 4.1, 5.4, 5.6, 6, 7.5, 7.6 and 7.7. Removed LC-230-ER1-S from manual.	INi
1.31	22.12.2022	Added SW version for manual contents to section 2. Updated section 6.4.1.	INi
1.4	30.01.2025	Updated various pictures. Updated "Mechanical Characteristics" section. Updated sections 2, 5.3, 5.4, 5.5, 6.3.4 and 6.3.5.	INi

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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.

Table 1. Acronyms and Abbreviations

COM	Controller Module of the Local Controller (LC)
CB	Circuit Breaker
GC	Global Controller
GPS	Global Positioning System
GUI	Graphical User Interface
LC	Local Controller
LHC	Light Head Controller
OVP	Overvoltage Protection
SW	Software
UPS	Uninterruptible Power Supply

Contents of this manual regarding the menu layouts and functionality have been created with software (SW) version **1.3.68**. Differences may be possible for later SW versions.

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3 SAFETY INSTRUCTIONS

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

3.1 General considerations

Install device observing manufacturer's installation guide.

Use only cables and connectors specified by the manufacturer.

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 manufacturer.

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.

3.2 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 priority, the prevention of WEEE and, in addition, by the re-use, recycling and other forms of recovery of such wastes 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.

3.3 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.

4 ABOUT THIS PRODUCT

Obelux Local Controller (LC) is used for controlling and monitoring many 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.

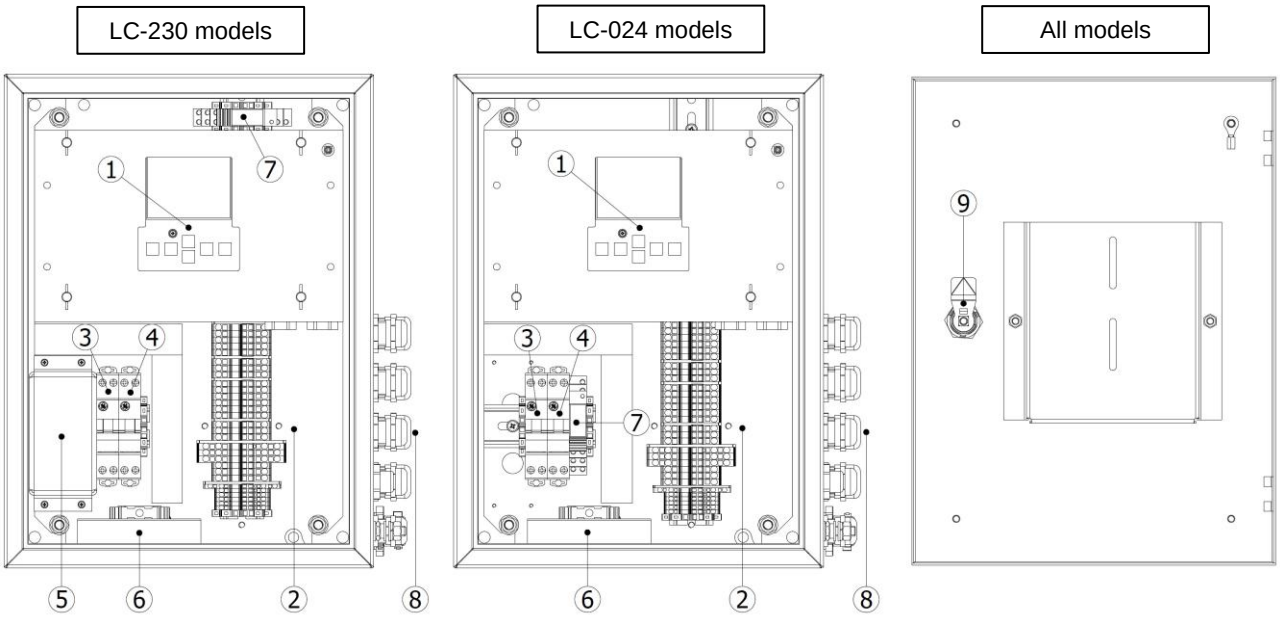

Figure 1: Main functional parts of the Local Controller

1. Controller module (COM)
2. Terminal block connectors
3. Main circuit breaker
4. Visibility sensor circuit breaker (only in -V models)
5. Overvoltage protectors
6. Ethernet Surge protection (only in -E models)
7. Visibility sensor heater relay (only in -U models)
8. Cable glands
9. Lock

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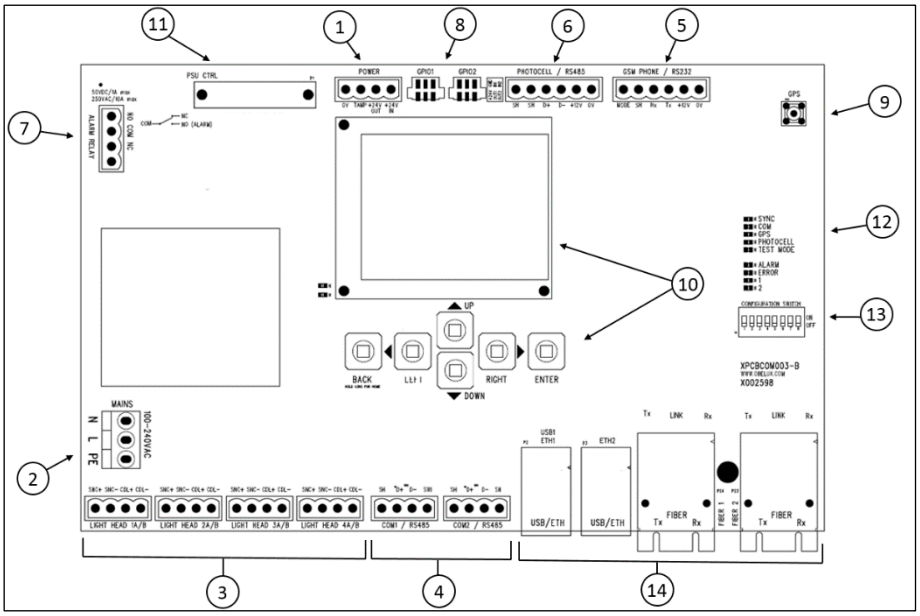

Figure 2: Controller module

1. Power out
2. Main power feed
3. LHC Output connectors (sectors)
4. RS-485 communication connectors
5. External GSM modem connector (RS-232)
6. External photocell connector (RS-485)
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 Fiber)

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.

Mechanical Characteristics	Electrical Characteristics
• **Enclosure:** Painted Steel (RAL7035), IP65 • **Dimensions (W x H x D):** 300 x 400 x 200 mm • **Weight:** < 12 kg • **Cable glands:** 5 x M20 (Ø6-13 mm cable) EMC 4 x M25 (Ø11-17 mm cable) EMC 1 x M25 split (Ø6-9 mm cable) for Ethernet	• **Input voltage:** 230 V_{AC} or 24 V_{DC} • **Output voltage:** 230 V_{AC} or 24 V_{DC} • **Power consumption:** < 10 W • **Serial ports:** 3 x RS-485 (Modbus), 1 x RS-232 • **Ethernet connection:** RJ45 or Optic Fibre (Multimode) • **Alarm relay:** NO/NC dry contact, max 230 V_{AC} / 3A • **Operating temperature:** -40 … +55 °C • **Overvoltage protection:** Raycap Strikesorb 30-B-M (230 V_{AC} models)

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4.1 Versions

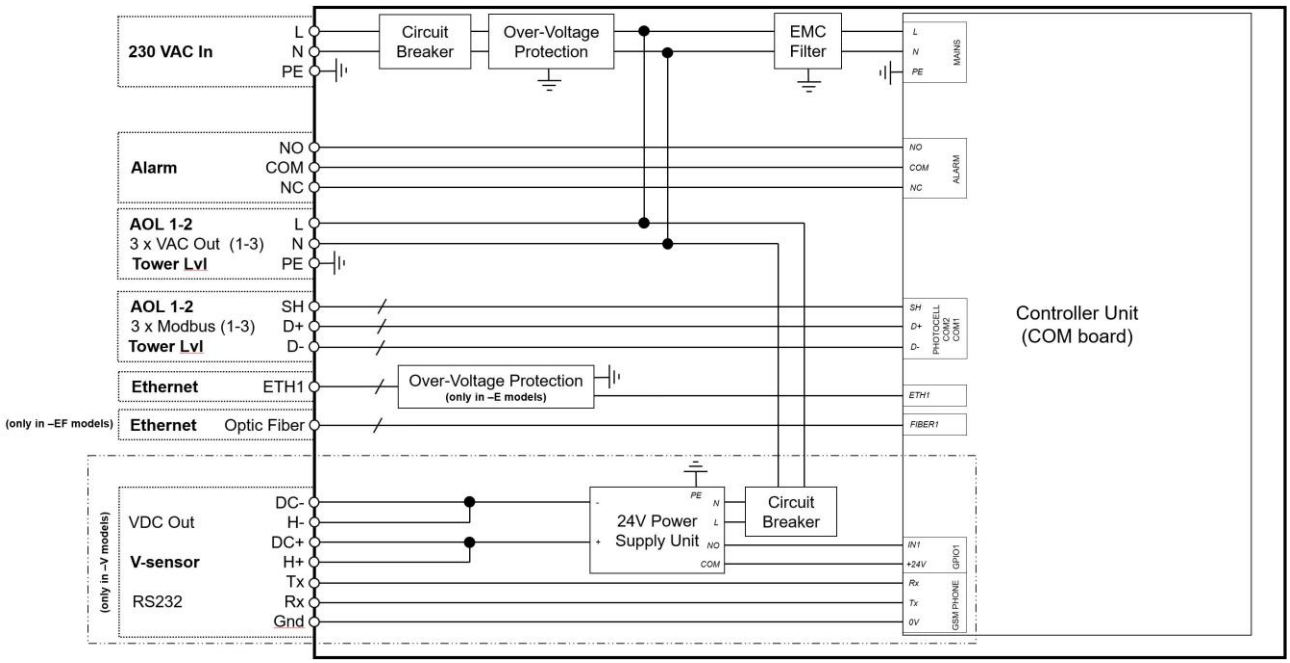
The Local Controller is available as the following models:

