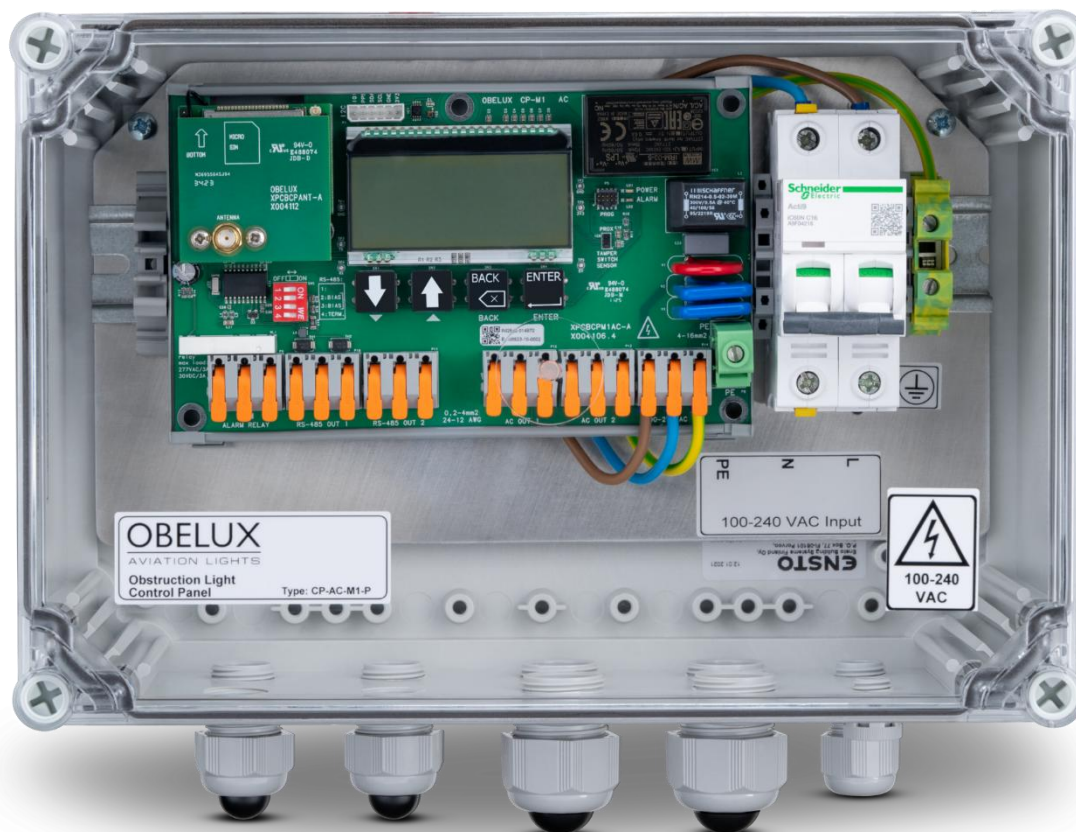




Control Panel M1 manual

RS-485/Modbus Control Panel for Aviation Obstruction Lights

Acronyms and Abbreviations

AC	Alternating Current
CP	Control Panel
DC	Direct Current
FPM	Flashes Per Minute (flash rate)
FS	Failsafe
GPS	Global Positioning System
GSM	Global System for Mobile Communications
HI	High intensity
IR	Infrared
LCD	Liquid crystal display
LI	Low intensity
MI	Medium intensity
PCB	Printed circuit board
SW	Software

Definitions

Time-of-day (ToD)	Functional modes of lights Day/Twilight/Night are operating modes resolved from lights photocell data and lux settings. Additionally, there are Off and Failsafe modes. Each mode has its own settings for light behavior.				
	Day	Twilight	Night	Off	Failsafe
	Day mode	used when ambient illuminance is between Day and Night limits	Night mode	no light output, but lights remain powered on	this mode is triggered if contact to Master is lost, lights are powered on

CONTENTS

1	ABOUT THIS PRODUCT	4
1.1	Product Codes	5
1.2	Block diagrams	6
1.3	Parts	7
1.4	Controller board	8
2	INSTALLATION	9
2.1	Device installation	9
2.2	Inserting SIM card (-T models)	11
2.3	Wiring	12
2.3.1	EMC cable glands	12
2.3.2	AC power IN/OUT	12
2.3.3	DC power IN/OUT	13
2.3.4	RS-485 OUT 1/OUT 2	13
2.3.5	Alarm Relay	14
3	OPERATION	14
3.1	Status LEDs	14
3.2	RS-485 termination resistor	14
3.3	Operating the unit with the LCD panel	15
3.3.1	Summary of the menus	15
3.3.2	Main -> Lamp Status	24
3.3.3	Main -> Photocell Status	24
3.3.4	Main -> GPS Status	24
3.3.5	Main -> Status	24
3.3.6	Main -> Settings	28
3.3.7	Main -> Test	32
3.3.8	Main -> About	33
3.3.9	Main -> Calibrate Door	33
3.3.10	Main -> GSM Status	33
3.3.11	Main -> GSM Settings	33
3.3.12	Main -> R.Ctrl	34
3.3.13	Main -> SI.Addr	35
3.3.14	Main -> SMS SI.Sett	35
3.3.15	Main -> SMS SI.Status	37
3.3.16	Main -> CSV Settings	37
3.3.17	Main -> CSV Pattern	38
3.3.18	Main -> CSV Status	40
3.3.19	Main -> Offsets	40
3.4	Operating the unit with SMS Commands (-T models)	40
3.4.1	The format of SMS commands	41
3.4.2	SET - Set database variable	41
3.4.3	READ - Read database variable	41

3.4.4	PWC - Password for control	42
3.4.5	PWS - Password for settings	42
3.4.6	CTRL - Control	42
3.4.7	MBW - Modbus write	43
3.4.8	MBR - Modbus read	43
3.4.9	RDM - Read multiple	44
3.4.10	RDMH - Read multiple values human-readable	44
3.4.11	SETN - Set phone number	44
3.5	Light network examples	45
3.5.1	Example: 3 Low intensity (LI) lights, photocell, no GPS	45
3.5.2	Example: 1 Medium intensity light, 3 Low intensity lights, photocell, GPS, JB	46

1 ABOUT THIS PRODUCT

Obelux Control Panel M1 is designed for controlling Modbus connected Obelux aviation lights. The unit offers several features including photocell support, several flash modes, fault signal in case of malfunction and GPS synchronization (from GPS capable light or optional receiver within cabinet). The unit has a LCD screen and buttons for configuring the lights. The control panel M1 communicates with the connected lights to synchronize the flashing of the lights, providing time of day information and collecting the status of the lights. Status reporting is done via alarm relay output and LCD screen messages.

Mechanical characteristics

- ▶ Cabinet size
Steel: 300x200x150 mm
Polycarbonate: 300x200x132 mm
- ▶ Weight
Steel cabinets: <6 kg
Polycarbonate cabinets: <2,5 kg
- ▶ Design degree of protection:
IP65 (ventilation IP44)
- ▶ Cable glands
4 x M20 (Ø6-13 mm cable)
4 x M25 (Ø11-17 mm cable)
EMC glands in steel cabinets

Electrical characteristics

- ▶ Operating voltage
AC version: 100-240VAC, 50/60 Hz
DC version: 10-60VDC
- ▶ Operating temperature range: -40°C to +55°C
- ▶ Power consumption: 1W
- ▶ Serial ports: RS-485 bus shared by 2 terminals
- ▶ Alarm Relay: NO/NC dry contact
- ▶ Max relay voltage/current:
277VAC @ 3A; 30VDC @ 3A

1.1 Product Codes

Order code	Operating voltage	GSM	GPS	Cabinet material	Dimensions (L x W x D)	Weight
AC MODELS						
CP-AC-M1-P	100-240VAC	No	No	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-AC-M1-T-P	100-240VAC	Yes	No	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-AC-M1-G-P	100-240VAC	No	Yes	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-AC-M1-T-G-P	100-240VAC	Yes	Yes	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-AC-M1-S	100-240VAC	No	No	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-T-S	100-240VAC	Yes	No	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-G-S	100-240VAC	No	Yes	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-T-G-S	100-240VAC	Yes	Yes	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-SS	100-240VAC	No	No	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-T-SS	100-240VAC	Yes	No	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-G-SS	100-240VAC	No	Yes	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-T-G-SS	100-240VAC	Yes	Yes	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-AS	100-240VAC	No	No	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-T-AS	100-240VAC	Yes	No	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-G-AS	100-240VAC	No	Yes	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
CP-AC-M1-T-G-AS	100-240VAC	Yes	Yes	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
DC MODELS						
CP-DC-M1-P	10-60VDC	No	No	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-DC-M1-T-P	10-60VDC	Yes	No	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-DC-M1-G-P	10-60VDC	No	Yes	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-DC-M1-T-G-P	10-60VDC	Yes	Yes	Polycarbonate	300 x 200 x 132 mm	<2.5 kg
CP-DC-M1-S	10-60VDC	No	No	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-T-S	10-60VDC	Yes	No	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-G-S	10-60VDC	No	Yes	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-T-G-S	10-60VDC	Yes	Yes	Painted steel (RAL 7035)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-SS	10-60VDC	No	No	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-T-SS	10-60VDC	Yes	No	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-G-SS	10-60VDC	No	Yes	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-T-G-SS	10-60VDC	Yes	Yes	Stainless steel (AISI 304)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-AS	10-60VDC	No	No	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-T-AS	10-60VDC	Yes	No	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-G-AS	10-60VDC	No	Yes	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg
CP-DC-M1-T-G-AS	10-60VDC	Yes	Yes	Acid proof steel (AISI 316)	300 x 200 x 150 mm	<6 kg

