



Control Panel

for Obelux Aviation Lights

User's Manual

Version 1.3

18.09.2024

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1 CHANGE LOG

Version:	Date:	Description:	Author:
0.1	01.08.2016	Document created.	AHa
0.9	26.09.2016	Draft version for internal review.	AHa
1.0	07.10.2016	Document release.	AHa
1.1	03.05.2018	UI updates. Reset password. M25 cable gland cable diameter 16mm->17mm.	AHa
1.2	15.05.2018	Product versions added (chapter 3.1). Wiring picture updated.	AHa
1.3	18.09.2024	Changed document template. Added SW version for manual contents to chapter 2. Updated chapters 4, 5, 6 and 7.	INi

2 ABOUT THIS DOCUMENT

This document describes the Obelux Control Panel (CP) operation for the end-user. This document covers the installation and setup of the unit, maintenance, and operation of the unit on a practical level and is intended for everyone who needs to install and setup a CP unit for operation.

Table 1. Acronyms and Abbreviations

LHC	Light Head Controller
COM	Controller Module (of the CP)
CP	Control Panel
GUI	Graphical User Interface
GPS	Global Positioning System
SW	Software

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 other SW versions.

3 SAFETY INSTRUCTIONS

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

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 the 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 an 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

Control Panel is used to control and monitor Obelux Light Head Controllers (LHC) and Light Heads. Control panel offers full system management for devices that are connected to the same network. CP has a user-friendly color LCD screen for accessing the system locally. The CP also works as a web server so that the system monitoring can be also done via web browser.

The main component of the CP is the Controller Module (COM). The COM communicates with the connected light heads to synchronize the flashing of the lights, providing time of day information and collecting the statuses of the lights. Status reporting is done with an alarm relay output, or optionally with a web server. The controller module is used in several Obelux products, and some of the connectors and features are not used in the Control Panel application.

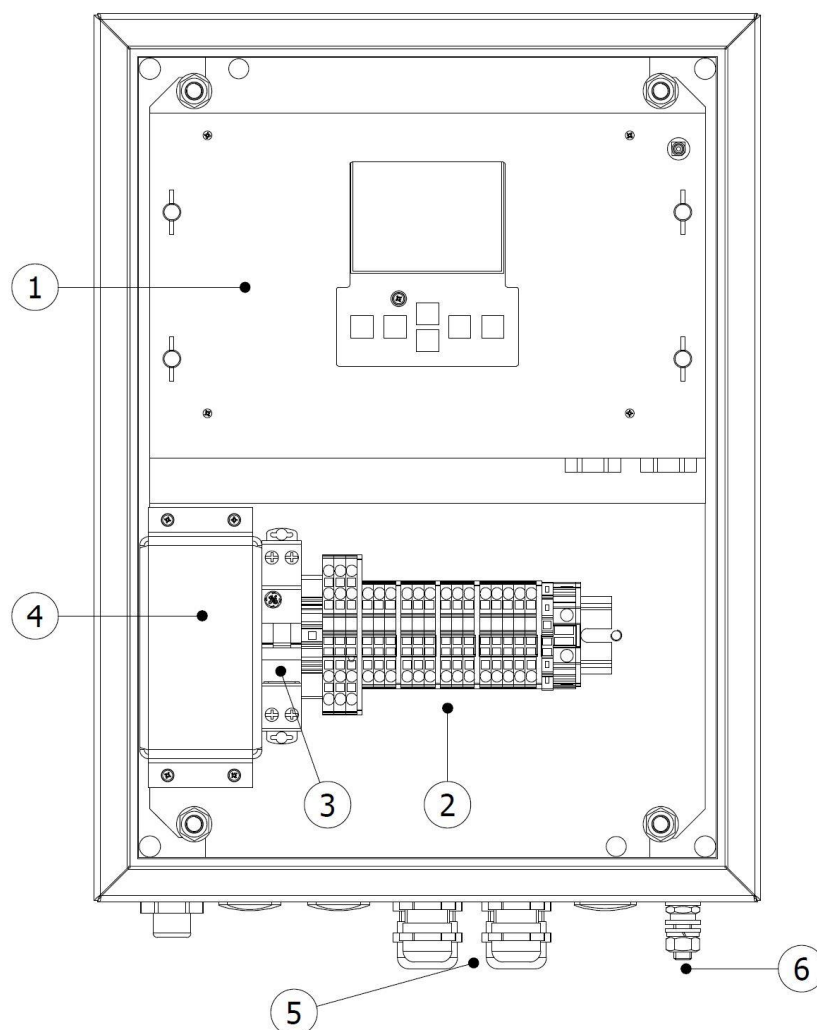


Figure 1: Main functional parts of the Control Panel

1. Controller module (COM)
2. Terminal block connectors
3. Circuit breaker
4. Overvoltage protectors
5. Cable glands
6. Grounding point