Order code:	Input voltage:	Output voltage:	Visibility sensor support:	Visibility sensor heater relay:	Ethernet connection OVP (RJ45):	Ethernet connection (Optic fibre):	Packing details:
LC-230-E-S	230 V_{AC}	230 V_{AC}	No	No	Yes	No	1
LC-230-EF-S	230 V_{AC}	230 V_{AC}	No	No	No	Yes	1
LC-230-VE-S	230 V_{AC}	230 V_{AC}	Yes	No	Yes	No	2
LC-230-VEF-S	230 V_{AC}	230 V_{AC}	Yes	No	No	Yes	2
LC-230-24-VUE-S	230 V_{AC}	24 V_{DC}	Yes	Yes	Yes	No	2
LC-024-VE-S	24 V_{DC}	24 V_{DC}	Yes	No	Yes	No	1
LC-024-VUE-S	24 V_{DC}	24 V_{DC}	Yes	Yes	Yes	No	1

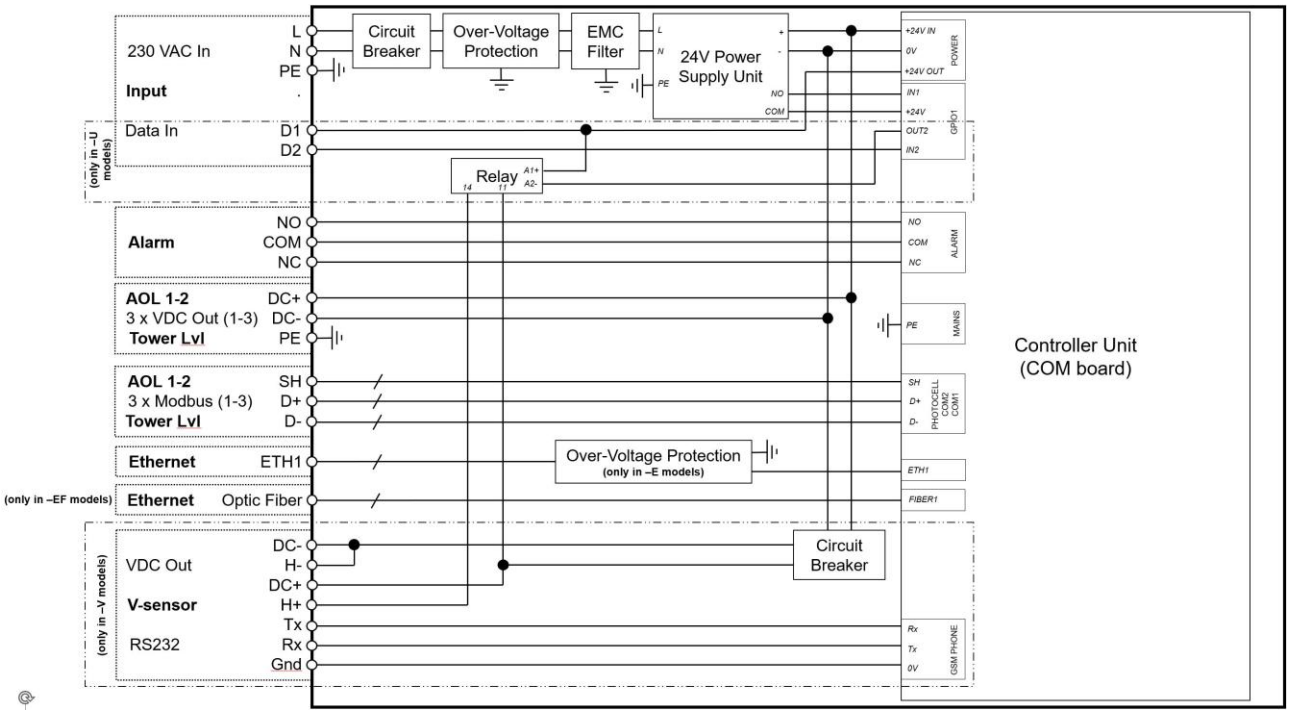
Packing details: 1) 480 x 390 x 300 mm, 12 kg
2) 480 x 390 x 300 mm, 13,2 kg

4.2 Block diagram

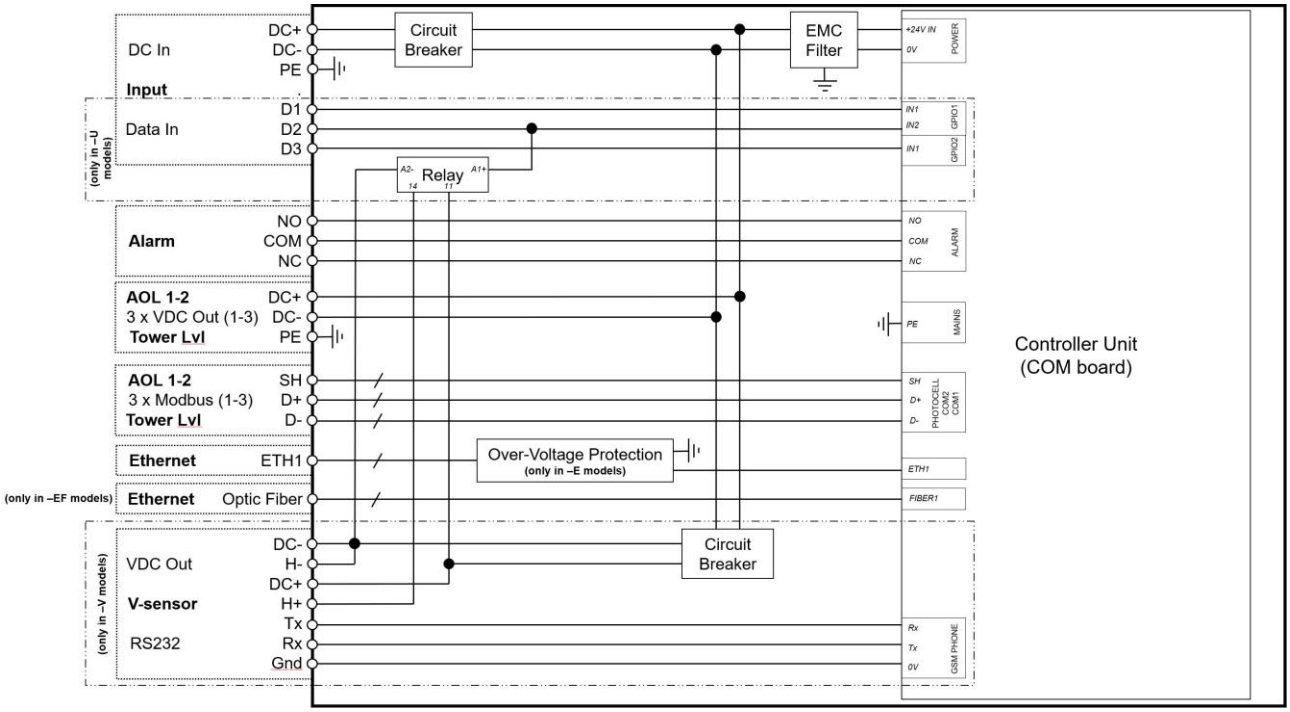
4.2.1 LC-230-xxx versions



4.2.2 LC-230-24-xxx versions



4.2.3 LC-024-xxx versions



5 INSTALLATION

The cabinet can be installed using the holes on the backside or by using the mounting legs in horizontal or vertical position.