1.2 Block diagrams

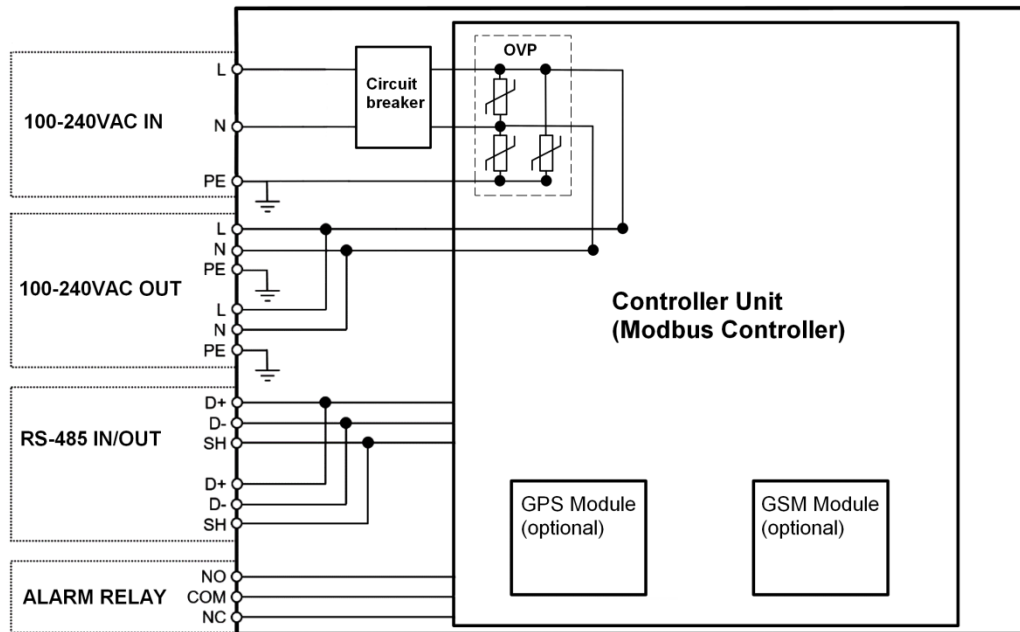


Figure 1. Block diagram for AC models

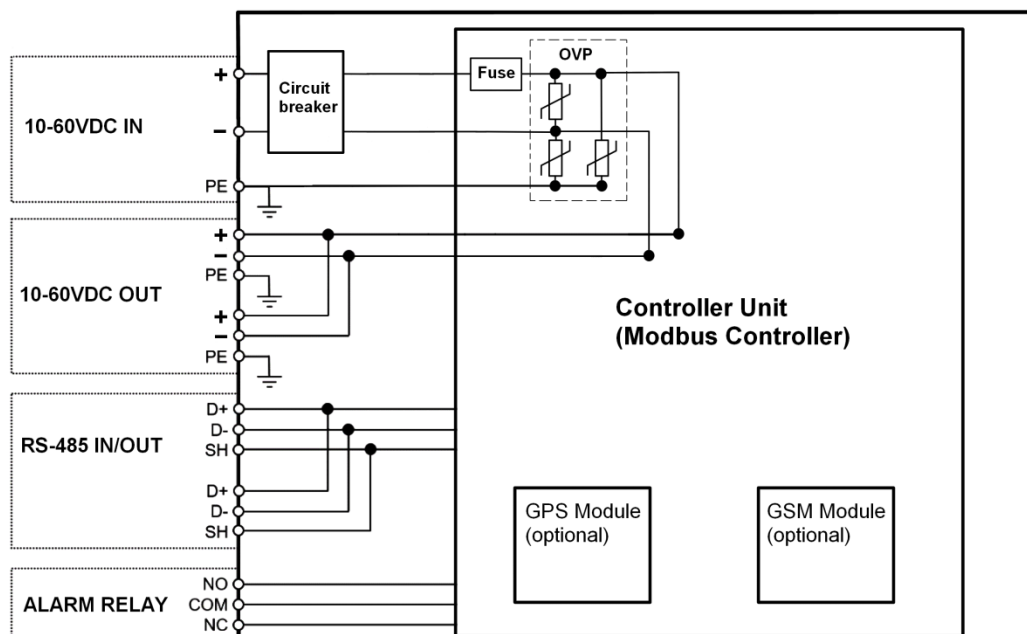


Figure 2. Block diagram for DC models

1.3 Parts

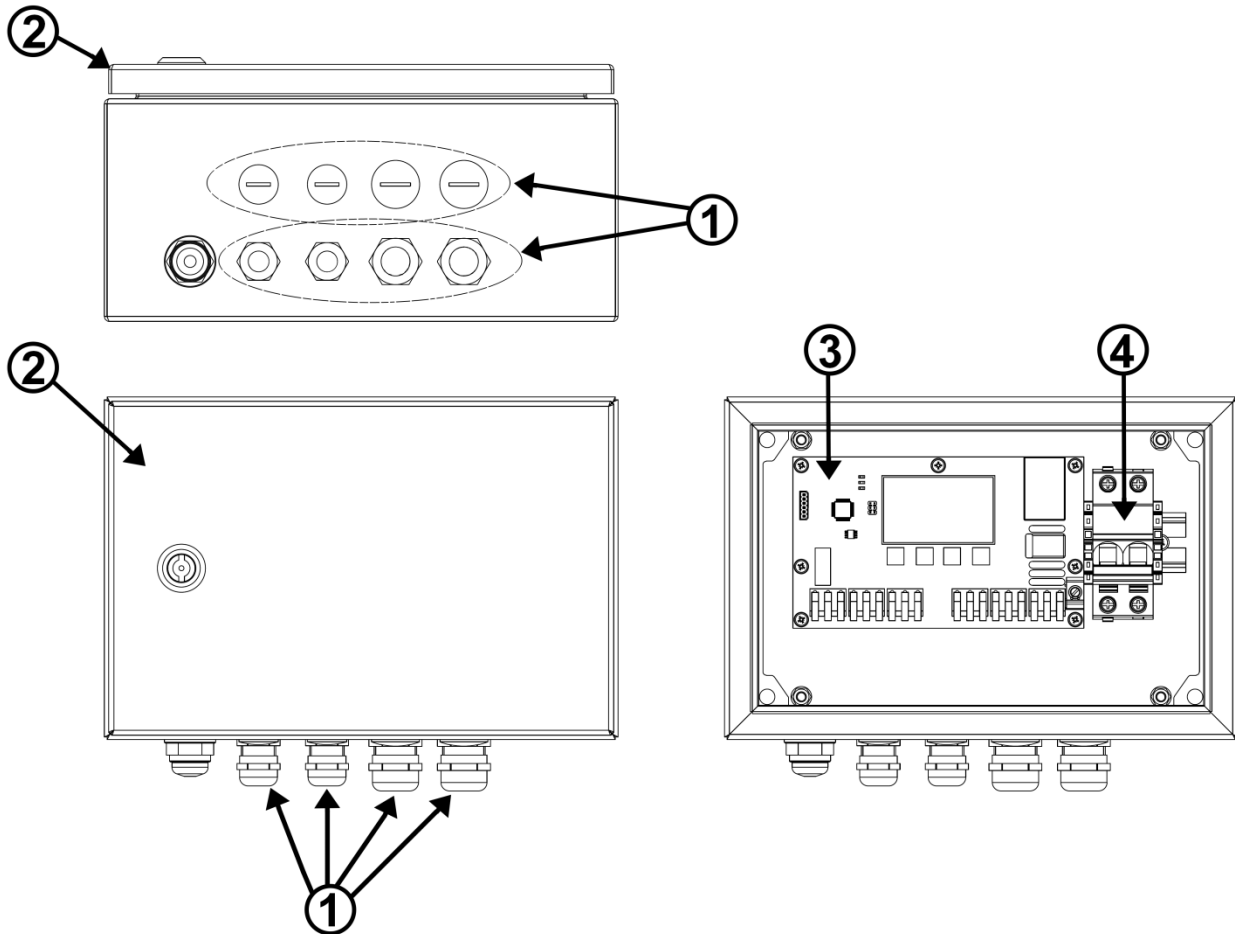


Figure 3. Basic functional parts (steel cabinet)

1. Cable Glands (4x M20, 4x M25, (+1x M16 in polycarbonate cabinet))
2. Service access door
3. Controller board
4. Circuit breaker

1.4 Controller board

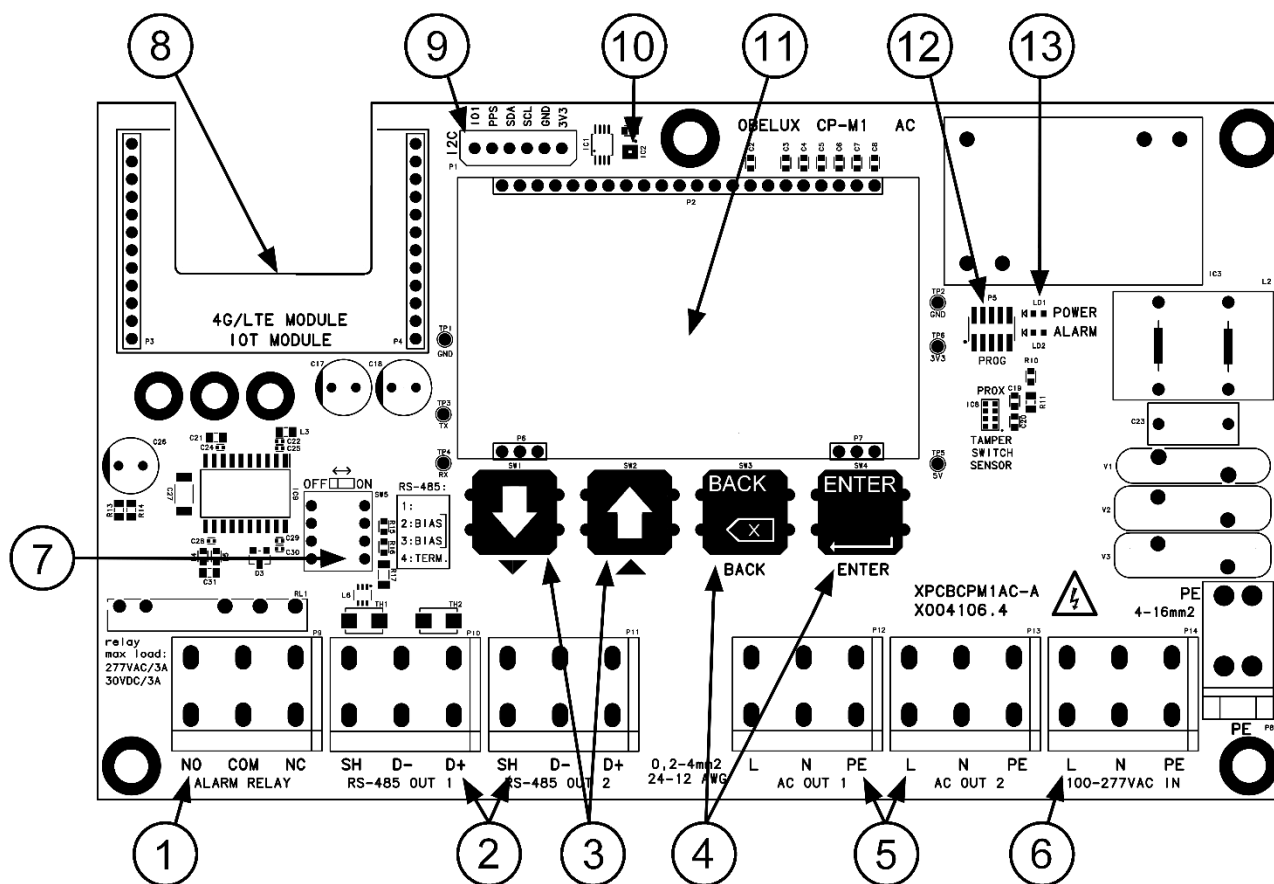


Figure 4. Controller board (AC version)

1. Alarm relay
2. RS-485 (Modbus) outputs (2) (shared RS-485 bus)
3. Down/Up buttons for LCD panel
4. Back/Enter buttons for LCD panel
5. Power output terminals (2)
6. Power input terminal
7. RS-485 (Modbus) termination resistor DIP switch (switch 4)
8. 4G/LTE module (GSM option)
9. I2C terminal for external GPS and photocell support
10. Internal Photocell (can be used only with a transparent cover (polycarbonate cabinets), as the photocell needs an unobstructed view of the sky)
11. LCD panel
12. Programming terminal
13. Status LEDs (in polycarbonate cabinets these LEDs can be seen through transparent cover)

2 INSTALLATION

2.1 Device installation

Install the device to the selected mounting point. When the cabinet door is open, check that there is no inflow of water (incl. hail and snow) into the cabinet. Make sure that all unused cable glands or gland holes are sealed.

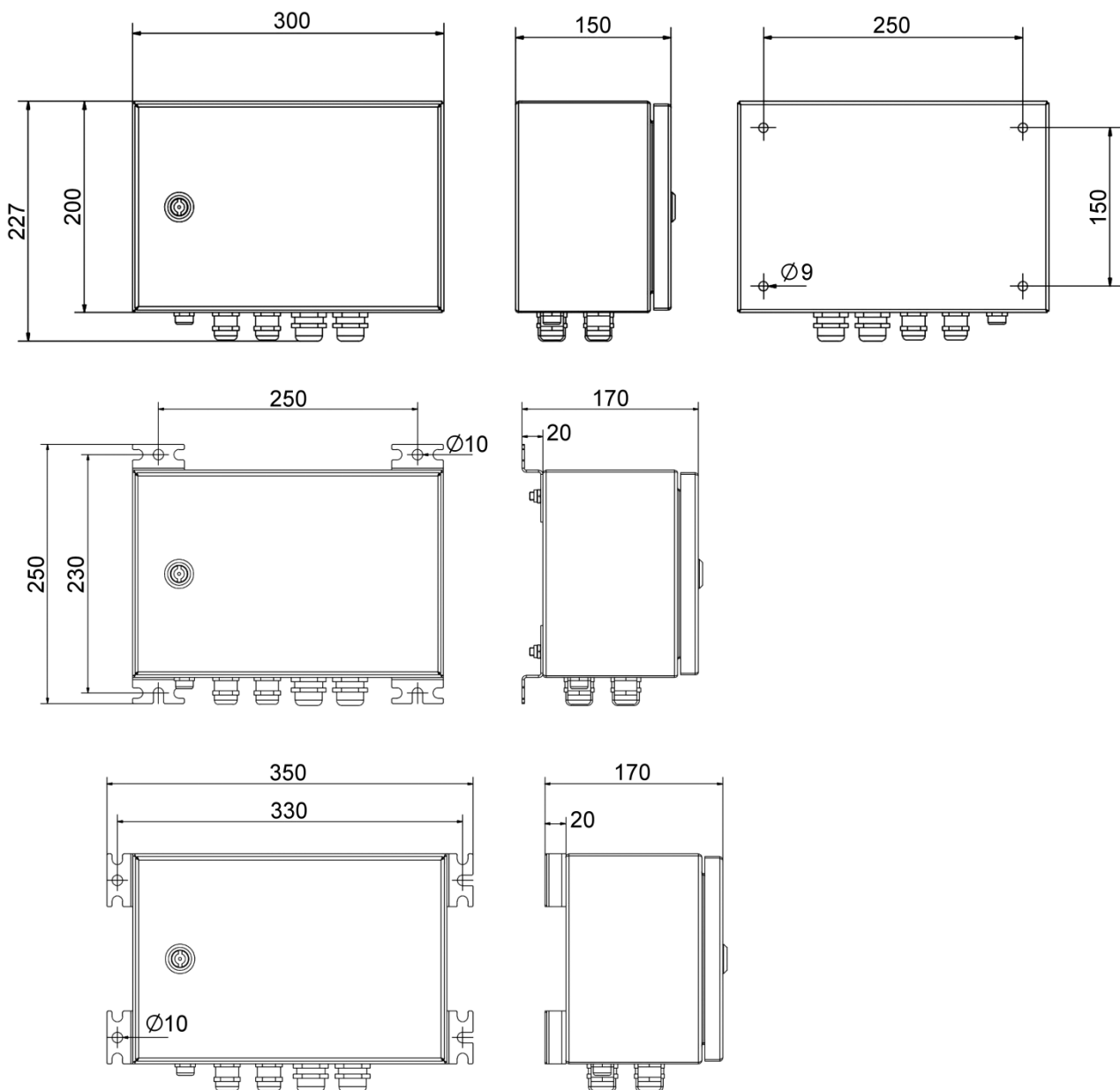


Figure 5. Steel cabinet dimensions [mm]