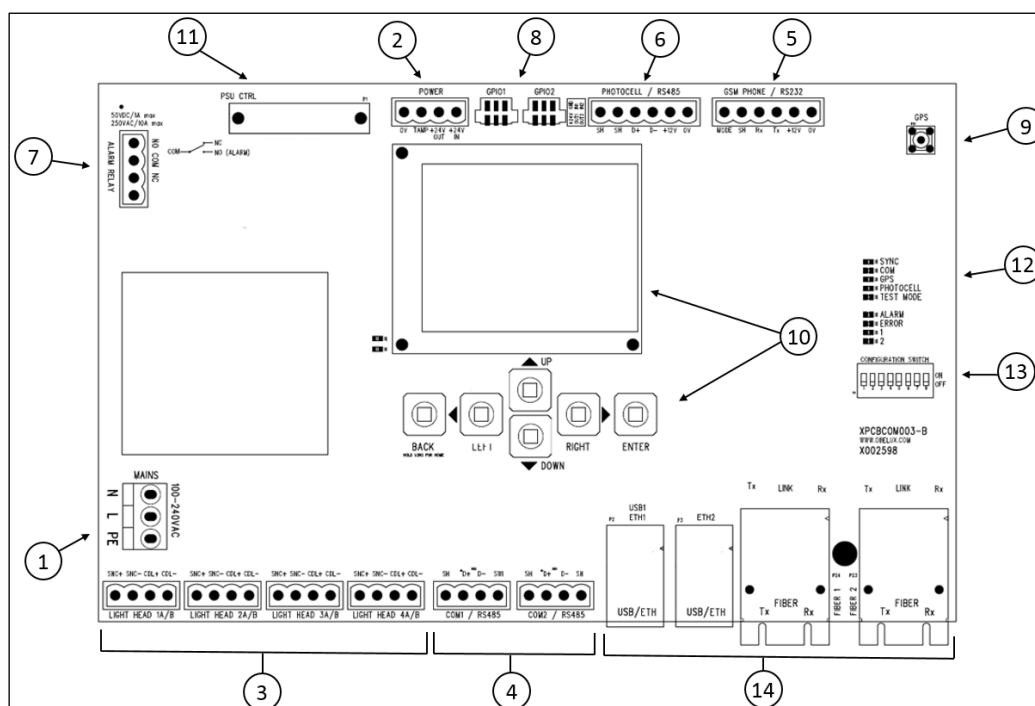


Figure 2: Controller module

1. Main power feed
2. COM board Power
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 Fiber SC)

The controller module is used in several Obelux products, and some of the connectors and features are not used in the Control Panel 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 Acidproof Steel (AISI 316L), IP65 Dimensions (W x H x D): 300 x 400 x 200 mm Weight: <11 kg Cable glands: 2 x M20 EMC (Ø6-13 mm) 2 x M25 EMC (Ø11-17 mm)	Operating voltage: 100-240 V_{AC} Power consumption: <10 W Serial ports: 3 x RS-485 (Modbus) Ethernet connection: RJ45 or Optic Fiber (multimode) Alarm relay: NO/NC dry contact max. 240 V_{AC} / 3 A or 50 V_{DC} / 0,5 A Operating temperature: -40°C to +55°C Overvoltage protection: Raycap Strikesorb 30-B-M

4.1 Versions

The CP is available as the following models:

Order code:	Operating voltage:	Enclosure material:	Weight:	Dimensions (W x H x D):	Packing dimensions:
CP-ACW-xxx-A3	100-240 V _{AC}	Painted steel	<11 kg	300 x 400 x 200 mm	600 x 350 x 250 mm
CP-ACW-xxx-B3	100-240 V _{AC}	Acidproof steel	<11 kg	300 x 400 x 200 mm	600 x 350 x 250 mm

xxx:

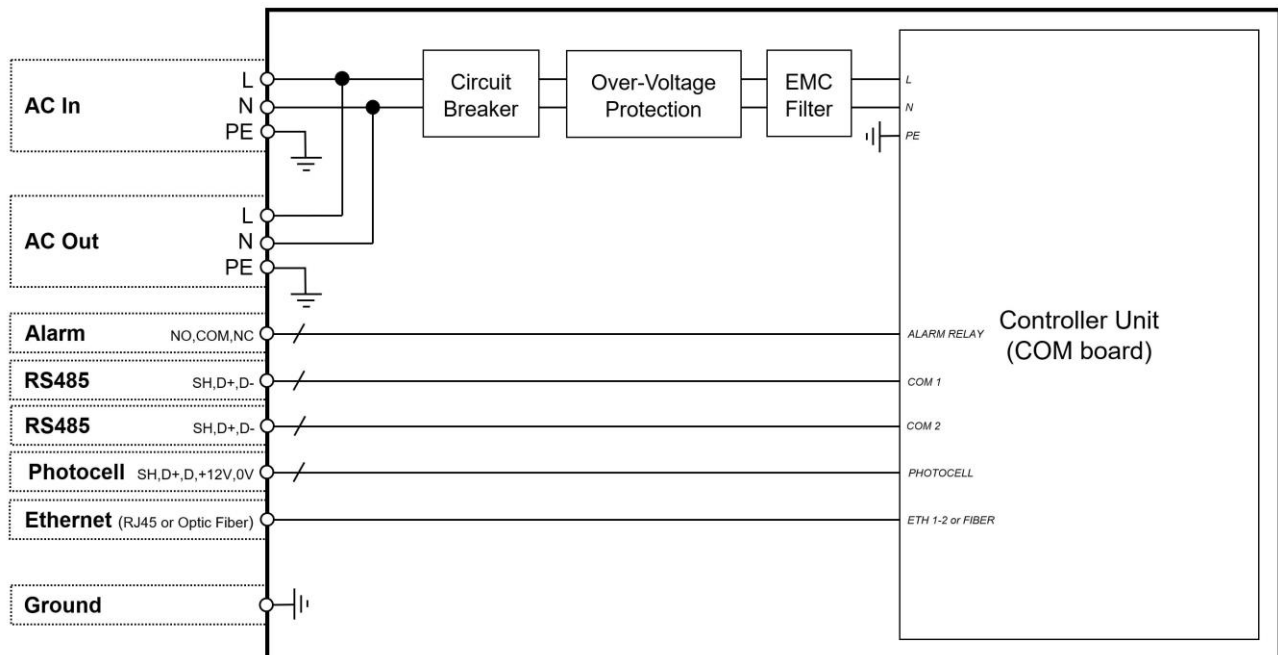
[] = no options

G = GPS Synchronization option

F = Optic Fiber connection option

W = Web Server option

4.2 Block diagram



5 INSTALLATION

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

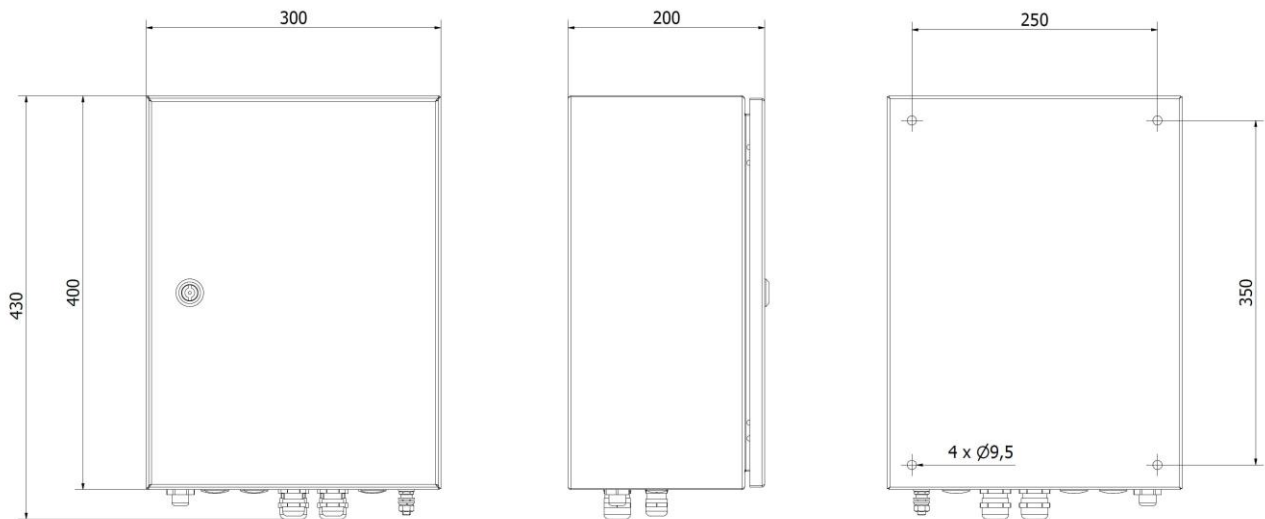


Figure 3: Dimensions and mounting points

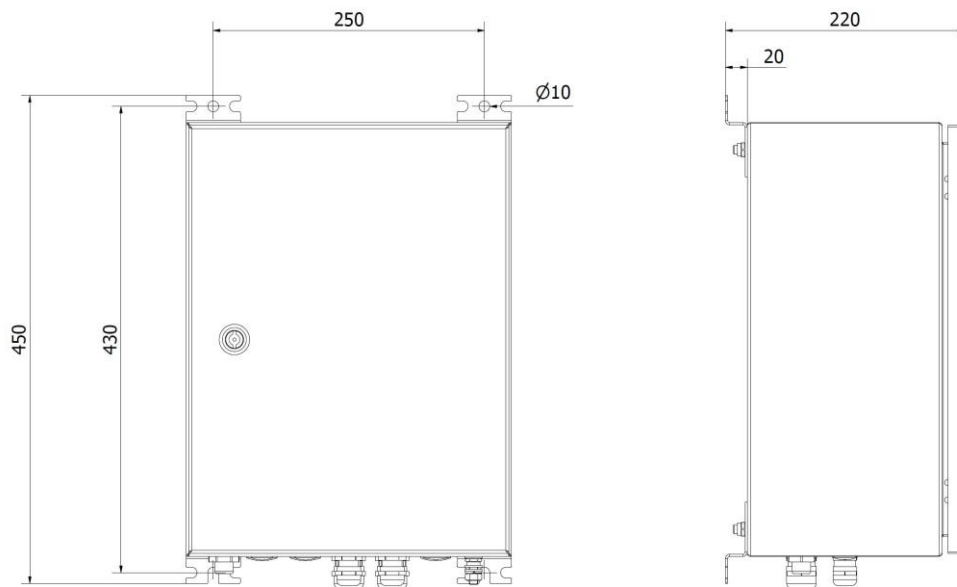


Figure 4. Dimensions and mounting points with vertical mounting legs

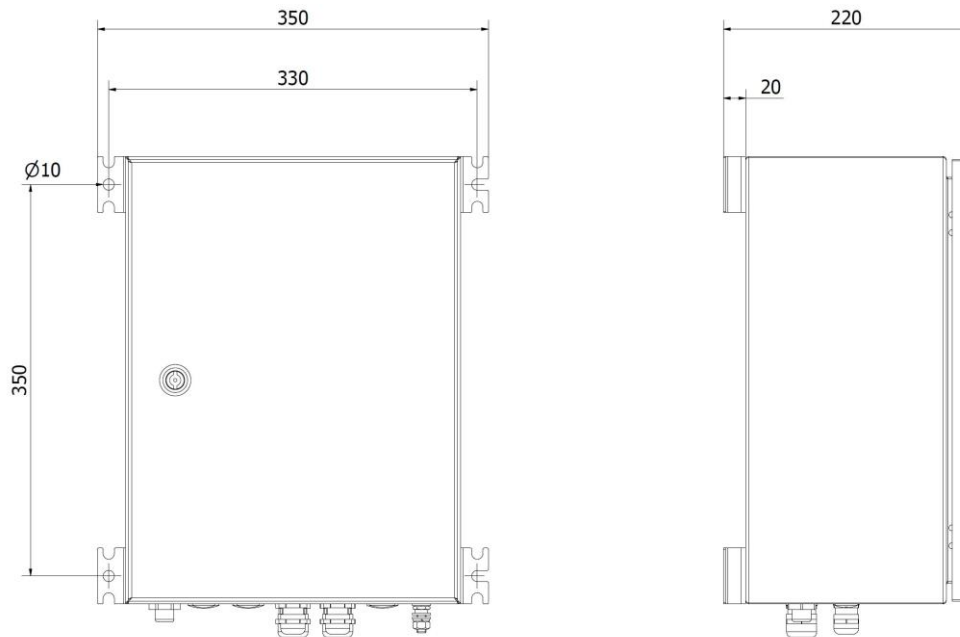


Figure 5. Dimensions and mounting points with horizontal mounting legs

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 with the EMC glands:



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.

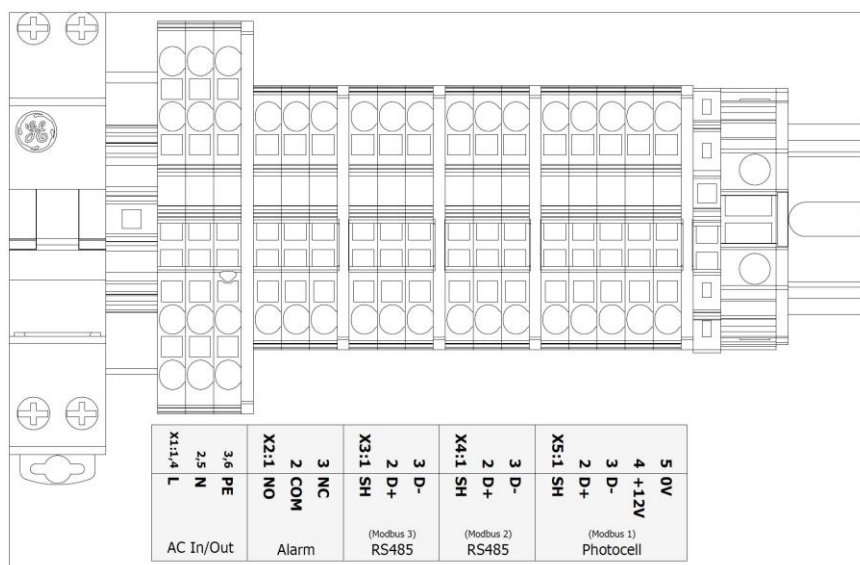


Figure 6: Control Panel connectors

5.2.1 AC In / Out

Connectors for input and output voltage.

Number	Mark	Description	Information
X1:1,4	L	Live terminal	Colour typically brown.
X1:2,5	N	Neutral terminal	Colour typically blue.
X1:3,6	PE	Protective earth	PE line is typically indicated with yellow/green colour.

Connector is push in terminal block.

Conductor cross-section: 0,14 – 2,5mm² (solid wire max. 4mm²)

5.2.2 Alarm

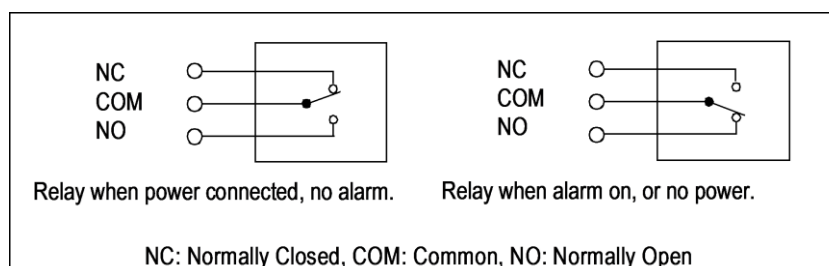
Connectors for system alarm relay.

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 CP 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 – 2,5mm² (solid wire max. 4mm²)



5.2.3 RS485 Communication – Modbus 3

Connectors for the RS485 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.

RS-485 bus is implemented with one pair. Therefore, communication on RS-485 bus is half-duplex.

Connector is push in terminal block.

Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.2.4 RS485 Communication – Modbus 2

Connectors for the RS485 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.

RS-485 bus is implemented with one pair. Therefore, communication on RS-485 bus is half-duplex.