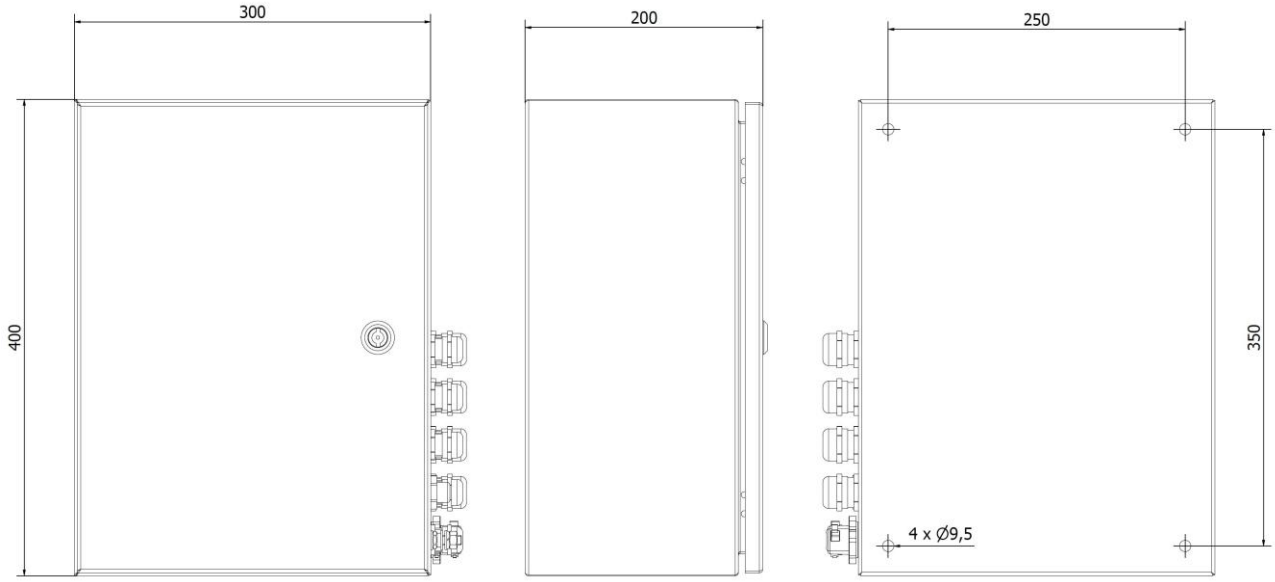


Figure 3. Dimensions and mounting points

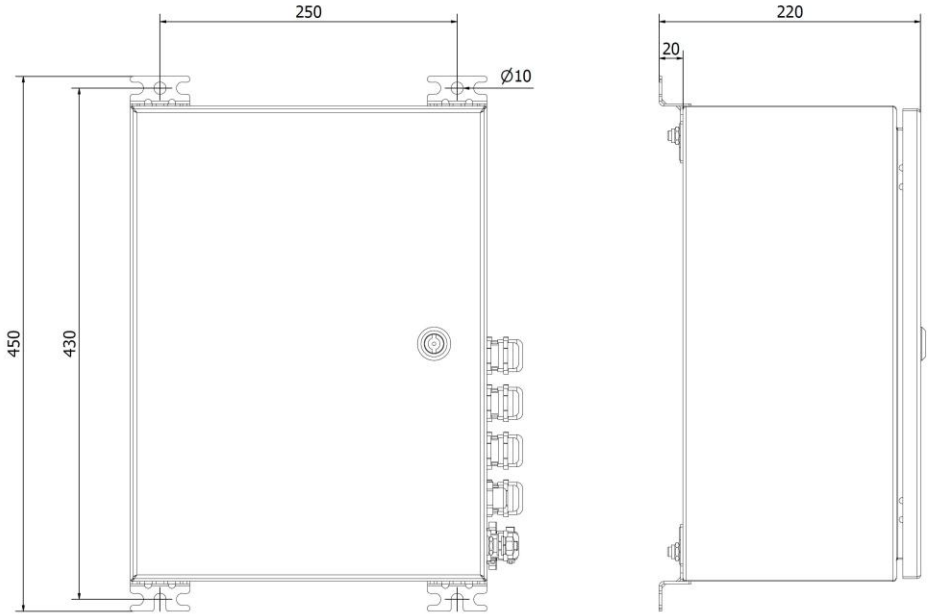


Figure 4. Dimension and mounting points with vertical mounting legs

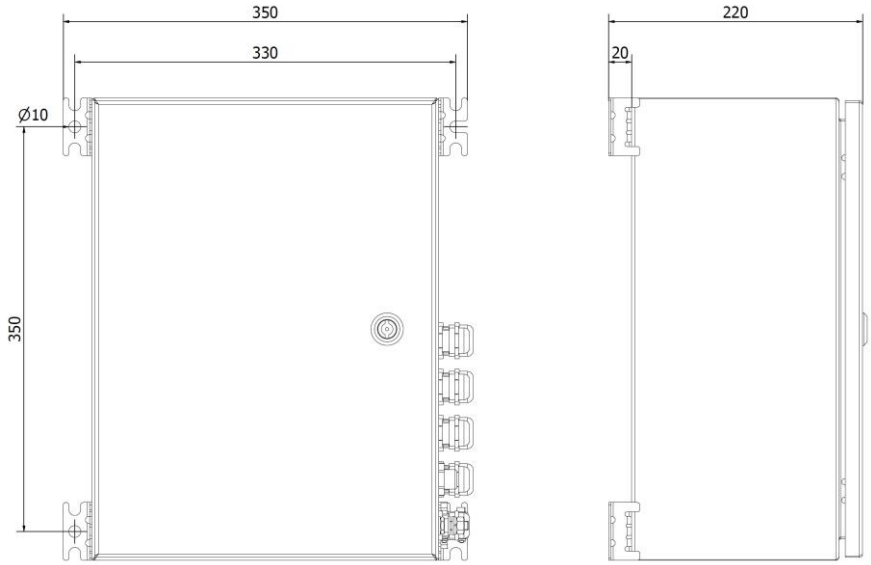


Figure 5. Dimensions and mounting points with horizontal mounting legs

5.1 Device installation

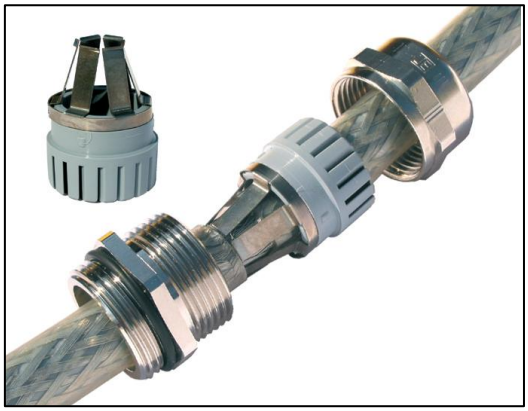
Please check that ALL the circuit breakers are in the OFF position before doing any of the following installation work.

1. Mount the device to the selected mounting point using quality made fasteners. It is highly recommended to mount the cabinet before installing any cables.

Note: When the cabin door is open, check that there is no inflow of water (incl. hail and snow) into the cabinet!

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. 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

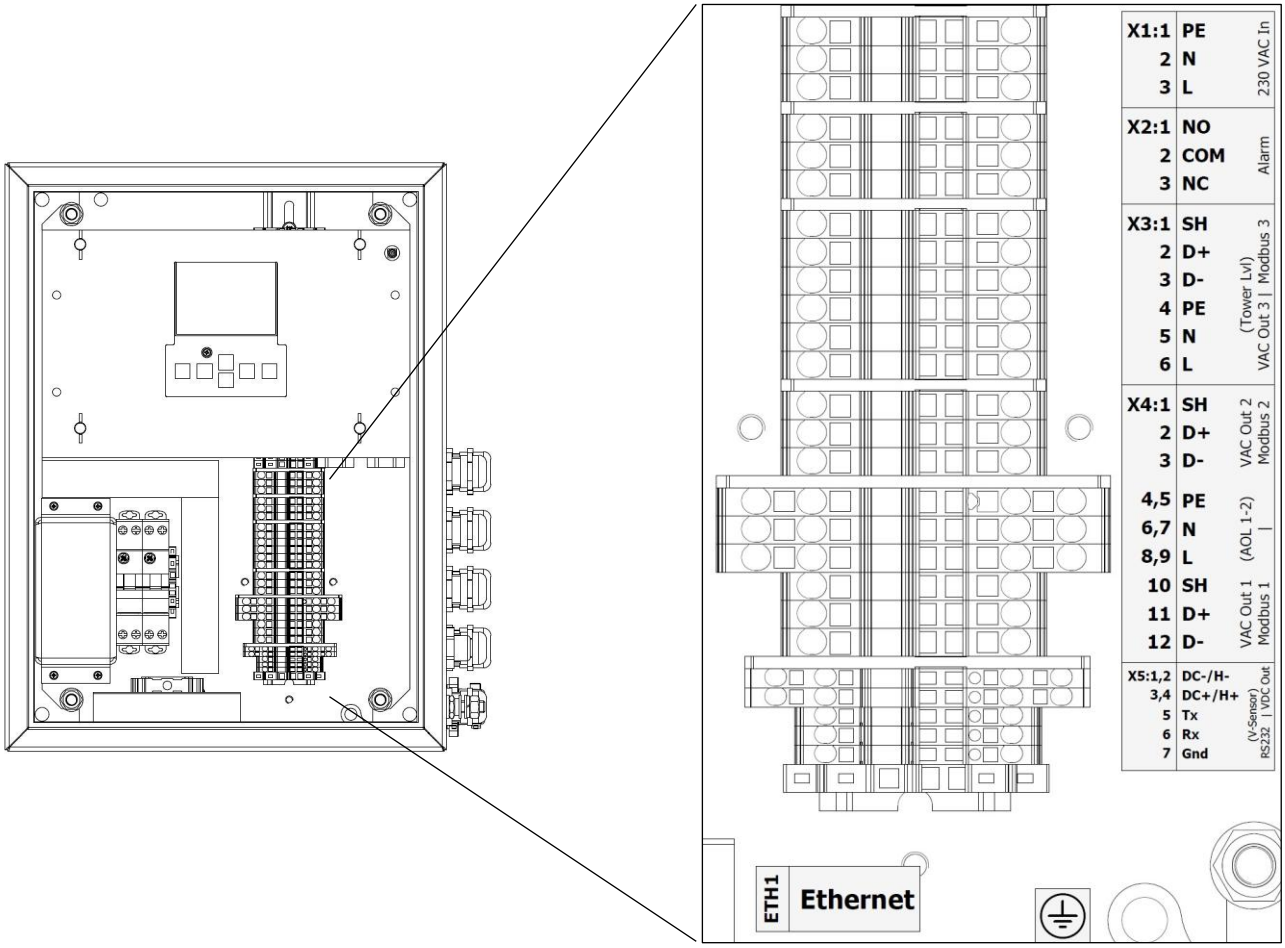


Figure 6: Local Controller connectors

5.3.1 230 VAC In

Connectors for input voltage.

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: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.3.2 Alarm

Connectors for system alarm relay.

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

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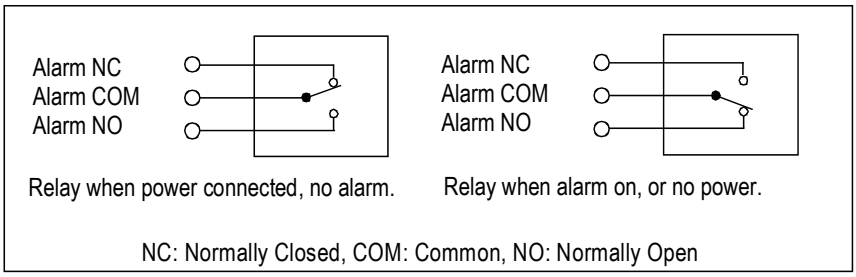
Unused alarm relay connectors can be left floating i.e., no wiring there is required. The relay is in the alarm state when the LC is without power and during start (reboot). The alarm relay will change state to normal during the start-up process if no faults have been found.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)



5.3.3 Tower Lvl (VAC Out 3 and Modbus 3)

Connectors for the tower level lights power and data.

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.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.3.4 AOL 1-2 (VAC Out 1-2 and Modbus 1-2)

Connectors for the two nacelle lights power and data.

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.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

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5.3.5 V-sensor (VDC Out and RS232)

This connector is only in versions with visibility sensor support.