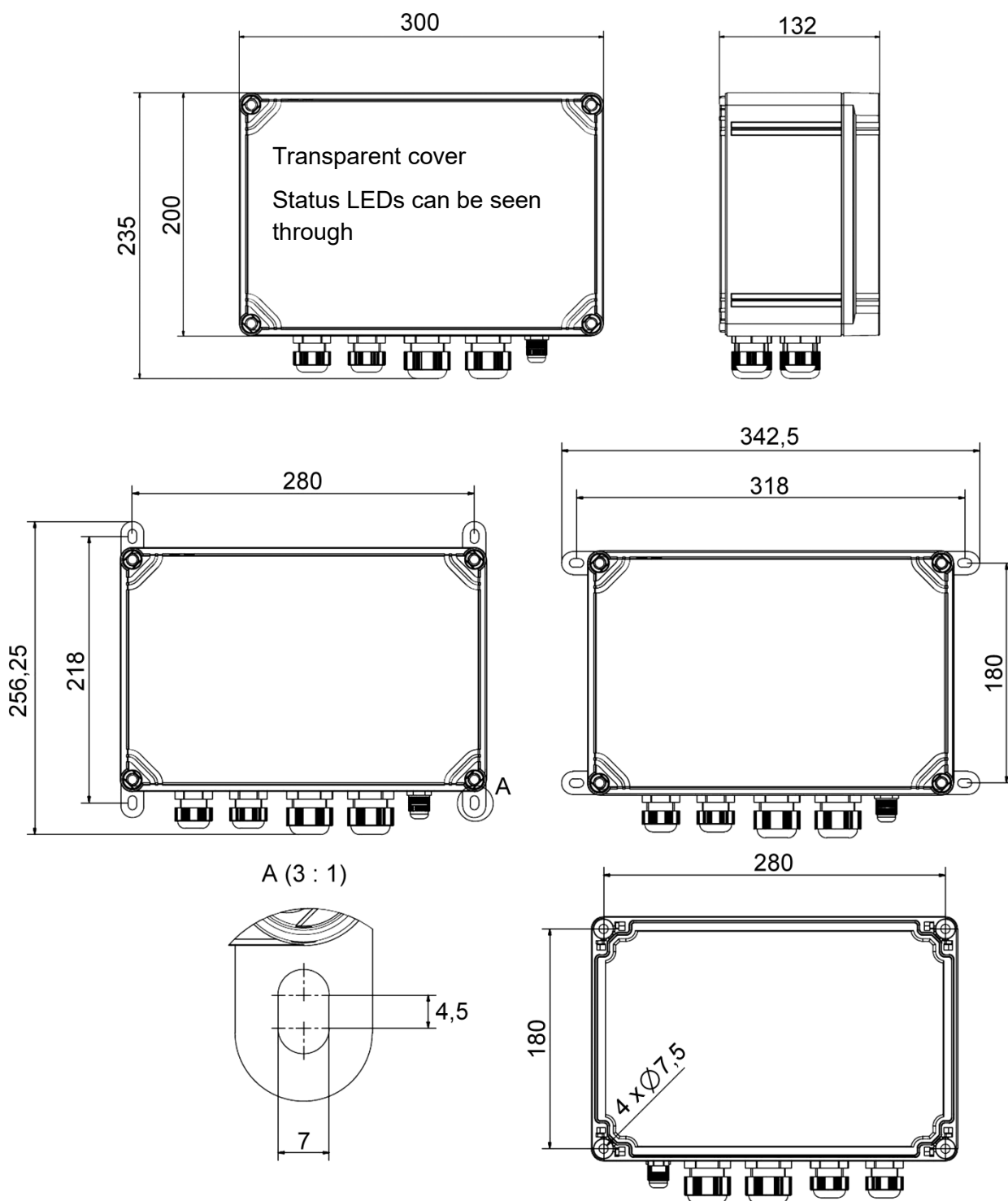
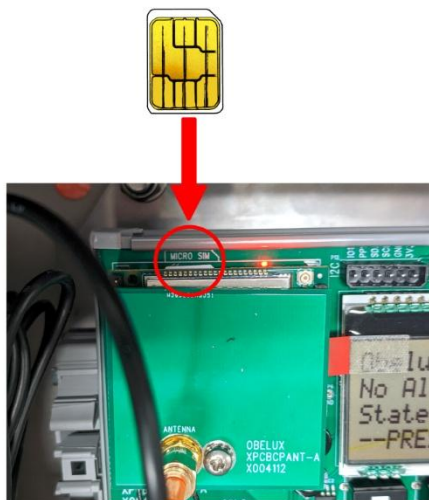


Figure 6. Polycarbonate cabinet dimensions [mm]

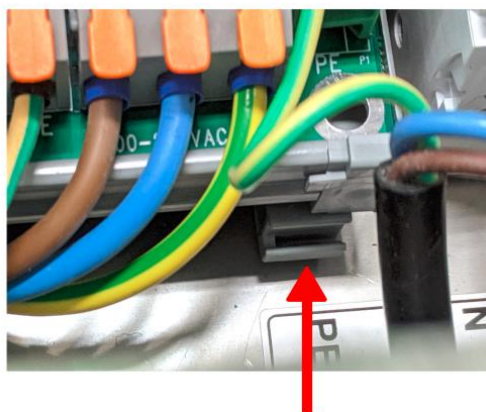
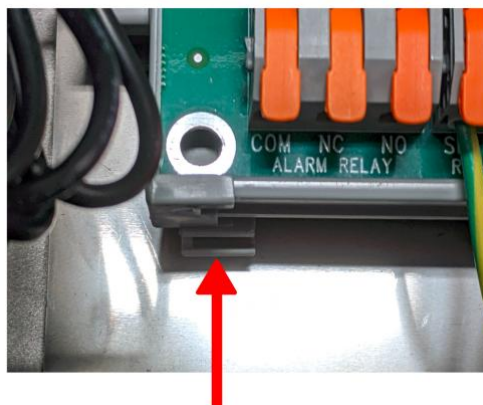
2.2 Inserting SIM card (-T models)



Power off the device before inserting the SIM card into 4G/LTE module.

Note: a SIM card may need to be activated by inputting its PIN code in a cellphone and making a phone call.

To ease inserting the Micro SIM card, the PCB can be taken out of the cabinet as it is attached to a DIN rail with 2 blocks. Push a screwdriver to release latch of the blocks and pivot the blocks off the rail. At the same time wiggle and lift the PCB upwards to get it loose.



To put the PCB back on the DIN rail, push it downwards and the blocks should make an audible snap as they are locked on the DIN rail.

2.3 Wiring

Route cables through cable glands. Make sure all unused cable gland holes are sealed.



Power/RS-485/Relay terminal block



Wire strip length 9-11mm

2.3.1 EMC cable glands

Steel cabinets are EMC compliant already, so it is not necessary to use EMC cable glands. EMC cable glands can be used in steel cabinets only.



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

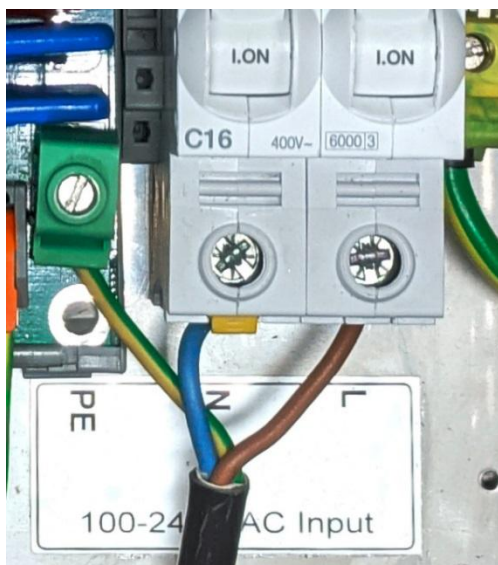
1. Partially expose the braided screen by removing the outer sheath of the cable at a length of approx. 10 mm.
2. Insert the cable through the dome nut and the gland body until the contact spring is pressed against the braided screen.
3. Firmly screw on dome nut.

2.3.2 AC power IN/OUT

Mark	Description
L	Live pole
N	Neutral pole
PE	Protective earth pole

Operating voltage	100-240VAC, 50/60 Hz
Conductor cross-section	0.2mm ² - 4mm ² (24-12 AWG)
Recommended cable size	2.5mm ² (14 AWG)

AC models have AC IN and 2 AC OUT terminals. The AC IN terminal is wired through circuit breaker. Connect wires to the circuit breaker and PE terminal on the controller board. The AC OUT terminals can be used to distribute power. The terminals are Wago Push-in CAGE CLAMP® type.



Mains IN wiring

2.3.3 DC power IN/OUT

Mark	Description
+	Positive pole
-	Negative pole
GND	Ground pole

Operating voltage	10-60VDC
Conductor cross-section	0.2mm ² - 4mm ² (24-12 AWG)
Recommended cable size	2.5mm ² (14 AWG)

DC models have DC IN and 2 DC OUT terminals. The DC IN terminal is wired through circuit breaker. Connect wires to the circuit breaker and PE terminal on the controller board. The DC OUT terminals can be used to distribute power. The terminals are Wago Push-in CAGE CLAMP® type.

2.3.4 RS-485 OUT 1/OUT 2

Mark	Description	Information
D+	Data +	RS-485 non-inverting pole
D-	Data -	RS-485 inverting pole
SH	Shield	Shield wire

Modbus is shared by 2 RS-485 terminals. Unused terminals can be left floating, i.e. no wiring there is required. The terminals are Wago Push-in CAGE CLAMP® type.

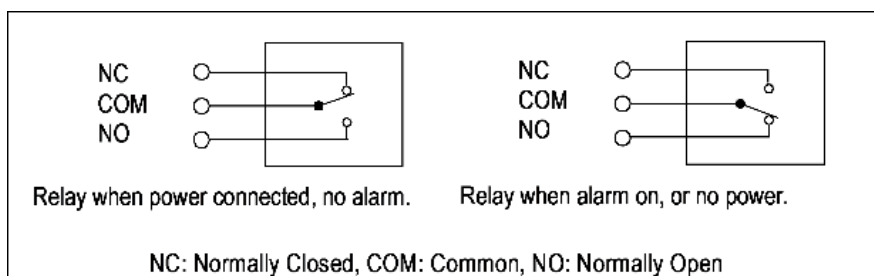
Conductor cross-section	0.2mm ² - 4mm ² (24-12 AWG)
Recommended cable size	0.75mm ² - 1.5mm ² (20-16 AWG) shielded twisted pair or shielded CAT cable

2.3.5 Alarm Relay

Mark	Description	Information
NO	Normally Open	Normally open contact; in alarm, connected with COM
COM	Common	Common relay contact
NC	Normally Connected	Normally connected with COM; in alarm, open contact

Unused alarm relay terminals can be left floating, i.e. no wiring is required. The terminal is Wago Push-in CAGE CLAMP® type.

Conductor cross-section	0.2mm ² - 4mm ² (24-12 AWG)
Recommended cable size	0.75mm ² - 1.5mm ² (20-16 AWG) or shielded CAT cable
Relay maximum load	277VAC @ 3A; 30VDC @ 3A



Relay operation

3 OPERATION

3.1 Status LEDs

LED	Description
POWER	Internal operating voltage (GREEN) LED OFF: power off LED ON: power on
ALARM	Alarm indicator (RED) LED OFF: Normal operation, no alarms LED ON: Active alarm condition

3.2 RS-485 termination resistor

Turn on termination resistor DIP switch on devices on both ends of the RS-485 bus, or between the furthest devices on the bus.

3.3 Operating the unit with the LCD panel

Manual is current for SW: v1.51.

Use the Up/Down/Back/Enter buttons to navigate the LCD panel menus. All values shown in the menus in this manual are examples only.

Navigation keys	
Down arrow	Down
Up arrow	Up
BACK	Left
ENTER	Right

Press BACK to go back in the menus. Press ENTER to select, and go forward in the menus.

On screens with numerical value input, press UP/DOWN to enter values, press ENTER/BACK to go to next/previous digit.

3.3.1 Summary of the menus

Summary of the menus				
Main menu	Lamp Status	R	Lamp 1...Lamp 16	Status of individual lamps, unit supports up to 16 lamps
	Photocell Status	R	Photocell 1 and 2	Photocells reading in luxes, current time-of-day mode, sensor status
	GPS Status	R	GPS 1 and 2	GPS information
	Status	R	ToD	Time-of-Day resolved from photocell data and lux settings 0 - Night, 1 - Twilight, 2 - Day, 3 - Off, 4 - Steady, 5 - Failsafe
			FPM	Flashes Per Minute lamps current flash rate 0 - Steady, 20 - 20 FPM, 30 - 30 FPM, 40 - 40 FPM, 60 - 60 FPM
			Luminos.	Currently measured ambient illuminance Luxes [lx] reported by the photocell
			PC-S	Photocell state
			GPS-S	GPS state
			Alarms	Active alarms
			Lamp ERROR	Alarm in lamp
			Lamp CONN	Modbus connection error to a lamp
			PC ERROR	Photocell error
			PC2 ERROR	Secondary photocell error
			GPS ERROR	GPS communications error
			GPS2 ERROR	Secondary GPS communications error
			GPS SIGNAL	No GPS signal
			Vin Low	Vin below limit
			V.Chg Trig	Vin didn't rise to this voltage during last 24h
			ToD Cycle	No Time-of-Day state change in 24h
			SMS SL-ERROR	Modbus slave error(s) via SMS
			SMS SL-CONN	Modbus slave connection alarm via SMS