Connector is push in terminal block.

Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.2.5 Photocell – Modbus 1

Connectors for the Photocell or RS485 data.

Number	Mark	Description	Information
X5:1	SH	Shield	Shield.
X5:2	D+	Data+	RS485 non-inverting pin.
X5:3	D-	Data-	RS485 inverting pin.
X5:4	+12V	+12V	12V voltage
X5:5	0V	0V	0V voltage

The Photocell connectors can be used for Modbus 1 communication only like Modbus 2 and 3. In this case, +12V and 0V terminals can be left unused.

Connector is push in terminal block.

Conductor cross-section: 0,14 – 2,5 mm² (solid wire max. 4 mm²)

5.2.6 GPS Antenna

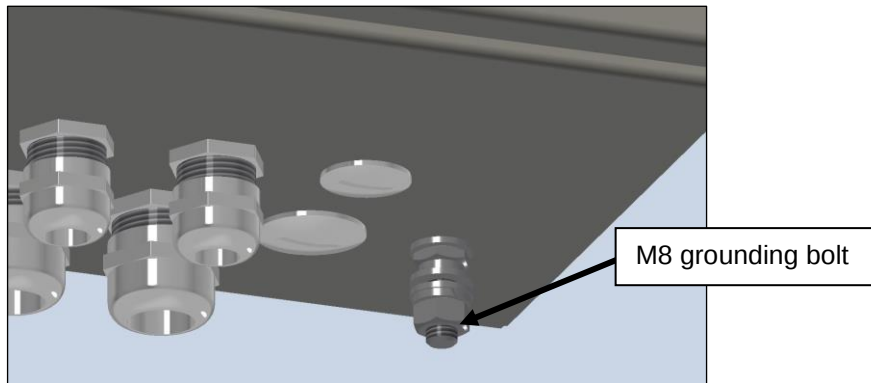
Antenna is connected to the SMA connector on the COM board. Connector location can be seen in the Figure 2. Be careful not to overtighten the connector.

5.2.7 Ethernet LAN connectors

Ethernet LAN ports. Two RJ-45 connectors and two optic fiber SC type connectors (-F models only). Both connectors are on the COM board. Connector location can be seen in the Figure 2.

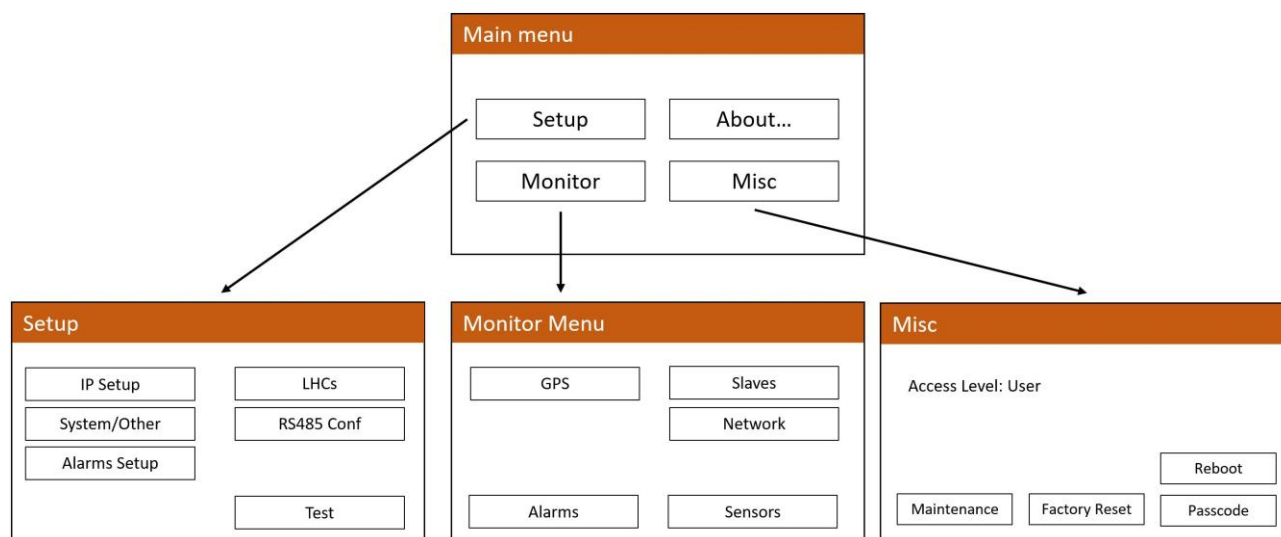
5.2.8 Ground

There is an M8 grounding bolt at the bottom of the cabinet.