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

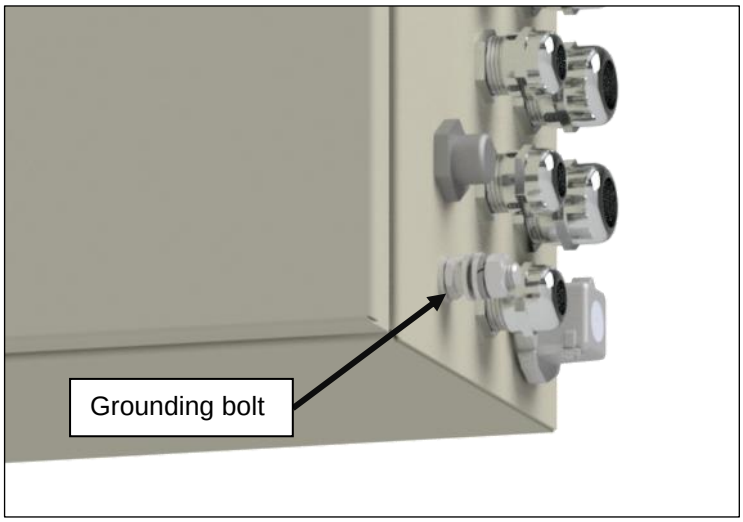
Connector is push in terminal block.
Conductor cross-section: 0,14 – 1,5 mm² (solid wire max. 2,5 mm²)

5.3.6 Ethernet LAN connector (ETH1)

Two RJ-45 connectors and two optic fiber connectors (only -EF 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 Device grounding point

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



5.4 LC-230-24 versions

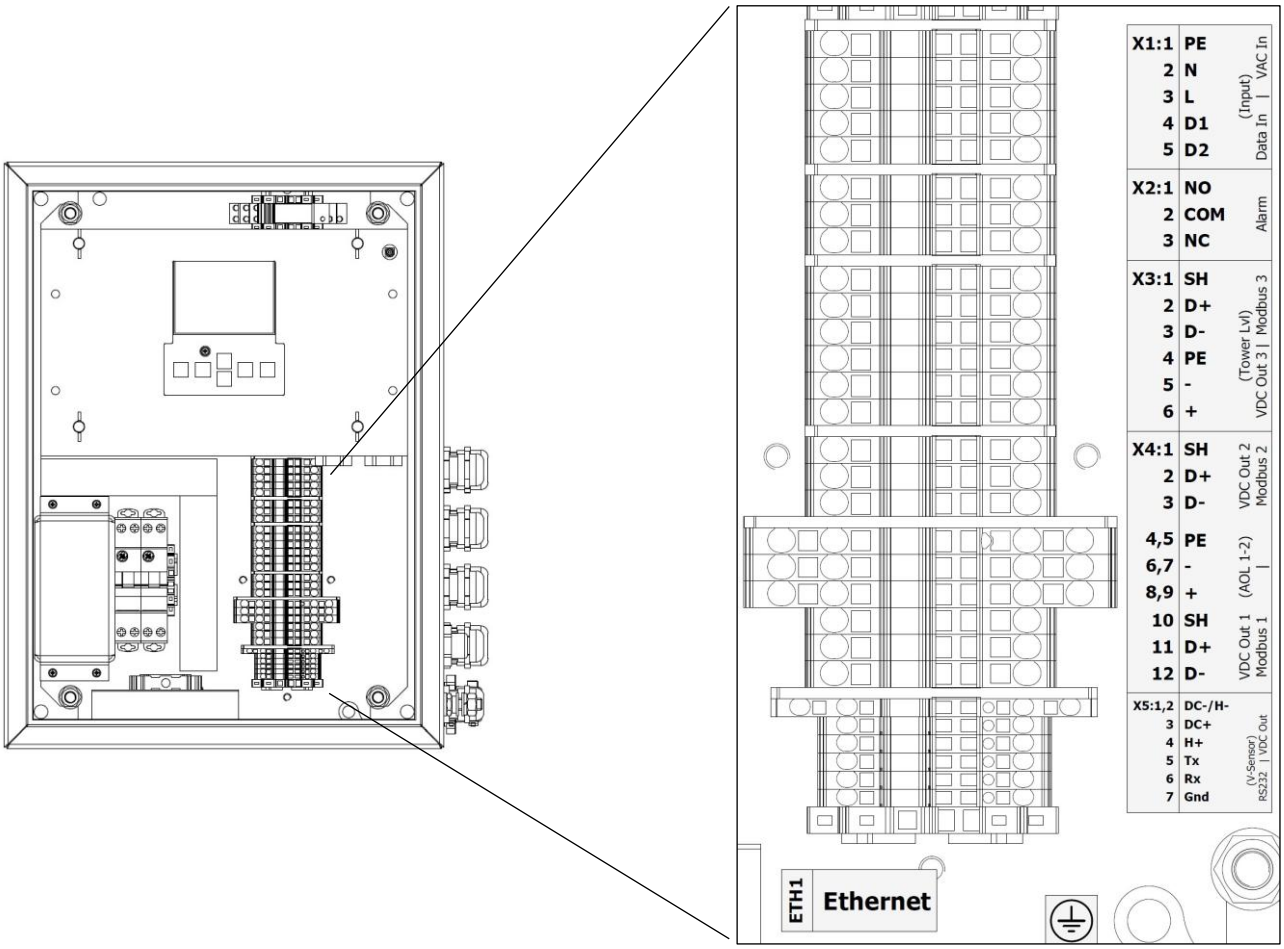


Figure 7: Local Controller connectors

5.4.1 Input (VAC In and Data In)

Connectors for input voltage and UPS status signal (only in versions with UPS support).

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.
X1:4	D1	Data1	UPS charger status signal 1
X1:5	D2	Data2	UPS charger status signal 2

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

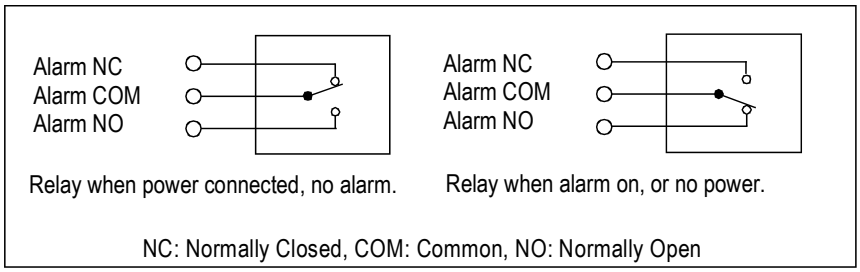
5.4.2 Alarm

Connectors for system alarm relay.

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

Unused alarm relay connectors can be left floating i.e., no wiring there is required. The relay is in the alarm state when the LC is without power and during start (reboot). The alarm relay will change state to normal during the start-up process if no faults have been found.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)



5.4.3 Tower Lvl (VDC Out 3 and Modbus 3)

Connectors for the tower level lights power and data.

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	-	Negative	Negative connector for 24VDC out.
X3:6	+	Positive	Positive connector for 24VDC out.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.4.4 AOL 1-2 (VDC Out 1-2 and Modbus 1-2)

Connectors for the two nacelle lights power and data.

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	-	Negative	Negative connector for 24VDC out.
X4:8,9	+	Positive	Positive connector for 24VDC out.
X4:10	SH	Shield	Shield.
X4:11	D+	Data+	RS485 non-inverting pin.
X4:12	D-	Data-	RS485 inverting pin.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

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5.4.5 V-sensor (VDC Out and RS232)

This connector is only in versions with visibility sensor support.

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

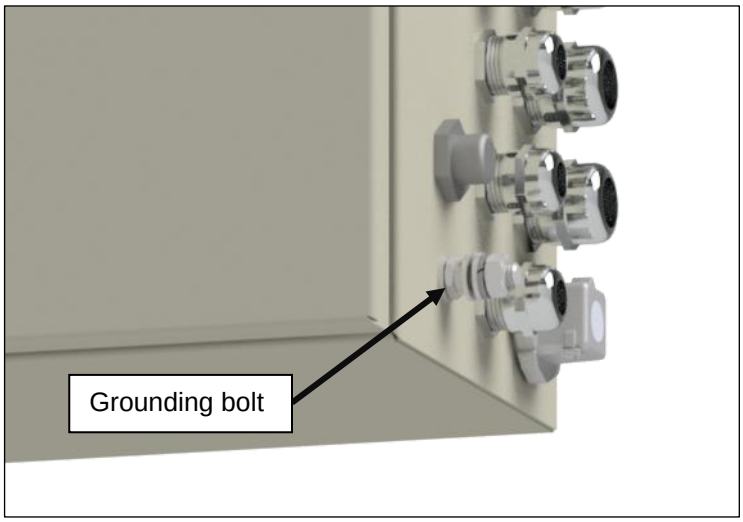
Connector is push in terminal block.
Conductor cross-section: 0,14 – 1,5 mm² (solid wire max. 2,5 mm²)

5.4.6 Ethernet LAN connector

Two RJ-45 connectors and two optic fiber connectors (only -EF 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.

5.4.7 Device grounding point

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



5.5 LC-024 versions

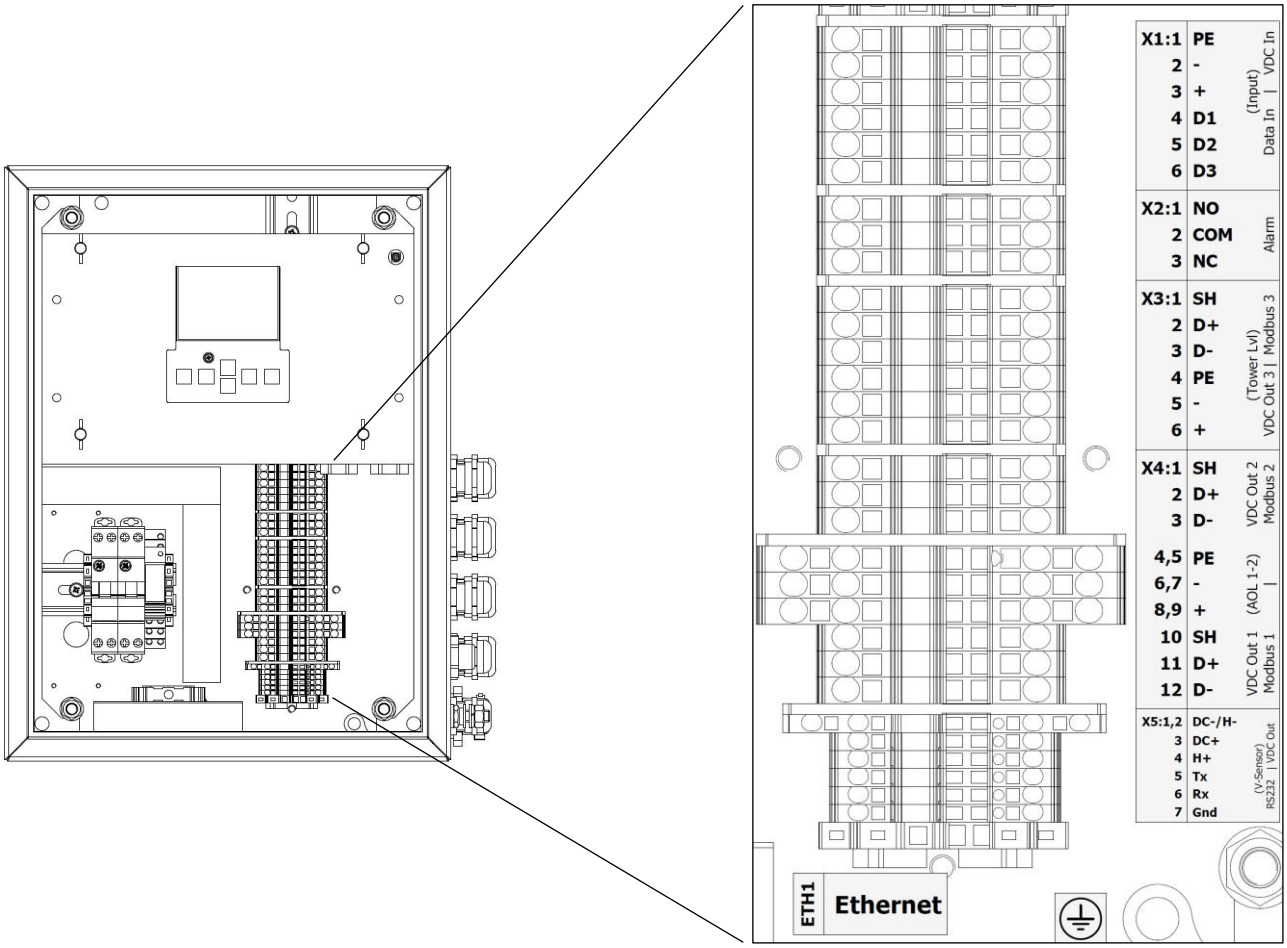


Figure 8: Local Controller connectors

5.5.1 Input (VDC In and Data In)

Connectors for input voltage and UPS status signal (only in versions with UPS support).