Summary of the menus		
		Output 1 Current limit breached at Output 1 (DC lights, CSV functionality)
		Output 2 Current limit breached at Output 2 (DC lights, CSV functionality)
	Proxy	Current output value of the proximity sensor, used to detect door opening
	Pr. Avg.	Proximity sensor average. The sensor values are averaged to detect door opening. Sensor is sensitive to reflective (metal) surfaces. The closer an object is, the bigger its value is.
	SW Ver.	Software version
	Uptime	Uptime since powered on [hh:mm:ss]
	V.in	Voltage in power input
	V.Bus 1	Bus 1 Voltage. Measured voltage in bus 1 (DC OUT 1 output)
	V.Bus 2	Bus 2 Voltage. Measured voltage in bus 2 (DC OUT 2 output)
	Vin Min	Minimum recorded input voltage during last 24h
	Vb1 Min	Minimum recorded V.Bus 1 voltage during last 24h
	Vb2 Min	Minimum recorded V.Bus 2 voltage during last 24h
	Vin Max	Maximum recorded input voltage during last 24h
	Vb1 Max	Maximum recorded V.Bus 1 voltage during last 24h
	Vb2 Max	Maximum recorded V.Bus 2 voltage during last 24h
	Door	Cabinet door open or closed status (Closed / Open). Status resolved from Proxy sensor reading and Proxy lmt
	T-Sen.OK	Temperature sensor status (Yes / No). Whether the temperature sensor is communicating correctly.
	Temp	Temperature sensor value [°C] Range: 0.00..999.99
	Test Tmr	Time left until the Test table is reset to default values [hh:mm:ss]
	Avg. Lux	Averaged ambient illuminance in luxes
	Avg L.OK	Lux Averaging OK Whether the lux averaging has been running long enough to produce a meaningful value (0 - No, 1 - Yes)
	Mode time	Time in Current Mode Time since the last change of Time-of-Day [hh:mm:ss]
	PC ToD	Photocell Time-of-Day Time-of-Day calculated from photocell measurements
	ToD Src	Time-of-Day Source The subsystem that has determined the current system Time-of-Day mode
	Heap	Reserved
	SMS-S-NR	Non-Responded SMS Slaves SMS slave units(1-16) that have not yet responded to last message

Summary of the menus				
			SMS-S-ALM	Alarm SMS Slaves SMS slave units (1-16) that have an active alarm condition
			SMS-S-UR	Unresponsive SMS Slaves SMS slave units (1-16) that have not responded to any hails since last command
			Sent SMS	Number of SMS messages sent since last reboot
			Recd SMS	Number of messages received since last reboot
			Raw Alarm	Which alarm sources are currently active. These are unfiltered alarms (Main -> Settings -> Alarm Mask)
			Prox. Stat	Proximity sensor state Status of on-board door proximity sensor (0 - N/A, 1 - OK, 2 - Error)
			Int.PC St	Internal photocell status
			Int.PC Lx	Internal photocell measured illuminance in luxes
	Settings (password:01267)	W	Num. Lamp	number of connected lamps, unit supports up to 16 lamps
			Lux Day	lux limit for Day mode (Default: 1600, Range: 0-65535)
			Lux Night	lux limit for Night mode (Default: 400, Range: 0-65535)
			FPM Day	flash rate in Day mode (Default: 40, Range: 0-65535)
			FPM Night	flash rate in Night mode (Default: 40, Range: 0-65535)
			FPM FS	flash rate in Failsafe mode (Default: 30, Range: 0-65535)
			B.Bits	Behavior bits
			LI Red On Twil.	Low intensity lamps turn red on Twilight
			MI Red On Twil.	Medium intensity lamps turn red on Twilight
			HI Red On Twil.	High intensity lamps turn red on Twilight
			LI Flash Visib.	Low intensity lamps flash instead of being steady
			LI Flash IR	Low intensity lamps flash IR
			PC Type	Photocell type
			None	No photocell
			Modbus	Photocell data from a Modbus connected lamp
			I2C Ext	I2C connection via I2C terminal
			I2C Int	I2C connection from internal photocell
			Analog	Analog voltage from phototransistor
			MBv1	Modbus v1, protocol for old Obelux lamps (8-bit MCU lamps)
			PC Addr.	Photocell address (Modbus address) (Disabled, 1-255)
			2nd PC-A.	secondary photocell address (Modbus address) (Disabled, 1-255)
			GPS Type	GPS connection type
			None	No GPS
			Modbus	Lamp or external device connected to Modbus
			I2C Ext	I2C connection via I2C terminal
			GPS Addr.	Address of Primary GPS (Modbus) (0-254)
			2nd GPS-A	Address of secondary GPS (Modbus) (0-254)
			Def. ToD	Default Time-of-Day, to be used when photocells are not available
			Night	
			Twilight	

Summary of the menus			
			Day
			Off
			Failsafe
			Relay
			Normal
			Reversed
			Disabled
			Hot-Spare
			TSSE
			No
			Yes
			Scr. Tmo.
			VIn Trig
			VIn Norm
			Reserved
			GPS Alm. T
			Vch. Trig
			Alarm Mask
			Lamp ERROR
			Lamp CONN
			PC ERROR
			PC2 ERROR
			GPS ERROR
			GPS2 ERROR
			GPS SIGNAL
			Vin Low
			V.Chg Trig
			ToD Cycle
			SMS SL-ERROR
			SMS SL-CONN
			Output 1

Summary of the menus					
				Output 2	Current limit breached at Output 2 (DC lights, CSV functionality)
			Proxy lmt	Door Sensor Threshold The threshold value for the proximity sensor that triggers cabinet door open state. (Default: 1000) (Range: 0-65535)	
			L.Avg Sec	Lux Averaging Time Number of seconds illuminance measurements are averaged for ToD determination (Range: 1-3600)	
			Tmo ToD	Remote Control timeout for Time-of-Day, set in R.Ctrl -> ToD V (Range: 0-60000)	
			Tmo L.Off	Remote Control timeout for Lights Off function. After the timeout, the control panel discards the R.Ctrl -> L.Off V setting (Range: 0-60000)	
			Tmo Dimm.	Remote Control timeout for Dimming. After the timeout, the control panel discards the R.Ctrl -> Dimm. V setting (Range: 0-60000)	
			RC-C PW	Remote Control Password for Control Password that SMS messages must give to write to R.Ctrl (Remote Control)	
			RC-S PW	Remote Control Password for Settings Password that SMS messages must give to write to Settings	
			MB-S Mode	Modbus slave mode Whether RS-485 Modbus interface is in Slave mode instead of Master (No, Yes)	
			Red Day	Red Day transmission Handling of the Red Day behavioral directive register in slaves (Not Sent, Yes, No)	
			Scr.Id.Pw	Screen Idle Power Intensity of screen backlight when idle (Range: 0-100)	
			PPS pin	PPS pin usage (PPS, Debug)	
			Prog. Ena	Features Enable Enables functionality (and corresponding menus) in the unit	
				Modem/GSM	
				RC	Remote Control
				SMS Master	
				Time Offset	Offsetting lights flashing
				CSV	
				Door Proxy	
				Code Input	
				MB Master	Modbus master
			Num.Lamp.	number of connected lamps on 2 nd Modbus, unit supports up to 16 lamps per Modbus	(for future product)
			Num.Lamp.	number of connected lamps on 3 rd Modbus, unit supports up to 16 lamps per Modbus	(for future product)
			PC Corr.	correction factor for internal photocell (photocell is inside transparent cover in polycarbonate cabinets)	Default:1024 (100%), Min:1, Max: 2048 100% means the sensor has direct view of the sky and no glass losses
	Test	W	ToD Test	Sets ToD state	
				No Test	Test off
				Night	Night mode
				Twilight	Twilight mode
				Day	Day mode
				Off	Turn off lamps (lamps remain powered on)
				Failsafe	Failsafe mode
				Steady	Steady lights
			Relay Test	Actuates the alarm relay to test functioning	
				No Test	Test off
				Alarm	Active alarm condition
				No alarm	No alarm condition

Summary of the menus						
			Time Spd.	Time speedup Accelerates some functions of the unit for testing purposes		
			Off	No test		
			x60	Time speedup x60		
			T-Tmr Off	Test Timer Off Changing Testing values automatically starts this timer. With the timer on, after 12 hours all values return to defaults (test off). This disables the timer. No - Timer not disabled, Yes - Disables the timer		
			Light Off	Sets the lights-off state. Turns off lights.		
				Inactive		
				IR Only		
				All Off		
			WDT Test	Watchdog Test Stops the software and the watchdog timer reboots it. Default: No. Yes - Resets the unit.		
			About...	R	Product code and software version	
			Calibrate Door (password:01267)	W	Calibrates proximity sensor for detection of door open status.	
			GSM Status	R	Shows status of GSM modem	
			GSM Settings (password:01267)	W	GSM modem settings	
Alerts	Alert number (phone number) The number to which status and alarm reports are sent.					
AuxCtl1	Auxiliary alert number (phone number)					
AuxCtl2	Auxiliary alert number (phone number)					
Name	Name of unit The unit name is displayed in some SMS messages and other communications.					
PIN	SIM card PIN (Range: 0...9999)					
Ret. Min	PIN Retries Minimum number PIN attempts remaining in SIM for an unlock attempt to be made. (Range: 0...9999)					
Unit ID	Unit ID ID number is included in all alarm and status messages as a primary identifier. (Range: 0...9999)					
Reports	Enabled/Disabled Reports Enabled reports are sent to the Alerts number.					
	Bit	Report				
	B0	Startup				
	B1	Heartbeat				
	B2	Alarms				
	B3	Mode Change				
	B4	Door Sensor				
	B5	V.In Low				
	B6	V.Bus1 Low				
	B7	V.Bus2 Low				
	B8	Lamp comm.				
	B9	Lamp alarms				
	B10	Response				
HB Interv	Heartbeat Interval Interval of heartbeat messages, in minutes. (Range:1...48)					
Num.Mtch	Number matching SMS message privilege elevation by matching sender number to settings numbers.					
	0 - Off	No number matching				
	1 - Regular	Check 5 numbers of the phone number These 5 numbers must match.				
	2 - Strict	The whole number must match				
R.Preamb	Response preamble Add a preamble to response messages, to identify the protocol.					
	0 - No	Don't add preamble.				
	1 - Yes	Add preamble.				

Summary of the menus				
	R.Ctrl		Aux1 Rep.	Aux1 Reports Same reports as enabled in Reports are sent to Aux1 number.
			Aux2 Rep.	Aux2 Reports Same reports as enabled in Reports are sent to Aux2 number.
			Roam Ena.	Roaming enabled Modem may access networks other than home network (No, Yes)
		R	Remote control	
			ToD V	Time-of-Day value Set the Day or Night mode.
				Night
				Twilight
				Day
				Off
				Failsafe
			L.Off V	Lights Off value Set the Lights Off mode.
				Inactive L. Off V inactive
				IR Only Only infrared lights go to Off mode.
				All Off All lights go to Off mode.
			Dimm. V	Dimming value (Range: 10-100)
			ToD C	Time-of-Day Controlled
				No
				Yes Indicates that the value is written from the outside, e.g. via SMS.
			L.Off C	Lights Off Controlled
				No
				Yes Indicates that the value is written from the outside, e.g. via SMS.
			Dimm. C	Dimming Controlled
				No
				Yes Indicates that the value is written from the outside, e.g. via SMS.
			ToD T	Time-of-Day timer [hh:mm:ss]
			L.Off T	Lights Off timer [hh:mm:ss]
			Dimm. T	Dimming timer [hh:mm:ss]
	Sl.Addr (password:01267)	W	Slave addresses	
			Addresses of Units 1-16	Address of a slave unit. In case of SMS-capable control panel, this is the phone number of the slave unit.
	SMS Sl.Sett. (password:01267)	W	SMS slave units settings	
			Num. SI	Number of slaves (Range: 0-16)
			CHK Inter	Check interval (Range: 1-10080)
			HA Interv	Hail interval (Range: 1-10080)
			HA Count	Hail count (Range: 1-99)
			Alm. Mask	Alarm Mask. Bitfield.
				Bit Alarm
				B0 Lamp ERROR
				B1 Lamp CONN
				B2 PC ERROR
				B3 PC2 ERROR

Summary of the menus					
				B4	GPS ERROR
				B5	GPS2 ERROR
				B6	GPS SIGNAL
				B7	Vin Low
				B8	V.Chg Trig
				B9	ToD Cycle
				B10	SMS SL-ERROR
				B11	SMS SL-CONN
				B12	Output 1
				B13	Output 2
SMS Sl.Status	R	Status of the SMS slaves			
		OK	Number of slaves that responded and do not have alarms.		
		RE	Total number of slaves that have responded.		
		ALM	Number of slaves that have an active alarm condition.		
		TOT	Total number of configured slaves.		
		CFG	Number of slaves that a message could not be sent to due to configuration error.		
CSV Settings (password:01267)	W	Settings for CSV functionality (DC lights)			
		Mode	CSV operating mode		
			Digital	ON - OFF flashing (lights have autonomous flashing control)	
			Pattern	Patterned flashing	
		Options	CSV options		
			Sets outputs 1 and 2 ON at Night/Twilight/Day, if output is not selected, then it is OFF. Bitfield.		
			B0	O1 On Night	Output 1 ON at Night
			B1	O1 On Twilight	Output 1 ON at Twilight
			B2	O1 On Day	Output 1 ON at Day
			B3	O2 On Night	Output 2 ON at Night
			B4	O2 On Twilight	Output 2 ON at Twilight
			B5	O2 On Day	Output 2 ON at Day
		Steps	Number of steps in the flashing pattern of the output determined in CSV Pattern . Min:2, Max:16		
		Meas.Del	Turn-on grace time Delay for lamp current measurement to start. Min:1, Max:10000 [ms]		
		I _{max} 1	Max current ch1 Overcurrent limit for Output 1. Min:0.001, Max:1.000 [A]		
		I _{Min} 1	Min current ch1 Undercurrent limit for Output 1. Min:0.001, Max:1.000 [A]		
		I _{max} 2	Max current ch2 Overcurrent limit for Output 2. Min:0.001, Max:1.000 [A]		
		I _{Min} 2	Min current ch2 Undercurrent limit for Output 2. Min:0.001, Max:1.000 [A]		