6 CONFIGURATION

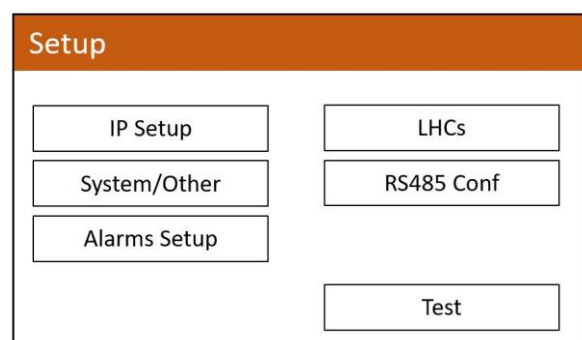
This chapter describes the configuration of the CP. The configuration is carried out with COM board's keyboard and display. DIP switches are not used. Arrow buttons on the COM board are used to move in the menus. Enter button selects a menu and back button returns to the previous menu.



The CP functionality is divided mainly into two 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.

6.1 Setup menu

From the **Setup** menu, the user can setup IP address, setup LCH units, change system settings and enable or disable alarm sources. Modbus light heads are configured in the RS485 Conf. menu. The test menu contains several test modes to test system installation and functionality.



6.1.1 IP Setup

Ethernet settings for the Control Panel are set from **IP Setup** menu. Select Apply to confirm settings. If you change the DHCP setting you must reset Control Panel 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.

IP Setup	
DHCP	OFF
IP	192.168.100.252
Netmask	255.255.255.0
Gateway	192.168.100.1
Reboot	

6.1.2 LHCs

LHCs (or any Ethernet capable slave units, such as lights and other COM based products) are added to the Control Panel from the LHCs menu. Add LAN slave unit's IP address to an empty slot on the menu.

LAN Slaves Setup	
=> 1. Empty	9. Empty
2. Empty	10. Empty
3. Empty	11. Empty
4. Empty	12. Empty
5. Empty	13. Empty
6. Empty	14. Empty
7. Empty	15. Empty
8. Empty	16. Empty

If lights are added using **RS485 Conf** menu and Modbus, these lights also appear in LAN Slaves Setup list but they cannot be selected.

6.1.3 System / Other

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

System/Other			
Photocell Input	Modbus	Address	Bus 1-1
Light Limits	Night: <200, Day: >1600		
VSens.	None		
FPM Day	40fpm	FPM Night	Steady

Photocell input

Photocell input options are the following:

None:	No photocell
Local:	A dedicated photocell is connected to Modbus1.
Modbus:	CP is reading data from light head connected to the specified Modbus address.
GPI-D:	CP is reading day/night inputs from GPI-O ports.
Ethernet:	CP is reading data from light head connected to the specified Ethernet address.
G3 Swarm:	CP is reading data from Swarm compatible 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. Typically, this is not used in Control Panel applications.

FPM Day / FPM Night

This menu lets you select the flashing rate for the day and night modes.

6.1.4 RS485 Conf

Aviation lights connected directly to the CP with RS485 (Modbus) are configured from the **RS485 Conf** menu. Select the number of lights that are connected to the bus. After this select the type of light from the next menu. If you add a visibility sensor to the RS232 bus, you add it to the **Vis. Sens.** part of the menu. Select Apply setup to confirm your selection.

Config Intntl. -ICAO		
Modbus 1	0	Any
Modbus 2	0	Any
Modbus 3	0	Any
Vis. Sens.	0	--
Apply setup		

6.1.5 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.

Alarms setup

Alarms enabled

GPI1-1 Limits

Min/Max 5.0 / 30.0
Measured 0.00V

GPI1-2 Limits

Min/Max 5.0 / 30.0
Measured 0.00V

To disable an alarm source, uncheck the (x) mark in front of the alarm name with the Enter button. Alarm source is described in more detail at the bottom of the screen. All the alarm sources might not be relevant to the Control Panel.