Number	Mark	Description	Information
X1:1	PE	Protective earth	PE line is typically indicated with yellow/green colour.
X1:2	-	Negative	Negative connector for 24VDC in.
X1:3	+	Positive	Positive connector for 24VDC in.
X1:4	D1	Data1	UPS charger status signal 1
X1:5	D2	Data2	UPS charger status signal 2
X1:6	D3	Data3	UPS charger status signal 3

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

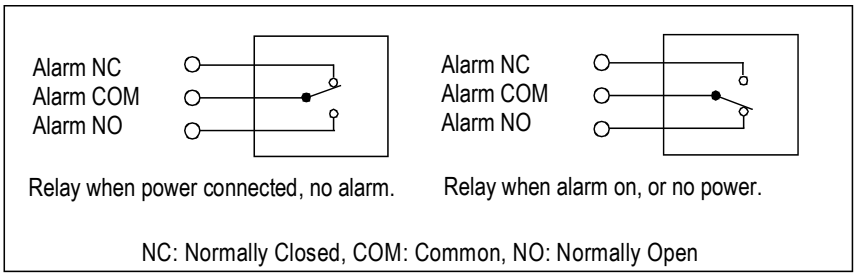
5.5.2 Alarm

Connectors for system alarm relay.

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

Unused alarm relay connectors can be left floating i.e., no wiring there is required. The relay is in the alarm state when the LC is without power and during start (reboot). The alarm relay will change state to normal during the start-up process if no faults have been found.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)



5.5.3 Tower Lvl (VDC Out 3 and Modbus 3)

Connectors for the tower level lights power and data.

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	-	Negative	Negative connector for 24VDC out.
X3:6	+	Positive	Positive connector for 24VDC out.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.5.4 AOL 1-2 (VDC Out 1-2 and Modbus 1-2)

Connectors for the two nacelle lights power and data.

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	-	Negative	Negative connector for 24VDC out.
X4:8,9	+	Positive	Positive connector for 24VDC out.
X4:10	SH	Shield	Shield.
X4:11	D+	Data+	RS485 non-inverting pin.
X4:12	D-	Data-	RS485 inverting pin.

Connector is push in terminal block.
Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

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5.5.5 V-sensor (VDC Out and RS232)

This connector is only in versions with visibility sensor support.

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

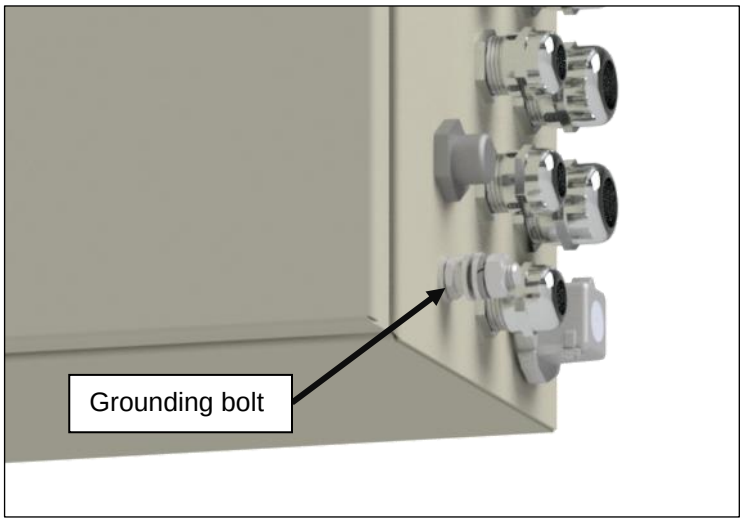
Connector is push in terminal block.
Conductor cross-section: 0,14 – 1,5 mm² (solid wire max. 2,5 mm²)

5.5.6 Ethernet LAN connector

Two RJ-45 connectors and two optic fiber connectors (only -EF 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.

5.5.7 Device grounding point

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

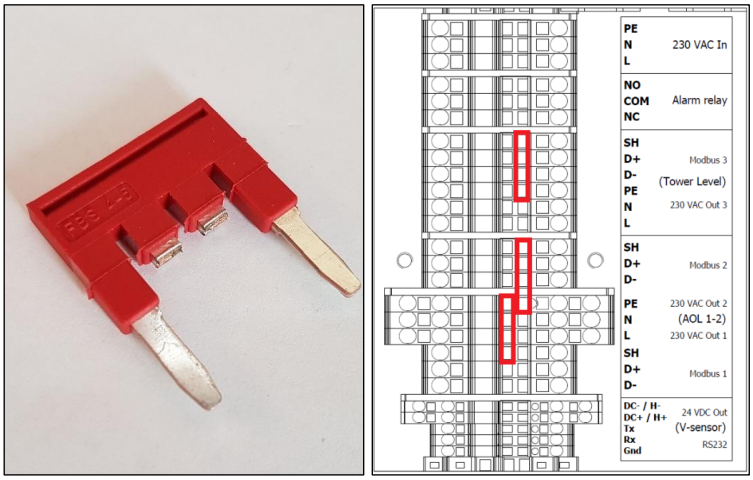


5.6 Light head cable shielding

The outermost shield of the nacelle light and tower level cables should be connected to ground from both ends if possible. Normally, the cable shield is connected to ground at the cable gland (see chapter 5.2).

In case a cable is used where the outer cable shield does not connect to ground at the cable gland but connects to Modbus shield (SH) instead, the SH terminal should be connected to ground. Applications for such scenario are, for example, a hybrid cable for power and data or separate data cable where the outer cable shield is used for Modbus shield (SH).

The ground connection in the above scenarios can be done with a shielding jumper. The shielding jumper will connect the SH to the protective earth (PE). This 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 if necessary. Make sure that two middle pins of the jumper are cut before connecting!

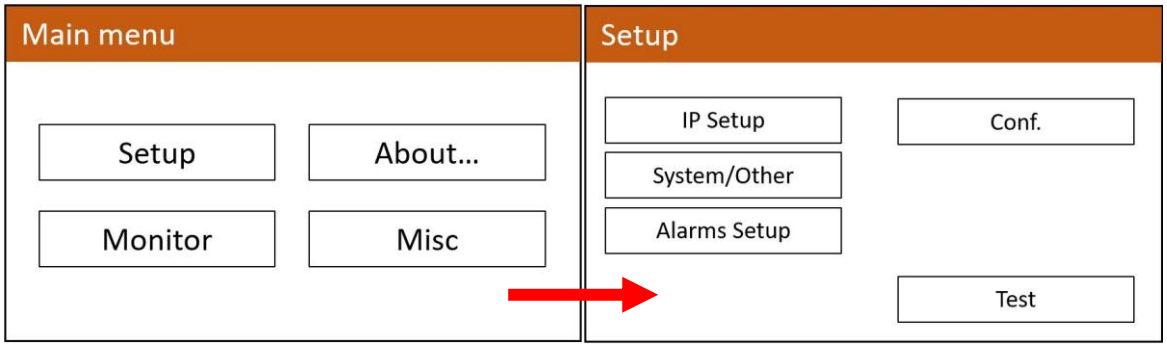
6 CONFIGURATION

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.

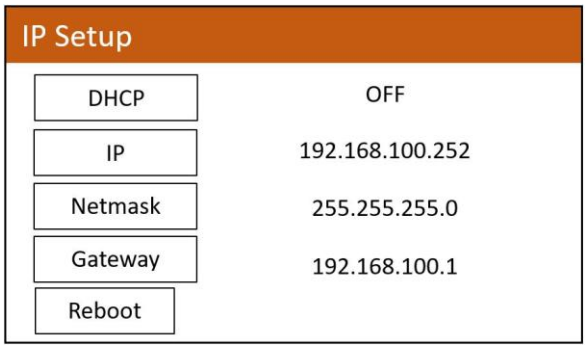
6.1 Quick setup guide

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

1. Select **Setup** menu from the start screen.

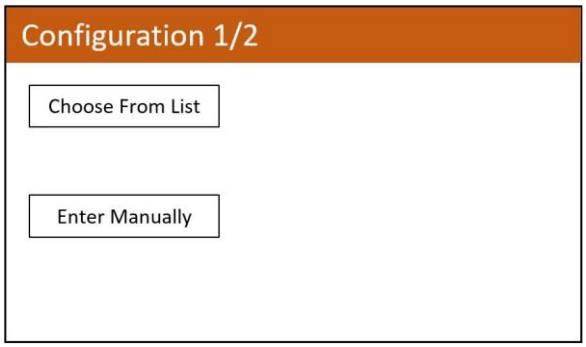


2. Select **IP Setup** and input the Ethernet settings that you want to use. If you change the **DHCP** setting you must reset Local Controller by switching off its power. This can be done with the **Reboot** button from the same menu.



Note! The reboot button appears only when changes to settings are made.

3. After setting up the IP address, select the **Conf.** menu to configure what sort of lights and control boxes are connected to the LC. You can use a country specific quick setup by selecting **Choose From List**.