Summary of the menus					
CSV Pattern (password:01267)	W	Defines flashing pattern for DC lights connected at DC OUT 1 / DC OUT 2 terminals.			
		Chn.On-1...Chn.On-16	Channels on		
			Output enabler. Channels to keep on for this step.		
			Out 1 corresponds to DC OUT 1, Out 2 corresponds to DC OUT 2. Bitfield.		
		B0	Out1	Output 1 is ON if selected, otherwise Output 1 is OFF	
B1	Out2	Output 2 is ON if selected, otherwise Output 2 is OFF			
		Time-1...Time-16	Timer. Time to remain in this step. After the timer has expired, the next step of the pattern is handled if CSV Settings -> Steps count is high enough. Min:20, Max:60000 [ms]		
CSV Status	R	Ch1 State	Output 1 (DC OUT 1) state		
			OK		
			Undercur	Undercurrent alarm at Output 1 (DC OUT 1)	
			Overcurr	Overcurrent alarm at Output 1 (DC OUT 1)	
			Off	Output 1 off (DC OUT 1)	
		Ch2 State	Output 2 (DC OUT 2) state		
			OK		
			Undercur	Undercurrent alarm at Output 2 (DC OUT 2)	
			Overcurr	Overcurrent alarm at Output 2 (DC OUT 2)	
			Off	Output 2 off (DC OUT 2)	
		I Max1	Maximum current of last flash at Output 1. [A]		
		I Max2	Maximum current of last flash at Output 2. [A]		
		I Min1	Minimum current of last flash at Output 1. [A]		
		I Min2	Minimum current of last flash at Output 2. [A]		
		V Max	Maximum input voltage during last flash cycle. [V]		
		V Min	Minimum input voltage during last flash cycle. [V]		
		V Start1	Voltage at the start of last flash at Output 1. [V]		
		V Start2	Voltage at the start of last flash at Output 2. [V]		
		V End1	Voltage at the end of last flash at Output 1. [V]		
		V End2	Voltage at the end of last flash at Output 2. [V]		
		I Start1	Current at the start of last flash at Output 1. [A]		
		I Start2	Current at the start of last flash at Output 2. [A]		
		I End1	Current at the end of last flash at Output 1. [A]		
		I End2	Current at the end of last flash at Output 2. [A]		
		Offsets (password:01267)	W	Offset.S1...Offset.S 16	Settings for offsetting lights flashing. Unit supports up to 16 Modbus connected lamps.

R = read-only, W = writable, user modifiable

3.3.2 Main -> Lamp Status

Lamp type, alarms, GPS and photocell status are reported from each lamp that supports them. A total of 16 lamps can be connected to the unit via RS-485 (Modbus) ports.

3.3.3 Main -> Photocell Status

Photocell status shows the status and reading of photocells. The unit supports 2 photocells from photocell capable lamp(s) or external photocell(s). If using 2 photocells, the 2nd one is a secondary (spare) photocell that is used only if connection is lost to the primary photocell.

3.3.4 Main -> GPS Status

Shows GPS status. The unit supports 2 GPS signals from GPS capable lamps or optional external receivers. If using 2 GPS devices, the 2nd one is a secondary (spare) GPS that is used only if connection is lost to the primary GPS.

GPS needs to connect to at least 3 satellites to get a fix. GPS No Fix means no GPS signal found or accurate (< 1s) time information is not available.

3.3.5 Main -> Status

Status		
Status value	Description	Information
ToD	current Time-of-Day state resolved from photocell data and lux settings	Night / Twilight / Day / Off / Failsafe / Steady
FPM	lights flash rate	flashes per minute In a system configured for monotonous flashing, this is the current rate of flashing. 0 - Steady, 20 - 20 FPM, 30 - 30 FPM, 40 - 40 FPM, 60 - 60 FPM
Luminos.	illuminance	Current ambient illuminance reading by the photocell. [lx]
PC-S	photocell status	Status of currently configured photocell. 0 - Disabled, 1 - OK, 2 - Waiting, 3 - Dev. ERROR, 4 - Comm. ERROR, 5 - Prot. ERROR, 6 - Dev. No Func.
GPS-S	GPS status	Status of currently configured GPS or GNSS receiver. 0 - Disabled, 1 - OK, 2 - Waiting, 3 - Dev. ERROR, 4 - Comm. ERROR, 5 - Prot. ERROR, 6 - Dev. No Func.

Status			
Status value	Description	Information	
Alarms	Active alarms Alarm sources that are currently active. These are filtered alarms by Main -> Settings -> Alarm Mask	Alarm	Description
		Lamp ERROR	Alarm in lamp
		Lamp CONN	Modbus connection error to a lamp
		PC ERROR	Photocell error
		PC2 ERROR	Secondary photocell error
		GPS ERROR	GPS communications error
		GPS2 ERROR	Secondary GPS communications error
		GPS SIGNAL	No GPS signal
		Vin Low	Vin below limit
		V.Chg Trig	Vin didn't rise to this voltage during last 24h
		ToD Cycle	No Time-of-Day state change in 24h
		SMS SL-ERROR	Modbus slave error(s) via SMS
		SMS SL-CONN	Modbus slave connection alarm via SMS
		Output 1	Current limit breached at Output 1 (DC lights, CSV functionality)
		Output 2	Current limit breached at Output 2 (DC lights, CSV functionality)
Proxy	Current output value of the proximity sensor.	[number], proximity sensor is meant to measure distance to cabinet door to detect if it is open, the closer an object is, the bigger the sensor value is	
Pr. Avg	Averaged value from the proximity sensor.	[number], the sensor values are averaged to better detect door opening. Sensor is sensitive to reflective (metal) surfaces.	
SW Ver.	software version number		
Uptime	uptime since powered on	[hh:mm:ss]	
V.in	voltage at the power input	0.00 ..999.99 [V] DC version	
V.Bus 1	Bus 1 Voltage	Measured voltage of bus 1 (DC OUT 1) on DC models. 0.00 ..999.99 [V]	
V.Bus 2	Bus 1 Voltage	Measured voltage of bus 1 (DC OUT 1) on DC models. 0.00 ..999.99 [V]	
Vin Min	Minimum recorded Vin voltage during last 24h	[V] DC version	
Vb1 Min	Minimum recorded voltage at DC OUT 1 output during last 24h	[V] DC version	
Vb2 Min	Minimum recorded voltage at DC OUT 2 output during last 24h	[V] DC version	
Vin Max	Maximum recorded Vin voltage during last 24h	[V] DC version	

Status		
Status value	Description	Information
Vb1 Max	Maximum recorded voltage at DC OUT 1 output during last 24h	[V] DC version
Vb2 Max	Maximum recorded voltage at DC OUT 2 output during last 24h	[V] DC version
Door	Cabinet door open or closed status.	State of cabinet door as derived from proximity sensor or door switch. Status resolved from Proxy sensor reading and Proxy lmt. (Closed / Open)
T.Sen OK	Temp. Sensor OK	Whether the temperature sensor is communicating correctly. (Yes / No)
Temp	Temperature	Measured temperature value from on-board temperature sensor. Range: 0.00...999.99 [°C]
Test Tmr	Test Timer	Time left until the Test table is reset to default values. [hh:mm:ss]
Avg. Lux	Average Lux	Averaged ambient illuminance. A measure of the intensity of light. [lx]
Avg L.OK	Lux Averaging OK	Whether the lux averaging has been running long enough to produce meaningful value. Values: 0 - No, 1 - Yes
Mode time	Time in Current Mode	Time since the last change of Time-of-Day. [hh:mm:ss]
PC ToD	Photocell Time-of-Day	Time-of-Day calculated from photocell measurements. Not necessarily system Time-of-Day, as Test and Remote Control have precedence over Photocell. Values: 0 - Night, 1 - Twilight, 2 - Day, 3 - Off, 4 - Steady, 5 - Failsafe, 65535 - N/A
ToD Src	Time-of-Day Source	The subsystem that has determined the current system Time-of-Day mode. Values: 0 - Testing, 1 - CT Rem., 2 - Rem.Ctrl, 3 - GPI PC, 4 - CT Aut., 5 -Photoc., 6 - Def.ToD
Heap	Reserved	
SMS-S-NR	NonResponded SMS Slaves	SMS slave units that have not yet responded to last message. Values: S1 - S16. Bitfield (B0-B15)
SMS-S-ALM	Alarm SMS Slaves	SMS slave units that have an active alarm condition. Values: S1 - S16. Bitfield (B0-B15)
SMS-S-UR	Unresponsive SMS Slaves	SMS slave units that have not responded to any hails since last command. Values: S1 - S16. Bitfield (B0-B15)

Status		
Status value	Description	Information
Sent SMS	Number of Sent SMS	Number of SMS messages sent since last reboot.
Recd SMS	Number of Received SMS	Number of messages received since last reboot.
Raw Alarm	Raw Alarms	Which alarm sources are currently active. These are unfiltered alarms by Main -> Settings -> Alarm Mask Shows all active alarm sources. Bitfield. Values: B(0) - Lamp ERROR, B(1) - Lamp CONN, B(2) - PC ERROR, B(3) - PC2 ERROR, B(4) - GPS ERROR, B(5) - GPS2 ERROR, B(6) - GPS SIGNAL, B(7) - Vin Low, B(8) - V.Chg Trig, B(9) - ToD Cycle, B(10) - SMS SL-ERROR, B(11) - SMS SL-CONN, B(12) - Output1, B(13) - Output2
Prox. Stat	Proximity sensor state	Status of on-board door proximity sensor. Values: 0 - N/A, 1 - OK, 2 - Error
Int.PC St	Internal photocell status	
Int.PC Lx	Internal photocell value	Current illuminance reading by the internal photocell. [lx]

3.3.5.1 Main -> Status -> Alarms

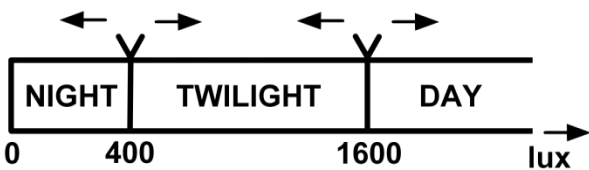
All alarm sources are displayed, and active alarms are checked.

Alarms		
Alarm	Description	Troubleshooting
Lamp ERROR	Alarm in a lamp	Check Main -> Lamp Status for details, contact your reseller.
Lamp CONN	No Modbus connection to a lamp	Check wiring and DIP settings. Check that lamp has a correct Modbus address and that there are no conflicting addresses. Check that termination resistor DIP switch is correct.
PC ERROR	Photocell failure	Check wiring, contact your reseller.
PC2 ERROR	Secondary photocell failure	Check wiring, contact your reseller.
GPS ERROR	GPS failure	Check wiring, contact your reseller.
GPS2 ERROR	Secondary GPS failure	Check wiring, contact your reseller.
GPS SIGNAL	GPS signal lost	Wait for signal, GPS needs to connect to at least 3 satellites to get a fix. Check wiring, contact your reseller.
Vin Low	Input voltage below alarm level	Check batteries and wiring (DC models).
V.Chg Trig	Vin didn't rise to voltage defined in Settings -> Vch. Trig during last 24h	Check batteries and wiring (DC models).
ToD Cycle	No Time-of-Day state change in 24h	Check that Photocell is clean and unobstructed. Check wiring, contact your reseller.

Alarms		
Alarm	Description	Troubleshooting
SMS-SL-ERROR	Modbus slave error(s) via SMS	Check the Alarm. Check the slave(s) with alarm(s). Contact your reseller.
SMS SL-CONN	Modbus slave connection alarm via SMS	Check wiring, contact your reseller.
Output 1	Current limit breached at Output 1 (DC lights, CSV functionality)	Check that current limits are set correctly at CSV Settings -> Imin1 / Imax1 . Check the load. Contact your reseller.
Output 2	Current limit breached at Output 2 (DC lights, CSV functionality)	Check that current limits are set correctly at CSV Settings -> Imin2 / Imax2 . Check the load. Contact your reseller.

3.3.6 Main -> Settings

Accessing the Settings menu requires a password: **01267**. It is factory set.