Alarms Enable

=> B0 (x) PSM
 B1 (x) LAN
 B2 (x) Light Head Power
 B3 (x) Light Feedback
 B4 (x) Photocell
 B5 (x) LAN Slave Communication
 B6 (x) LAN Slave Device
 B7 (x) RS485 Slave Device

An error from one of the Power Supply Modules

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

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 is 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.

6.1.6 Test

Test menu contains several test modes to test system installation and functionality. Active test modes are disabled after 24 hours. In other words, the CP 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	Off
Alarm test	Off
Photocell:	10 lux
Visibility:	Offline

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 their specified Failsafe flash mode.

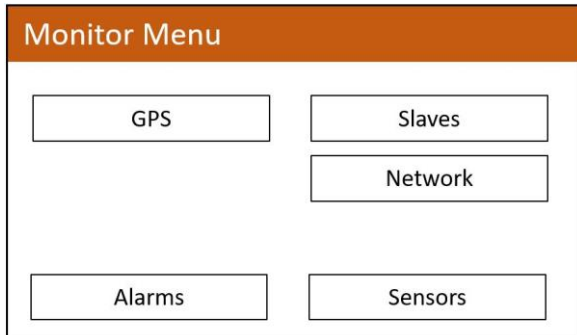
Alarm test

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.

6.2 Monitor menu

From the monitor menu you can monitor the system status and possible alarms.



6.2.1 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.

6.2.2 Alarms

This 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. The alarm condition has since disappeared.

6.2.3 Slaves

On **Slaves** sub-menu there is a list of the connected Modbus and Ethernet based slave devices and their status information including alarms. More information is available by selecting the device from the list.

6.2.4 Network

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

GC link:	Global Controller is connected to this device (typically not used with CP applications).
Time RX:	Device is receiving network time broadcast.

6.2.5 Sensors

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

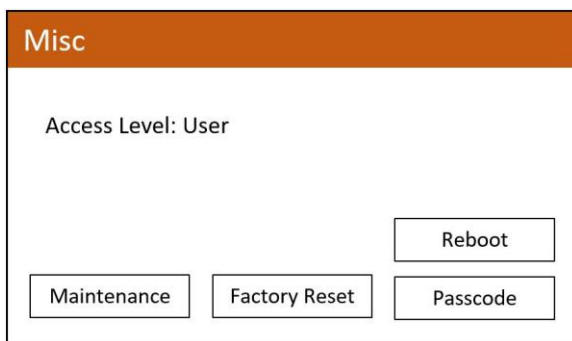
6.3 Misc menu

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 CP to its factory settings.

All CP functionality is not available for the normal user. Entering a valid **Passcode** will give access to these settings.

Reboot button restarts the Control Panel.



6.4 About menu

About menu shows different information about Control Panel SW version and copyright.

7 OPERATION

The CP consists of one major component, Controller Module (COM). COM communicates with Light Heads connected to the RS485 bus and LHCs or any Ethernet capable slave device via Ethernet to synchronize internal clock, providing time of day information and collecting statuses. Status reporting is done with alarm relay output or Web API.

7.1 Start-up

The CP software makes a 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 a few seconds.

7.2 Time synchronization

The CP provides time synchronization information via Ethernet for all slave devices connected to the network. Information is sent with broadcast message, so all devices get the information at the same time. Time synchronization message is sent with 10 seconds interval.

When a GPS module is installed with appropriate antenna, the CP synchronizes its clock to GPS time (UTC) and provides that to all slave units to flash simultaneously all over the world. If no GPS module is present on the CP, GPS time can also be received from any GPS equipped device on the network. The timing difference from one system to another is less than ± 2 millisecond depending on network latency.

7.3 Time of day synchronization and photocell

Luminance information is read from the dedicated photocell, or any photocell equipped slave device. Photocell measures the ambient light in lux. Depending on the ambient light level CP changes the aviation lights between day, twilight and night modes. 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 Status collection and reporting

The CP unit collects slave device statuses and reports possible errors via alarm relay output or Web API. GUI can be used to see more details about which device is causing the alarm and why. Also, on board status LEDs indicate system status. Status collection is done with 60 seconds interval via Ethernet.

7.5 Status LEDs

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

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 a 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.