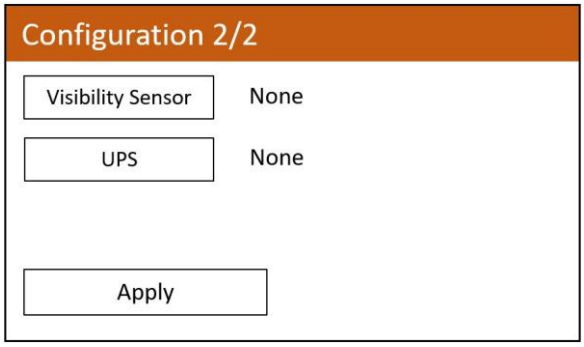
4. From the country specific list, you can choose the right configuration from few presets. The correct setting depends on the type of light heads and other devices that are connected to your LC.

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

Preset Name	Nacelle Light 1 (Modbus 1)	Nacelle Light 2 (Modbus2)	Tower Lights (Modbus 3)
HI1 (1 + 1 + 2)	High Intensity Light	High Intensity Light	2 x Tower Control Boxes
LI1 (1 + 1 + 2)	Low Intensity Light	Low Intensity Light	2 x Tower Control Boxes

All presets are explained in more detail in Obelux Configuration Instructions documents.

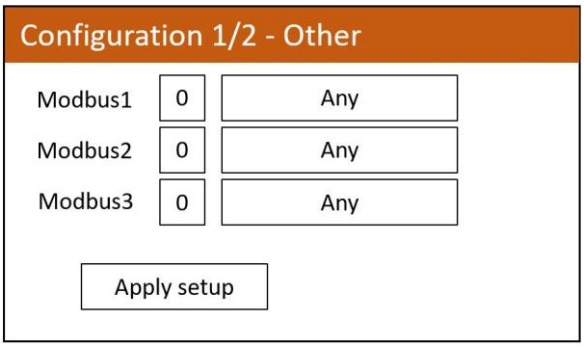
5. After selecting a preset second page of the Quick Configuration will appear. From the second page, you can select if a visibility sensor or a Obelux UPS is connected to the Local Controller. Select Apply setup to confirm selection.



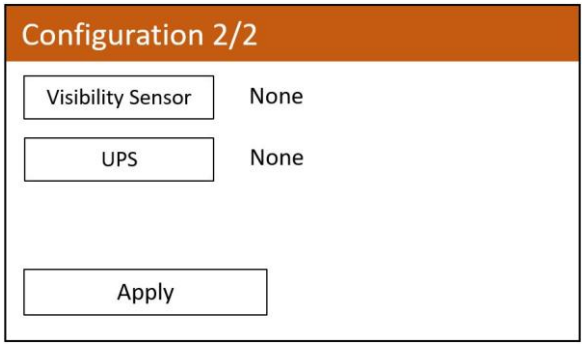
6. Make sure that correct light heads and control boxes are connected to correct connectors as specified in the wiring chapter. Alarm is raised if there is a problem with the selected setup. Preset will also configure photocell light limits and light flashing rates (FPM).

If a ready preset is not available for your application, you need to select the **Enter Manually** option from the **Conf.** menu and follow the instructions below.

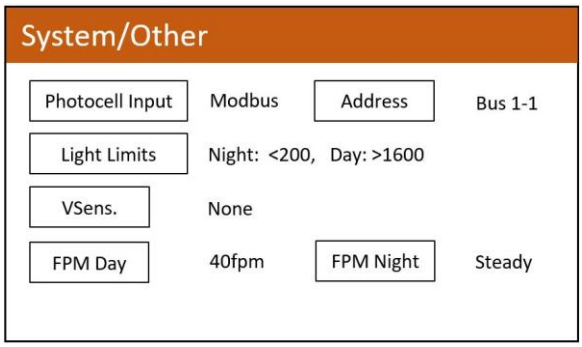
1. From the **Enter Manually** menu, you need to select the number and type of devices for each Modbus connector. Make sure to select the correct device for correct Modbus terminal. Select Apply to confirm selection. Alarm is raised if there is a problem with the selected setup.



2. 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.



3. From the **System/Other** 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
Local: A dedicated photocell is connected to the Modbus1.
Modbus: LC is reading data from light head connected to the specified Modbus address.
GPI-D: LC is reading day/night inputs from GPI-O ports.
Ethernet: LC is reading data from light head connected to the specified Ethernet address.
G3 Swarm: LC is reading data from any of the lights connected to Modbus or Ethernet network.

Address
The photocell address for Modbus or Ethernet can be selected from this menu.

Modbus: Set the bus number (1, 2, 3) and address (1-63).
Ethernet: Set the IP address.

Light Limits
Photocell ambient light limits [lux] for night and day can be selected from this menu.

VSens.
Visibility sensor can be enabled and disabled from this menu. There are few different models available.

FPM Day / FPM Night
This menu lets you select the flashing rate for the day and night modes.

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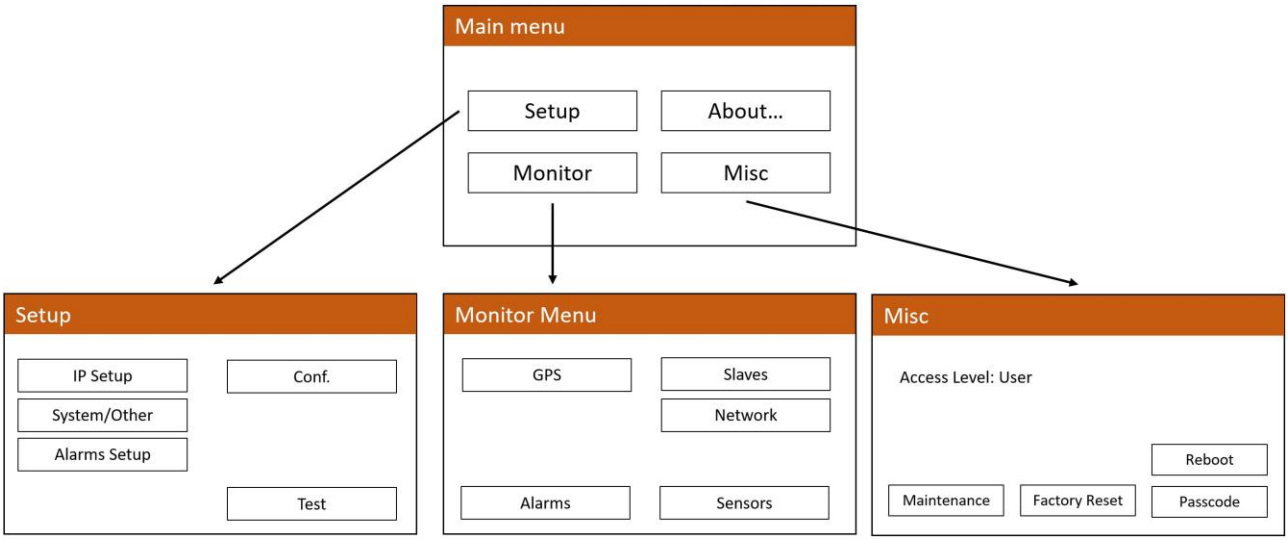
6.2 Local Controller menus

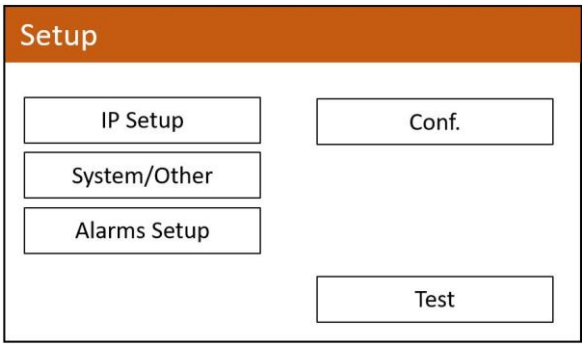
This chapter describes the LC software and menus in more detail.



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

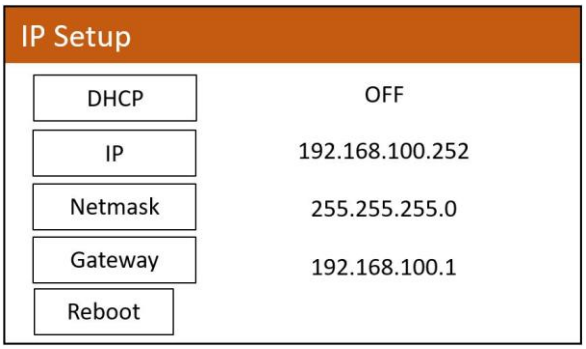
6.3 Setup menu

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



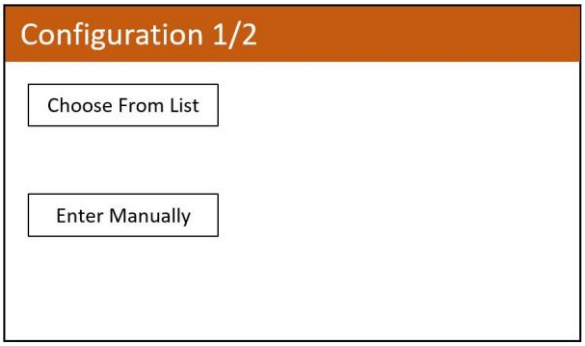
6.3.1 IP Setup

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 also be done with the **Reboot** button from the same menu. The IP address can be checked from the **Monitor -> Network** menu.



6.3.2 Conf.

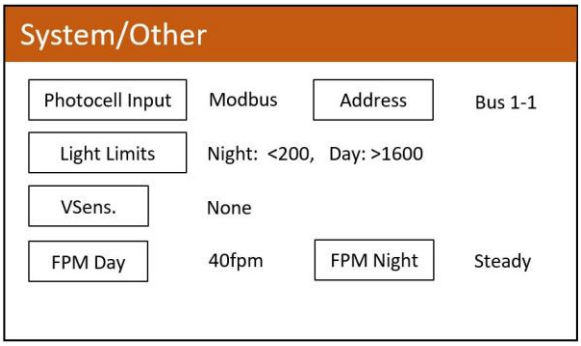
From **Conf.** menu you can configure what sort of lights and control boxes are connected to the LC. You can use a country specific quick setup if one is available for your country or set the configuration by hand.



Please refer to chapter 6.1 for detailed instructions for the sub-menus.

6.3.3 System / Other

From the **System/Other** menu you can change photocell, visibility sensor and flash rate settings.



Please refer to chapter 6.1 for detailed instructions for the settings.