Settings				
Num. Lamp	Number of connected lamps	Max. of 16 Modbus connected lamps are supported. Range 0-16.		
Lux Day	Lux limit for Day (the limit for Day time-of-day mode)	[lx] Default 1600. Range 0-65535.  Adjustable Lux Night and Lux Day.  Setting Lux Day = Lux Night eliminates Twilight range.		
Lux Night	Lux limit for Night time-of-day mode	[lx] Default 400. Range 0-65535. Setting Lux Night = Lux Day eliminates Twilight mode.		
FPM Day	Flashing rate for Day mode	Flashes per minute. Range 0-65535.		
FPM Night	Flashing rate for Night mode	Flashes per minute. Range 0-65535.		
FPM FS	Flashing rate for Failsafe mode	Flashes per minute. Range 0-65535. Failsafe mode is in effect when connection to photocell(s) is lost.		
B.Bits	Directives on RS-485 slave lights behavior depending on light type. Bitfield.	Bitfield bit	Directive	Description
		B0	LI Red On Twil.	Low intensity lamps that support red have red on Twilight
		B1	MI Red On Twil.	Medium intensity lamps that support red have red on Twilight

Settings					
		B2		HI Red On Twil.	High intensity lamps that support red have red on Twilight
		B3		LI Flash Visib.	Low intensity lamps flash instead of steady burn
		B4		LI Flash IR	Low intensity lamps that have IR flash IR instead of steady burn
PC. Type	The protocol or method of reading ambient illuminance from the primary photocell	None	No photocell		
		Modbus	Photocell data from a Modbus connected lamp		
		I2C Ext	I2C bus via I2C terminal		
		I2C Int	I2C bus from internal photocell		
		Analog	Analog voltage from phototransistor		
		MBv1	Modbus v1, protocol for old lamps (8-bit lamps)		
PC. Addr	Photocell address	Address of the photocell unit, if chosen communication protocol has addressing. Modbus address. Values: Disabled, 1-255.			
2nd PC-A.	Secondary photocell address	Address of the secondary photocell unit, if chosen communication protocol has addressing. Modbus address. Values: Disabled, 1-255. Spare photocell, used if primary photocell fails.			
GPS Type	The protocol or method of reading time from GPS or GNSS receiver	None	No GPS		
		Modbus	Lamp or external device connected to Modbus		
		I2C Ext	I2C bus via I2C terminal		
GPS Addr.	GPS address	Address of the GPS unit, if chosen communication protocol has addressing. Modbus address. Range 0-254.			
2nd GPS-A	Secondary GPS address	Address of the secondary GPS unit, if chosen communication protocol has addressing. Modbus address. Range 0-254. Spare GPS, used if primary GPS fails.			
Def. ToD	Default Time-of-Day	Default time-of-day is in effect at start-up before photocell information is read, and if connection to photocell is lost.			
		Night		Lamp is in Night mode.	
		Twilight		Lamp is in Twilight mode.	
		Day		Lamp is in Day mode.	
		Failsafe		Lamp is in Failsafe mode. In effect when connection to Photocell is lost.	
		Off		Lamps light output is off, but it is powered on.	
Relay	Alarm relay settings	Normal		OK: NC – COM shorted, NO – COM open Alarm: NC – COM open, NO – COM shorted	
		Reversed Reverses the alarm relay function.		OK: NC – COM open, NO – COM shorted Alarm: NC – COM shorted, NO – COM open	
		Disabled			

Settings				
Hot-Spare	Defines hot-spare lamp pairs. The number of units that should operate as pairs, of which one is a spare. Lamps in Modbus addresses 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16 can be selected as pairs. Number 0-8.	Hot-Spare pairs	Primary lamp addresses	Secondary lamp addresses
		0 (no Hot-Spares)	None	None
		1	1	2
		2	1,3	2,4
		3	1,3,5	2,4,6
		4	1,3,5,7	2,4,6,8
		5	1,3,5,7,9	2,4,6,8,10
		6	1,3,5,7,9,11	2,4,6,8,10,12
		7	1,3,5,7,9,11,13	2,4,6,8,10,12,14
		8	1,3,5,7,9,11,13,15	2,4,6,8,10,12,14,16
TSSE	Time Source Sync Exclusion	Whether this system should avoid sending time sync back to the device time was read from.		
		Yes – Doesn't send time sync signal back to the device the sync was got		
		No – Sends back time sync signal to the device the sync was got		
Scr. Tmo.	Screen timeout	Number of seconds of inactivity before the screen enters idle mode. Range: 60-6000 s. Pressing any key turns it back on and/or resets the timeout counter.		
VIn Trig	V-In Alarm Threshold Trigger voltage for V. In Low alarm	Input voltage value that triggers V. In Low alarm. Range: 00.00-72.00. [V] DC models. Model-dependent.		
VIn Norm	V-In Normal Threshold The value of Vin that resets V. In Low alarm after the alarm has been triggered.	Vin Norm needs to rise above Vin Trig. to reset the alarm. This is to reduce possible big number of alarms. DC models. Model-dependent. Range: 00.00-72.00. [V]		
Reserved				
GPS Alm. T	GPS Alarm Timeout	Minutes from GPS signal loss to raising of the GPS alarm. Default: 60. Range: 1-9999. [minutes]		
Vch. Trig	Charge Detection Voltage	Voltage threshold for detecting battery charging. If Vin doesn't rise to this voltage during last 24h, triggers an alarm. Range: 00.00-72.00. [V] DC models.		
Alarm Mask	Alarm mask. Selects which alarm causes can actually trigger an alarm state. Bitfield.	Bitfield bit	Alarm	Description
		B0	Lamp ERROR	Alarm in a lamp
		B1	Lamp CONN	No Modbus connection to a lamp
		B2	PC ERROR	Photocell failure
		B3	PC2 ERROR	Secondary photocell failure
		B4	GPS ERROR	GPS failure
		B5	GPS2 ERROR	Secondary GPS failure
		B6	GPS SIGNAL	GPS signal lost
		B7	Vin Low	Input voltage below alarm level

Settings				
		B8	V.Chg Trig	Vin doesn't rise to voltage defined in Settings -> Vch. Trig during last 24h
		B9	ToD Cycle	No Time-of-Day state change in 24h
		B10	SMS SL-ERROR	Send Modbus slave errors via SMS
		B11	SMS SL-CONN	Send Modbus slave connection alarm via SMS
		B12	Output 1	Current limit breached at Output 1 (DC lights, CSV functionality)
		B13	Output 2	Current limit breached at Output 2 (DC lights, CSV functionality)
Proxy Lmt.	Door Sensor Threshold	The threshold value for the proximity sensor that detects cabinet door state. Default: 1000. Range: 0-65535.		
L.Avg Sec	Lux Averaging Time	Number of seconds illuminance measurement values are averaged for ToD determination. Default: 60. Range: 1-3600.		
Tmo ToD	Remote control timeout for ToD	Remote Control timeout for Time-of-Day. After the timeout, the control panel discards the R.Ctrl -> ToD V setting and returns to default behavior. Default: 0. Range: 0-60000.		
Tmo L.Off	Remote control timeout for Lights Off	Remote Control timeout for Lights Off function. After the timeout, the control panel discards the R.Ctrl -> L.Off V setting and returns to default behavior. Default: 0. Range: 0-60000.		
Tmo Dimm.	Remote control timeout for Dimming	Remote Control timeout for Dimming. After the timeout, the control panel discards the R.Ctrl -> Dimm. V setting and returns to default behavior. Default: 0. Range: 0-60000.		
RC-C PW	Remote control password for Control	Password that SMS messages must give to write Remote Control values. Default: 1267.		
RC-S PW	Remote control password for Settings	Password that SMS messages must give to write Settings values. Default: 1267.		
MB S-Mode	Modbus slave mode	Whether RS-485 Modbus interface is in Slave mode instead of Master. Default: No. Values: 0 - No, 1 - Yes		
Red Day	Red Day transmission	Handling of the Red Day behavioral directive register in slaves. Default: Not Sent. Values: 0 - Not Sent, 1 - Yes, 2 - No		
Scr.Id.Pw	Screen Idle Power	Intensity of screen backlight when idle. Default: 1. Range: 0-100		
PPS pin		Usage of the PPS pin. Default: PPS, Values: 0 - PPS, 1 - Debug		
Prog. Ena	Features Enable Enables functionality in the unit Bitfield	Bitfield bit	Setting	Description
		B0	Modem/GSM	GSM functionality
		B1	RC	Remote control
		B2	SMS Master	SMS text messaging
		B3	Time Offset	Offsets lights flashing
		B4	CSV	Mode for DC lights at DC OUT 1 and DC OUT 2
		B5	Door Proxy	Calibration of proximity sensor
		B6	Code Input	Reserved
		B7	MB Master	Modbus master
Num.Lamp.	number of connected lamps on 2 nd Modbus	unit supports up to 16 lamps per Modbus (for future product)		

Settings		
Num.Lamp.	number of connected lamps on 3 rd Modbus	unit supports up to 16 lamps per Modbus (for future product)
PC Corr.	correction factor for internal photocell	photocell is inside transparent cover (polycarbonate cabinets) and gets less light than it would in the ambient lighting (without cover) Default:1024 (100%), Min:1, Max: 2048 100% means the sensor has direct view of the sky and no glass losses

3.3.7 Main -> Test

Test functions.

Test		
Screen name	Description	Notes
ToD Test	Time-of-Day test	Set Time-of-Day Night state
65535 - No Test	Test off	
0 - Night	Lights set to Night mode	Red light turns on if available, High Intensity lights flash White light @ 2,000cd
1 - Twilight	Lights set to Twilight mode	Mode between Night and Day
2 - Day	Lights set to Day mode	Nominal light intensity
3 - Off	Lights set to off	Lights off but remain powered on
4 - Failsafe	Lights set to Steady mode	Lights are steadily burning
5 - Steady	Lights set to Failsafe mode	Mode that lights go to if contact to photocell is lost
Relay Tst	Relay test	Actuates the alarm relay to test functioning
0 - No Test	Test off	
1 - Alarm	Set alarm relay to alarm state	
2 - No Alarm	Set alarm relay to normal state	
Time Spd.	Time speedup	Accelerates some functions of the device for testing purposes
0 - Off	Test off	
1 - x60	speeds up time calculation by 60 times	
T-Tmr Off	Test Timer Off	Changing Testing values automatically starts this timer. With the timer on, after 12 hours all values return to defaults (test off). This disables the timer.
0 - No	Timer on	
1 - Yes	Timer off	Disables the timer. Test mode on. Resetting or power recycling the unit resets this to default value (0 - No).
Light Off	Lights Off	Set the lights-off state. Turns off lights
0 - Inactive	test inactive	
1 - IR only	IR lights off	
2 - All off	All lights off	
WDT Test	Watchdog Test	Stop the software and see the watchdog timer reboot it
0 - No		
1 - Yes	Reboots the unit	

3.3.8 Main -> About

Software version.

3.3.9 Main -> Calibrate Door

Calibration of proximity sensor to detect door opening.

3.3.10 Main -> GSM Status

Display message	Description
Reg, home	Registered home, GSM status ok
No reg, searching...	
Reg denied	
Reg, roaming	
Waiting modem boot	Modem not installed or booted yet

3.3.11 Main -> GSM Settings

GSM Settings			
Screen name		Description	Notes
Alerts		Alert Number	The number to which status and alarm reports are sent. The reports can be selected in Reports .
AuxCtl1		Auxiliary number	The number to which status and alarm reports are sent. The reports can be selected in Aux1 Rep .
AuxCtl2		Auxiliary number	The number to which status and alarm reports are sent. The reports can be selected in Aux2 Rep .
Name		Name of unit	The unit name is displayed in some SMS messages and other communications.
PIN		SIM card PIN	PIN code for the SIM card. Range: 0-9999
Ret. Min		PIN Retries	Minimum number of PIN attempts remaining in SIM for an unlock attempt to be made. Range: 0-9999
Unit ID		Unit ID	ID number included in all alarm and status messages as a primary identifier. Range: 0-9999
Reports		Enabled/Disabled Reports	Reports that are sent to the Alerts number. Bitfield
Bit	Report		
B0	Startup	Unit start up	Sent after the unit has been on for 15 seconds.
B1	Heartbeat	Configurable transmission interval	Configurable messages at constant intervals.
B2	Alarms	Alarm condition change	Sent whenever the unit has an alarm event (an alarm condition turns active or inactive).
B3	Mode Change	Time-of-Day mode change	Sent whenever the Time-of-Day mode (Day/Twilight/Night) changes.

GSM Settings			
B4	Door Sensor	Door open detection	Sent when the unit detects that the door has been opened or closed.
B5	V.In Low	Input voltage low	DC versions
B6	V.Bus1 Low	Voltage at DC OUT 1 low	DC versions
B7	V.Bus2 Low	Voltage at DC OUT 2 low	DC versions
B8	Lamp comm.	Light communication	Sent when a light fails to communicate (or communication is restored).
B9	Lamp alarms	Light alarm condition change	Sent when a light has an alarm event (an alarm condition turns active or inactive).
B10	Response	Reserved	
HB Interv		Heartbeat Interval	Interval of heartbeat messages, in minutes. Range:1-48
Num.Mtch		Number Matching	SMS message privilege elevation by matching sender number to settings numbers.
0 - Off		No number matching	SMS messages need a password to be accepted
1 - Regular		Check 5 first numbers of the phone number	Check phone number of sent SMS message against allowed phone numbers in Alerts , AuxCtl1 , AuxCtl2 : if the number is found -> no password is required Otherwise a password is required.
2 - Strict		The whole number must match	
R.Preamb		Response preamble	Add a preamble to response messages, to identify the protocol.
0 - No		Don't add preamble.	
1 - Yes		Add preamble.	
Aux1 Rep.		Aux1 Reports	Reports that are sent to the AuxCtl1 number. Same options as in Reports . Bitfield.
Aux2 Rep.		Aux2 Reports	Reports that are sent to the AuxCtl2 number. Same options as in Reports . Bitfield.
Roam Ena.		Roaming enabled	Modem access to networks other than home network.
0 - No		Roaming disabled	Modem may not access networks other than home network.
1 - Yes		Roaming enabled	Modem may access networks other than home network.

3.3.12 Main -> R.Ctrl

Remote control.

R.Ctrl		
Screen name	Description	Notes
ToD V	Time-of-Day value	Set the Time-of-Day mode.
0 - Night		
1 - Twilight		
2 - Day		
3 - Off		
5 - Failsafe		
L.Off V	Lights Off value	Set the Lights Off mode.
0 - Inactive	L. Off V inactive	
1 - IR Only	Only infrared lights go to Off mode.	
2 - All Off	All lights go to Off mode.	The lights remain powered on.
Dimm. V	Dimming value	Set the Dimming level. Range:10-100 [%] of nominal intensity.
ToD C	Time-of-Day Controlled	Indicates that the value is written from the outside, e.g. via SMS. Status message. Values: 0 - No, 1 - Yes
L.Off C	Lights Off Controlled	Indicates that the value is written from the outside, e.g. via SMS. Status message. Values: 0 - No, 1 - Yes
Dimm. C	Dimming Controlled	Indicates that the value is written from the outside, e.g. via SMS. Status message. Values: 0 - No, 1 - Yes
ToD T	Time-of-Day timer	Counter for safety timeout, counting seconds. Status message.
L.Off T	Lights Off timer	Counter for safety timeout, counting seconds. Status message.
Dimm. T	Dimming Timer	Counter for safety timeout, counting seconds. Status message.