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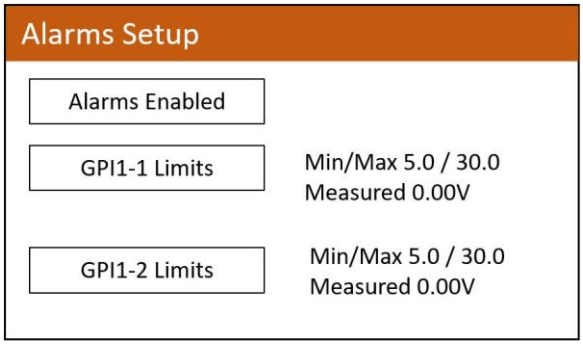
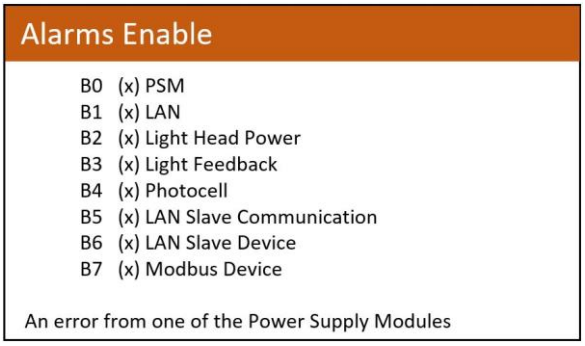
6.3.4 Alarms Setup

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 at the bottom of the screen. All alarm sources might not be relevant to the Local Controller.



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 device 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	Modbus Slave device has an error condition
B8 Modbus Communication	Modbus communication fault
B9 Lamp Life 80	A lamp or LH is at 80% of specified usage hours
B10 Lamp Life 100	A lamp or LH is at 100% of specified usage hours
B11 GPI1-1	Voltage of GPI input is out of range
B12 GPI1-2	Voltage of GPI input 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 is not working properly
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 synchronization master sources
B22 Master Communication	Device does not receive guidance from a master unit

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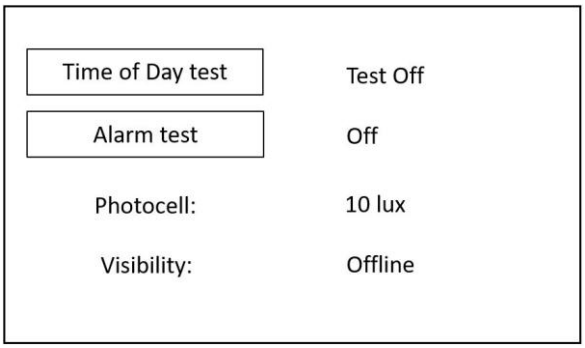
B23 Slave-Alarm Relays	The external module for indicating slave unit alarm has communication error or bad settings
B24 Temperature	Over-/Under-temperature
B25 Heater	Heater malfunction
B26 Ext. Alarm Relays	External relay module unreachable or faulty
B27 2nd Photocell	Secondary photocell is not working properly
B28 2nd GPS	Secondary GPS in not working properly
B29 No ToD Change	Time-of-Day has not changed in over 24h
B30 Photoc. Discrepancy	The primary and secondary photocells have a large difference of measurement
B31 Configuration	System is unconfigured or misconfigured

The GPI Limits menus can be used to change the voltage limits that trigger the B11 and B12 alarms.

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
Time of Day test modes are the following:

Test Off:	Test mode Off
Night:	All lights are switched to Night mode.
Twilight:	All lights are switched to Twilight mode.
Day:	All lights are switched to Day mode.
Light Off:	All lights are switched Off.
Steady:	All lights are switched to Steady burning mode.
Failsafe:	All lights are switched to specified Failsafe flash mode.

Alarm test
Alarm test modes are the following:

Test Off:	Test mode Off.
Alarm On:	Turns on B19 Test alarm.
Alarm Off:	Turns off all active alarms.

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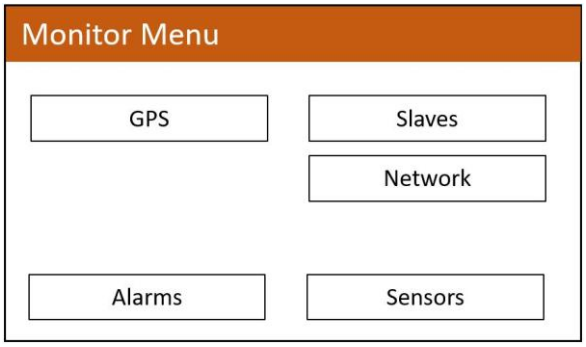
6.4 Monitor menu

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 time (UTC) and receiver location in latitude and longitude is shown on the GPS menu.

GPS information can be received via on-board receiver in controller module (COM) or external GPS capable device in network (Modbus, Ethernet).

GPS status can be one of the following:

GPS Disabled:	Receiver not installed or disabled in settings.
GPS MALFUNCTION:	GPS receiver (on-board or external) has malfunctioned.
GPS COMM.ERROR:	Communication to external GPS device (e.g., light in Modbus network) not working.
GPS No Fix:	Insufficient signal for GPS fix.
GPS OK/Fix:	GPS receiver working and has GPS fix.

6.4.2 Alarms

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

Alarm status can be one of the following:

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 Slaves

On **Slaves** 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.

6.4.4 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 and MAC address.

GC link:	Global Controller is connected to this device.
Time RX:	Device is receiving network time broadcast.

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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.

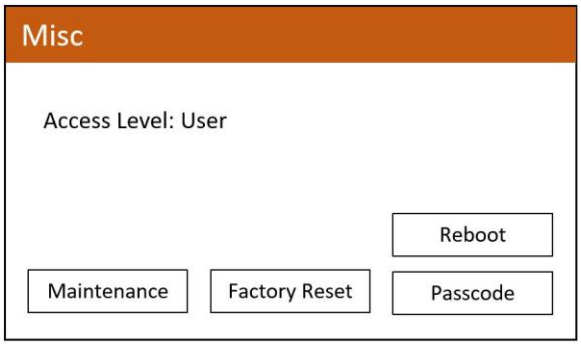
6.5 Misc menu

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 before entering the Misc menu 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.

Reboot button resets the Local Controller.



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 many 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.

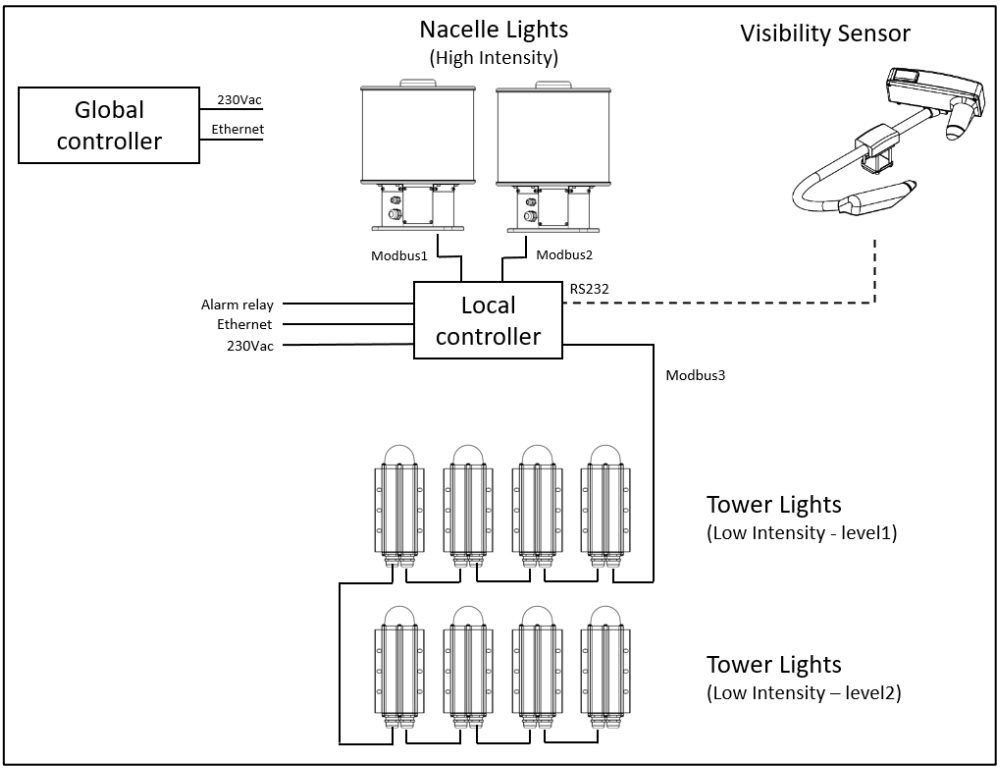


Figure 9: Typical use case for Local Controller in wind turbine environment

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 lights flash simultaneously all over the world. The timing difference from one system to another is less than ±2 milliseconds.

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7.3 Time of day synchronization and photocell

The LC reads the integrated photocell of the aviation light connected to the selected bus. 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 on the photocell information they receive from the aviation light in the selected bus.

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/Other** 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.

These GPIO signals trigger alarm state when out of range. Below are their meanings:

UPS-230-56

GPI1-2:	UPS has lost mains power and is in battery use.

UPS-230-024-56

GPI1-1 only:	Battery or charger error.
GPI1-2 only:	UPS has lost mains power and is in battery use.
GPI1-1 and GPI1-2:	UPS is in battery use and has low battery voltage.

The Local Controller also read GPI2-1 status when UPS-230-024-56 is selected which indicates that the UPS is charging batteries. This status signal does not trigger an alarm.

If the Local Controller has both Visibility Sensor and UPS support, then GPI1-2 alarm (UPS has lost mains power) also switches off visibility sensor heater power supply. This is to reduce total battery load and increase UPS uptime.

7.6 Status collection and reporting

The LC unit collects light head statuses and reports possible errors via alarm relay output and Web API. GUI can be used to see more details about which light head or tower controller is causing the alarm and why. Same information is also available from the Global Controller which collects all LC statuses in 60 second intervals via Ethernet.

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7.7 Status LEDs

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

SYNC (Green)
This LED will flash in sync with light heads.

COM (Green)
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.

TEST MODE (Green)
This LED indicates that time of day or alarm test has been enabled.

ALARM (Red)
Alarm led is used when there is an active alarm.

ERROR
Not used.

1, 2
Not used.