3.3.13 Main -> SI.Addr

Slave addresses.

SI.Addr.		
Screen names	Description	Notes
Unit 1...Unit 16	Addresses of Units 1-16	Address of a slave unit. In case of SMS-capable control panel, this is the phone number of the slave unit.

3.3.14 Main -> SMS SI.Sett.

SMS slaves settings.

The SMS Master unit controls slave units by sending them SMS commands. The SMS Master does:

- Attempt to synchronize the slaves

- Detect error conditions
- Detect some types of misconfiguration

The messages are sent:

- If the control conditions change. E.g. manual signaling.
- Regularly, every [SMS SI.Sett. -> CHK Inter.] minutes.
- If the slave unit did not reply, every [SMS SI.Sett. -> HA Interv] minutes until there is an answer or [SMS SI.Sett. -> HA Count] messages have been sent.

The control message sent to the slaves is:

CPM1,<1-99>:PWC:<password>;CTRL:<Time-of-Day>,<Dimming>,<On-Off state>;READ:2,5;

SMS SI.Sett.				
Screen name	Description	Notes		
Num. SI	Number of slaves	Number of SMS-connected slaves that should be communicated with. Range: 0-16. The SMS Master identifies slave units based on the ID number in the response messages. The ID number, set in [Settings -> Unit ID] of the slave units, must match the ordering of the phone numbers in the Master's directory in SI.Addr . Further, there may not be any gaps in the number directory; the Master will use the numbers starting from the first, up to Num. SI .		
CHK Inter	Check interval	The number of minutes between sending again a message to the slaves to make sure they are still in the right state. Range: 1-10080		
HA Interv	Hail interval	If a slave does not respond to a check, the number of minutes before trying again. Range: 1-10080		
HA Count	Hail count	Number of unresponded messages sent to the slave, after it should be considered to be in an error state and hailing stopped. Range: 1-99		
Alm. Mask	Alarm Mask	Determines which alarms from the slave unit cause alarm to be issued from this unit. Bitfield.		
		Bit	Alarm	Description
		B0	Lamp ERROR	Alarm in a lamp
		B1	Lamp CONN	No Modbus connection to a lamp
		B2	PC ERROR	Photocell failure
		B3	PC2 ERROR	Secondary photocell failure
		B4	GPS ERROR	GPS failure
		B5	GPS2 ERROR	Secondary GPS failure

SMS SI.Sett.				
		B6	GPS SIGNAL	GPS signal lost
		B7	Vin Low	Input voltage below alarm level
		B8	V.Chg Trig	Vin doesn't rise to voltage defined in Settings -> Vch. Trig during last 24h
		B9	ToD Cycle	No Time-of-Day state change in 24h
		B10	SMS SL-ERROR	Send Modbus slave errors via SMS
		B11	SMS SL-CONN	Send Modbus slave connection alarm via SMS
		B12	Output 1	Current limit breached at Output 1 (DC lights, CSV functionality)
		B13	Output 2	Current limit breached at Output 2 (DC lights, CSV functionality)

3.3.15 Main -> SMS SI.Status

Status of the slave units.

When the master sends the messages, there is a transmission status visible on the SMS Slaves screen. It indicates the number of sent messages, as well as possible error conditions.

SMS SI.Status	
Screen name	Description
OK	Number of slaves that responded and do not have alarms.
RE	Total number of slaves that have responded.
ALM	Number of slaves that have an active alarm condition.
TOT	Total number of configured slaves
CFG	Number of slaves that a message could not be sent to due to configuration error. Please check the phone number parameters.
NR	Number of slaves that have not responded.

SMS slave's statuses update while the transmission is in progress.

3.3.16 Main -> CSV Settings

Functionality for DC lights connected in DC OUT 1 / DC OUT 2 terminals.

CSV Settings	
Screen name	Description
Mode	CSV operating mode
0 - Digital	ON - OFF flashing (lights have autonomous flashing control)
1 - Pattern	Patterned flashing
Options	Sets outputs 1 and 2 ON at Night/Twilight/Day, if output is not selected, then it is OFF. Bitfield.

CSV Settings	
B(0) - O1 On Night	Output 1 ON at Night
B(1) - O1 On Twilight	Output 1 ON at Twilight
B(2) - O1 On Day	Output 1 ON at Day
B(3) - O2 On Night	Output 2 ON at Night
B(4) - O2 On Twilight	Output 2 ON at Twilight
B(5) - O2 On Day	Output 2 ON at Day
Steps	Number of steps in the flashing pattern of the output determined in CSV Pattern . (Patterned flashing) Min:2, Max:16
Meas.Del	Turn-on grace time. Delay for current measurement to start. Min:1, Max:10000 [ms]
Imax1	Max current ch1 Current limit for overcurrent alarm at Output 1 (DC OUT 1). Min:0.001, Max:1.000 [A]
IMin1	Min current ch1 Current limit for undercurrent alarm at Output 1 (DC OUT 1). Min:0.001, Max:1.000 [A]
Imax2	Max current ch2 Current limit for overcurrent alarm at Output 2 (DC OUT 2). Min:0.001, Max:1.000 [A]
IMin2	Min current ch2 Current limit for undercurrent alarm at Output 2 (DC OUT 2). Min:0.001, Max:1.000 [A]

3.3.17 Main -> CSV Pattern

Defines flashing pattern for DC lights connected at DC OUT 1 / DC OUT 2 terminals.

Patterned flashing must be selected in **Main -> CSV Settings -> Mode -> Pattern**.

CSV Pattern	
Screen name	Description
Chn.On-1	Output enabler for step 1 of the pattern. Out 1 corresponds to DC OUT 1, Out 2 corresponds to DC OUT 2.
Out 1	Output 1 is ON if selected, otherwise Output 1 is OFF
Out 2	Output 2 is ON if selected, otherwise Output 2 is OFF
Time-1	Timer for step 1. The selected Outputs in Chn.On-1 will be handled the time set. The outputs can be either ON or OFF. After the time has elapsed, the next step of the pattern will be handled if steps count is high enough. Min:20, Max:60000 [ms]
Chn.On-2	Output enabler for step 2 of the pattern.
Out 1	Output 1 is ON if selected, otherwise Output 1 is OFF
Out 2	Output 2 is ON if selected, otherwise Output 2 is OFF
Time-2	Timer for step 2. Min:20, Max:60000 [ms]
...	
Chn.On-16	Output enabler for step 16 of the pattern.
Out 1	Output 1 is ON if selected, otherwise Output 1 is OFF
Out 2	Output 2 is ON if selected, otherwise Output 2 is OFF
Time-16	Timer for step 16. Min:20, Max:60000 [ms]

Each step in **Main -> CSV Settings -> Steps** handles one Chn.On-x and one Time-x settings.

Example: steps=2 uses Chn.On-1 and Time-1 and Chn.On-2 and Time-2 (e.g. define ON time with Chn.On-1 and Time-1 and OFF time with Chn.On-2 and Time-2)

In patterned flashing, determining the pattern cycle time, all times of the steps defined in **CSV Settings -> Steps** are summed in Time-1...Time-16. After the total time has elapsed, the next cycle of the pattern starts.

Example: WROT flashing pattern

Flashing pattern: ON 1s - OFF 0.5s - ON 1s - OFF 1.5s

Using OUTPUT 1 (DC OUT 1) only, all Time-of-Day modes (Night, Twilight, Day). Steps = 4. Min. current alarm limit = 0.1A. Max. current alarm limit = 0.2A. The current alarm limits depend on the current drawn by the LEDs.

CSV Settings for WROT flashing pattern

CSV Sett.	P 01/03	Options	P 01/02
> Mode	Pattern	> [X] O1 On Night	
Options	0x0007	[X] O1 On Twilight	
Steps	4	[X] O1 On Day	

CSV Sett.	P 02/03
> Meas.Del	10
IMax1	0.200
IMin1	0.100

CSV Pattern for WROT flashing pattern

CSV Patt.	P 01/11	CSV Patt.	P 02/11
> Chn.On-1	0x0001	> Time-2	500
Time-1	1000	Chn.On-3	0x0001
Chn.On-2	0x0000	Time-3	1000

CSV Patt.	P 03/11
> Chn.On-4	0x0000
Time-4	1500
Chn.On-5	0x0000

3.3.18 Main -> CSV Status

Status information for DC lights connected at DC OUT 1 / DC OUT 2 terminals.

CSV Status	
Screen name	Description
Ch1 State	
OK	
Undercur	Undercurrent alarm at Output 1 (DC OUT 1)
Overcurr	Overcurrent alarm at Output 1 (DC OUT 1)
Off	
Ch2 State	
OK	
Undercur	Undercurrent alarm at Output 2 (DC OUT 2)
Overcurr	Overcurrent alarm at Output 2 (DC OUT 2)
Off	
I Max1	Maximum current of last flash at Output 1. [A]
I Max2	Maximum current of last flash at Output 2. [A]
I Min1	Minimum current of last flash at Output 1. [A]
I Min2	Minimum current of last flash at Output 2. [A]
V Max	Maximum input voltage during last flash cycle. [V]
V Min	Minimum input voltage during last flash cycle. [V]
V Start1	Voltage at the start of last flash at Output 1. [V]
V Start2	Voltage at the start of last flash at Output 2. [V]
V End1	Voltage at the end of last flash at Output 1. [V]
V End2	Voltage at the end of last flash at Output 2. [V]
I Start1	Current at the start of last flash at Output 1. [A]
I Start2	Current at the start of last flash at Output 2. [A]
I End1	Current at the end of last flash at Output 1. [A]
I End2	Current at the end of last flash at Output 2. [A]

3.3.19 Main -> Offsets

Offsets the flashing of Modbus connected lights. Offset.S1 refers to light connected to Modbus address 1, Offset.S2 to light in Modbus address 2 and so on.

Offsets	
Screen name	Description
Offset.S1...Offset.S16	Offset of light connected to Modbus addresses 1-16 Min:0, Max:65535

3.4 Operating the unit with SMS Commands (-T models)

The CP-M1-T controller can be issued commands via SMS messages. This chapter describes the interface and the possible commands.

3.4.1 The format of SMS commands

The general format of message is: CPM1[,optional message number 1-99]:<command 1>[<command 2>][<command n>]

The format of a command is: <command name>:<argument 1>,<argument 2>,<argument N>;

The maximum length of messages sent is 150 characters, due to technical limitations.

The SMS commands have 5 responses:

ACK - Command was accepted and executed.

NACK - Command was refused.

ERR CMD - Command was unrecognized or malformed.

ERR:<text> - General error with more information on the specific error condition after the colon.

<text> - The information content for a read command.

Example of a message with commands:

CPM1:PWC:1234;CTRL:D,100,A;

The successful response to the command would be (assuming the password is correct):

CPM-U1:10:ACK;ACK;

It is possible to give command messages a serial number to connect responses to queries. This number must be between 1-99. For example:

Query: CPM1,11:PWC:1234;

Response: CPM-U1:10:A11:ACK;

3.4.2 SET - Set database variable

Set a single value in the device's backend database.

Syntax: SET:<Table>,<Row>,<Value>;

Arguments: Table,Row,Value

NOTE: The value must be unsigned 32-bit. If the target value is usually signed, and a negative value is desired, you must write the value's binary value re-presented as unsigned.

The Table and Row values can be read from the Data Manual of the product.

Return values:

ACK - Command accepted

NACK - Command refused (usually because of insufficient write privileges)

3.4.3 READ - Read database variable

Read a single value in the device's backend database.

Syntax: READ:<Table>,<Row>;

Arguments: Table,Row

The Table and Row values can be read from the Data Manual of the product.

Return values:

Number - The requested database row's value, as 32-bit unsigned number.

NACK - Command was refused. It is not possible to read the password fields, for example.

3.4.4 PWC - Password for control

Elevate the subsequent commands in the same SMS message to the level necessary for controlling the device.

Syntax: PWC:<Password>;

Arguments: Password

The password given must match the setting of the device in **Main -> Settings -> RC-C PW**.

Return values:

ACK - Password was accepted

NACK - Password was refused

3.4.5 PWS - Password for settings

Elevate the subsequent commands in the same SMS message to the level necessary for writing to the Settings tables, or making other permanent changes.

Syntax: PWS:<Password>;

Arguments: Password

The password given must match the setting of the device in **Main -> Settings -> RC-S PW**.

Return values:

ACK - Password was accepted

NACK - Password was refused

3.4.6 CTRL - Control

Set the Time-of-Day, Dimming level and On-Off state transmitted to connected lights.

Syntax: CTRL:<Time-of-Day>,<Dimming>,<On-Off>;

Arguments: Time-of-Day,Dimming,On-Off

Time-of-Day:

D - Day

T - Twilight

N - Night

Dimming:

Number between 10 and 100. Percent of nominal light intensity. If you don't intend to dim the lights, always write 100 (100%).

WARNING!: Dimming aviation obstruction lighting always requires permission from local aviation authorities!

On-Off state:

A - All lights on normally. Nothing is forced off.

I - IR only. Only infrared light allowed. Visible lights are off.

N - No light. All lights are forced off.

Return values:

ACK - Command was accepted

NACK - Command was refused. Typical reason is insufficient privileges.

3.4.7 MBW - Modbus write

Write Modbus registers on connected devices.

Syntax: MBW:<Bus>,<Address>,<StartingRegister>,<NumberOfRegisters>,<Value1>,...,<ValueN>;

Arguments: Bus,Address,StartingRegister,NumberOfRegisters,Value1,...,ValueN

Issuing this command causes a Write Multiple Registers operation to be performed, assuming the device is a Modbus master on a live bus.

NOTE: You need Settings level privileges to perform this operation.

Bus:

Which Modbus interface to use for the operation. On devices with only 1 bus, this parameter is ignored, but should still be set to 0 for future compatibility.

Address: The Modbus protocol address of the device to write to.

Starting Register: Which register to write the values to.

Number of Registers: Must match the number of values following. Must be 1 or more.

Values: The values to be written are handled as 16-bit unsigned, so they must be between 0-65535.

Return values:

ACK - Operation was successful

NACK - Either the operation failed or the command was issued with insufficient privileges.

3.4.8 MBR - Modbus read

Read Modbus registers of connected devices.

Syntax: MBR:<Bus>,<Address>,<StartingRegister>,<NumberOfRegisters>;

Arguments: Bus,Address,StartingRegister,NumberOfRegisters

Issuing this command causes a Read Multiple Holding Registers operation to be performed, assuming the device is a Modbus master on a live bus.

Bus:

Which Modbus interface to use for the operation. On devices with only 1 bus, this parameter is ignored, but should still be set to 0 for future compatibility.

Address: The Modbus protocol address of the device to read from.

Starting Register: Which register to start the read from.

Number of Registers: Number of registers to read. Must be 1 or more.

Return values:

Numbers - Operation was successful. Values returned are 16-bit unsigned values as read by the operation.

NACK - The operation failed.

3.4.9 RDM - Read multiple

Read multiple values from backend database of the device.

Syntax: RDM:<Table>,<Row>,<NumberOfValues>;

Arguments: Table,Row,NumberOfValues

The Table and Row values can be read from the Data Manual of the product.

Return values:

Numbers - The requested database row's value, as 32-bit unsigned numbers, separated by commas.

NACK - Command was refused. It is not possible to read the password fields, for example.

3.4.10 RDMH - Read multiple values human-readable

Read multiple values from backend database of the device. The returned values are formatted as if they had been read from the device's screen.

Syntax: RDMH:<Table>,<Row>,<NumberOfValues>;

Arguments: Table,Row,NumberOfValues

The Table and Row values can be read from the Data Manual of the product.

Return values:

Other text - Representations of the requested database rows' values.

NACK - Command was refused. It is not possible to read the password fields, for example.

3.4.11 SETN - Set phone number

Write phone numbers to the device's directory.

Syntax: SETN:<Index>,<PhoneNumber>;

Arguments: Index,PhoneNumber

Phone numbers must be 5-17 characters in length. They may begin with a '+', but all other characters must be numbers 0-9. No spaces, hyphens or other punctuation is allowed.

NOTE: On the CP-M1 platform, the index 0 is the "Alarm" number, and 1...3 are the "Aux" numbers.

Return values:

ACK - Command succeeded

NACK - Command failed

3.5 Light network examples

Light network systems have robustness. If data connection between lights and control panel is lost, this generates an alarm and the lights will continue to work using their own Photocell and GPS (if available) data. Control Panel can use photocell and GPS (if available) data from any device that is connected to Modbus.

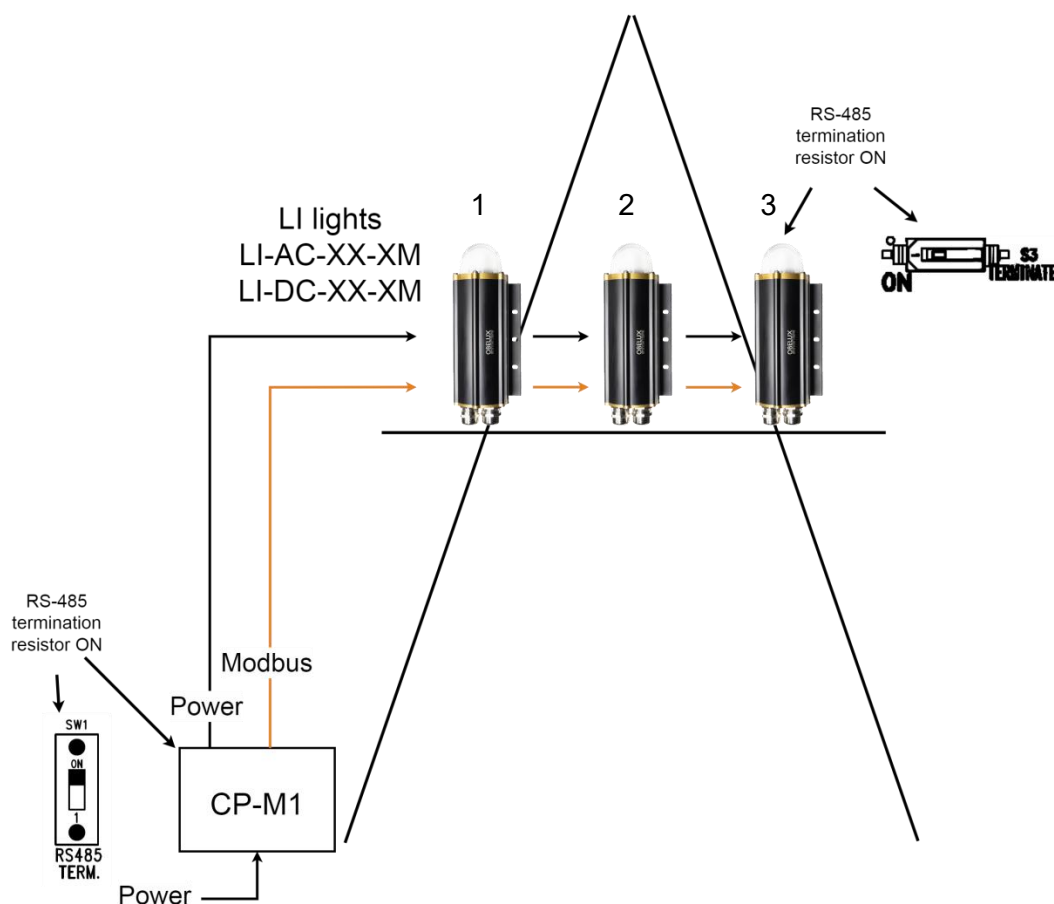
In the Control panel, Modbus is shared between 2 RS-485 terminals. The Modbus addresses need to start from 1 and go up incrementally. E.g. 4 lights need to be configured to addresses 1-4. Refer to light manuals for further instructions how to setup the lights for Modbus operation.

3.5.1 Example: 3 Low intensity (LI) lights, photocell, no GPS

CP-M1 is configured to control 3 LI lights. Devices connected to the same Modbus use sequential addresses starting from one. The addresses need to be set from lowest to highest in order. 3 devices are used; they need to be in addresses 1, 2, 3. Modbus is terminated by using termination resistors on devices at each end of the bus.

Photocell type is configured to Modbus. Primary photocell is configured to light at Modbus address 1 and secondary photocell to light at Modbus address 2. The secondary photocell is used only if the primary photocell fails. GPS type is configured to 'None', it is not used.

Obelux device	Modbus address	Notes	
Control Panel CP-M1	None	RS-485 termination resistor on (DIP switch)	
		Configuration (with CP-M1 LCD panel menus)	
		Settings	Num. Lamps
			3
			PC Type
			Modbus
			PC Addr.
			1
			2nd PC-A.
			2
			GPS Type
			None
LI light	1	primary photocell	
LI light	2	secondary photocell	
LI light	3	RS-485 termination resistor on (DIP switch) (furthest device from CP-M1)	



System wiring

3.5.2 Example: 1 Medium intensity light, 3 Low intensity lights, photocell, GPS, JB

CP-M1 is configured to control 4 lights.

All devices are on the same Modbus. Devices connected to the same Modbus use sequential addresses starting from one. The addresses need to be set from lowest to highest in order. 4 devices are used; they need to be in addresses 1, 2, 3, 4.

Modbus is terminated by using termination resistors on devices at each end of the bus.

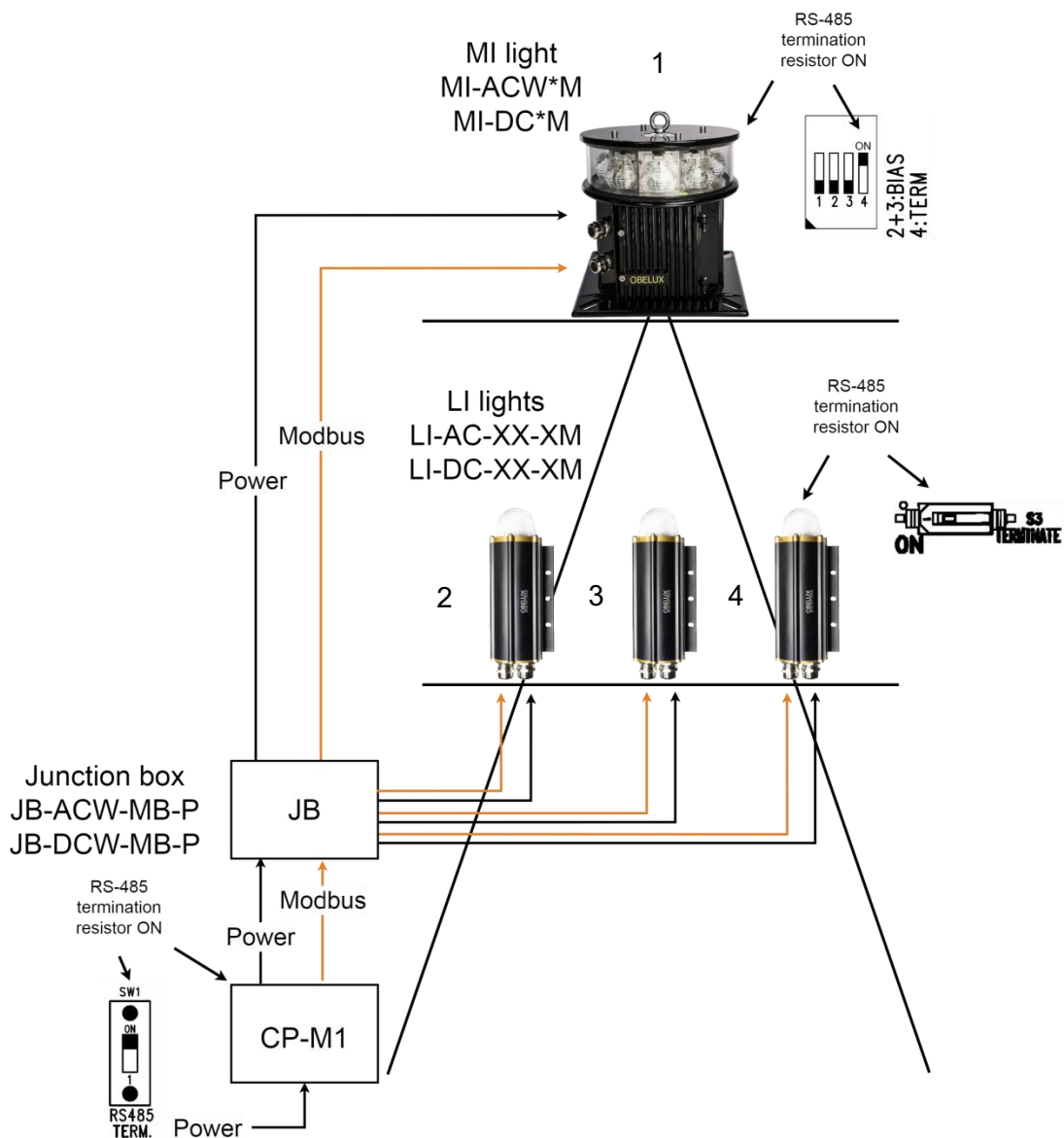
Primary photocell is configured to light at Modbus address 1 (MI light) and secondary photocell to light at Modbus address 2. The secondary photocell is used only if the primary photocell is broken.

GPS type is configured to Modbus, and GPS data is taken from the MI light connected to Modbus address 1. (If LI lights have GPS, secondary GPS can be taken from one of these lights. Secondary GPS is a spare GPS, used only if primary GPS fails.)

Junction box is used for wiring. Because the junction box branches Modbus data cables, the RS-485 termination resistor is turned on at the end of each branch.

Obelux device	Modbus address	Notes		
Control Panel CP-M1	None	RS-485 termination resistor on (DIP switch)		
		Configuration (with CP-M1 LCD panel menus)		
		Settings	Num. Lamps	4

Obelux device	Modbus address	Notes		
			PC Type	Modbus
			PC Addr.	1
			2nd PC-A.	2
			GPS Type	Modbus
			GPS Addr.	1
			2nd GPS-A	Address of secondary GPS (only if LI lights have GPS)
MID light	1	GPS / Photocell, RS-485 termination resistor on (DIP switch) (furthest device of the branch)		
LI light	2	secondary photocell		
LI light	3			
LI light	4	RS-485 termination resistor on (DIP switch) (furthest device of the branch)		
Junction box (JB)	None	circuit breaker, can connect up to 4 lights		



System wiring