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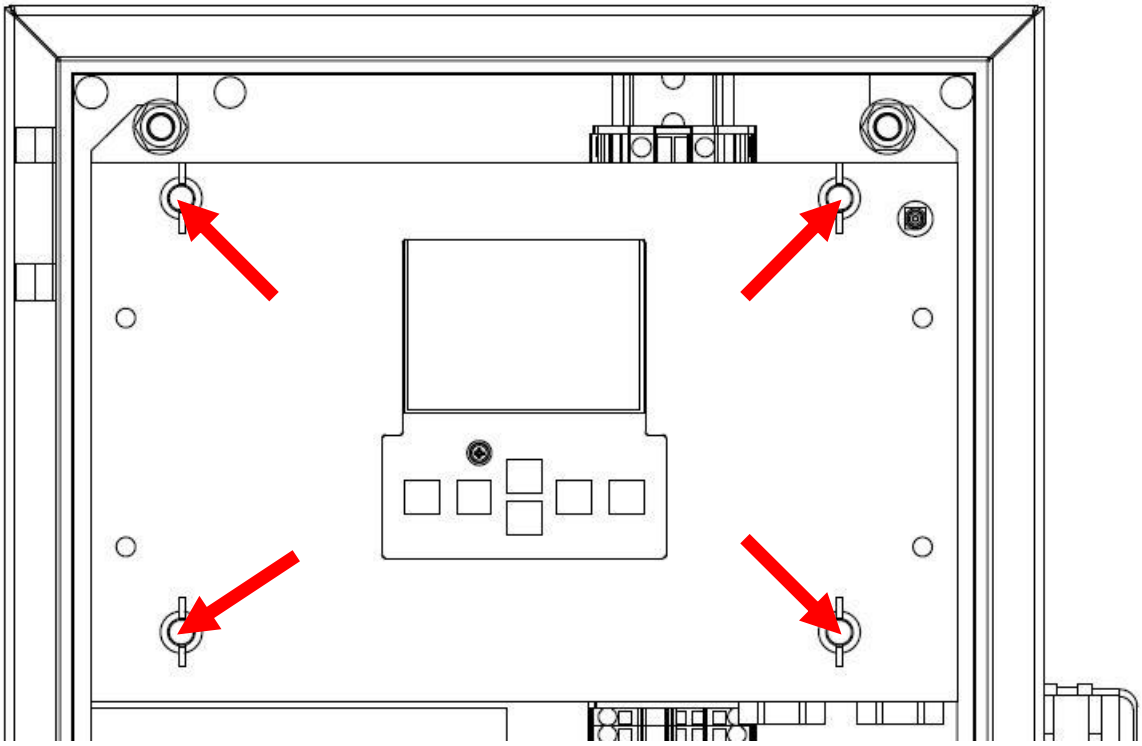
8 MAINTENANCE

This chapter describes maintenance procedures for Local Controller.

8.1 Replacing the controller board (COM)

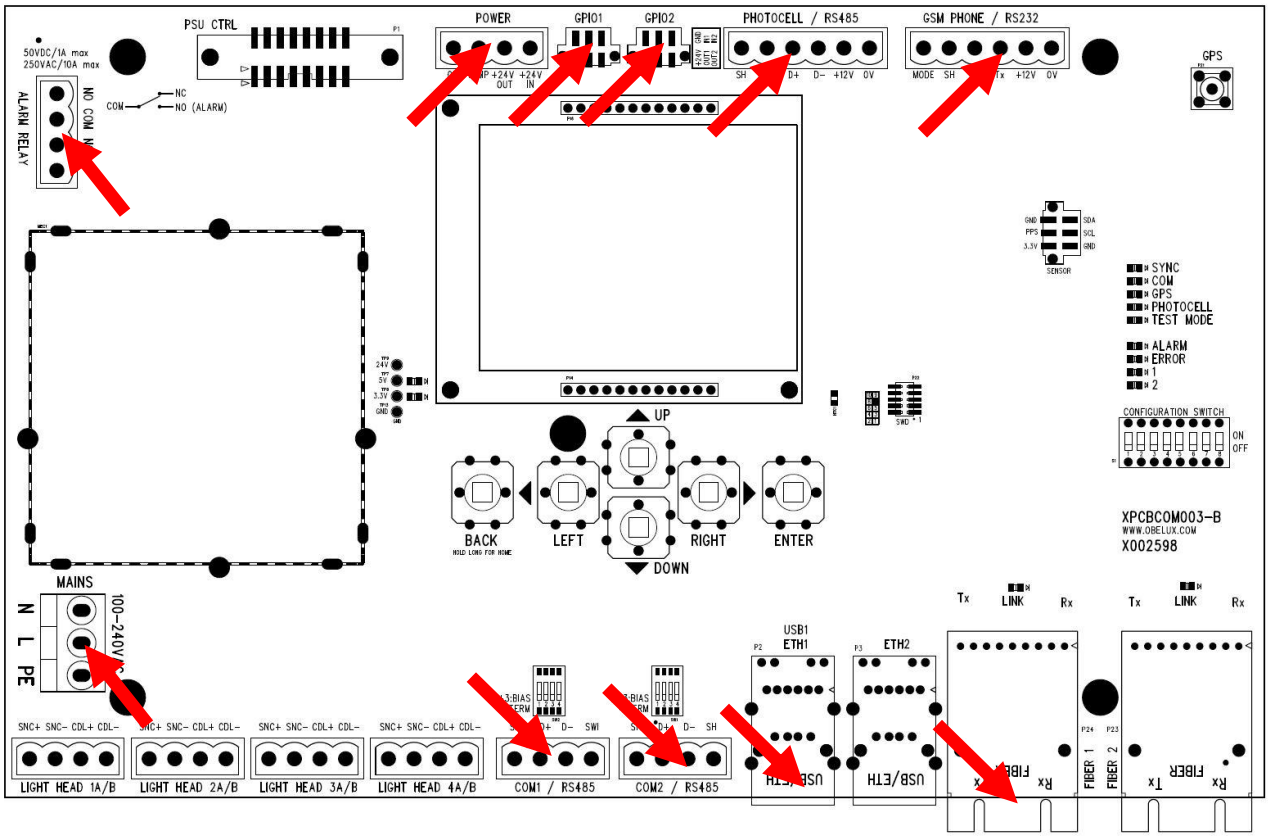
This section contains instruction for replacing the controller board.

1. Make sure that the cabinet is unpowered. Disconnect the power by switching off all the circuit breakers.
2. Remove the plastic cover plate by opening and removing the four wing nuts and washers.



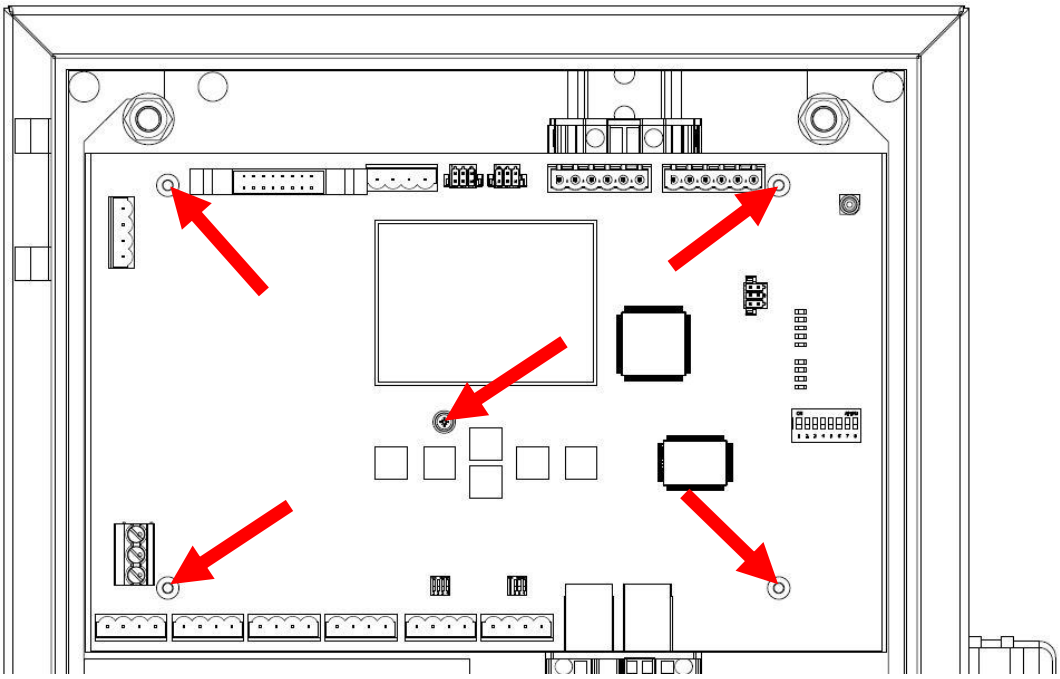
3. Remove all connectors, wires, and cables from the board.

Note! It is recommended to mark connectors (ie. left, right) that are close to each other and similar looking to ensure that they are placed back to correct positions.



Note! Not all Local Controller variations have every connector shown above. If a connector is not present it can be skipped.

4. Remove the four standoffs and one screw from the board.



5. Replace the old board with a new one.
6. Put back the standoffs and screw and tighten them.
7. Put back all the connectors, wires, and cables.

   Note! Wires going to MAINS connector are colour coded as follows

   N = blue (not present in all models)
   L = brown (not present in all models)
   PE = green/yellow

8. Put back the cover plate and wing nuts.
9. Power on the cabinet by switching on the circuit breaker(s) and check that the board starts up.
10. Configure the LC to needed settings (described in chapter 6).

8.1.1 Menu configuration

If the menu looks different than shown in chapter 6 follow the next steps.

1. Navigate menus to **Misc** -> **Maintenance** -> **Settings** -> **Options.**
2. Make sure that both **B5 Setup menu1** and **B6 Setup menu2** are checked.
3. Make sure that both **B26 No LHC use** and **B27 No CP use** are checked.

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9 SPARE PARTS

Order code	Description	Reference[1]
X002853	1 x Circuit Breaker, C6	3, 4
X002854	1 x Phoenix Contact DT-LAN-CAT.6+ OVP, 2881007	6
X004218	1 x Lock VPTL36, DIN-3	9
COM-LC	1 x Controller Board (XCOM003)	1
COM-LC-FO	1 x Controller Board (XCOM003) /w Fiber Optics (for -EF models)	1
SP-OVP-SS-B	2 x Raycap Strikesorb 30-B-M on a plate	5

[1] Item number from Figure 1.

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