Low-intensity 10cd red and infrared
Medium-intensity 100cd red and infrared

OBELUX AVIATION LIGHTS

Federal office of Civil Aviation	FOCA
Bundesamt für Zivilluftfahrt	BAZL
Office federal de l'aviation civile	OFAC
Ufficio federale dell'aviazione	UFAC

Optical characteristics

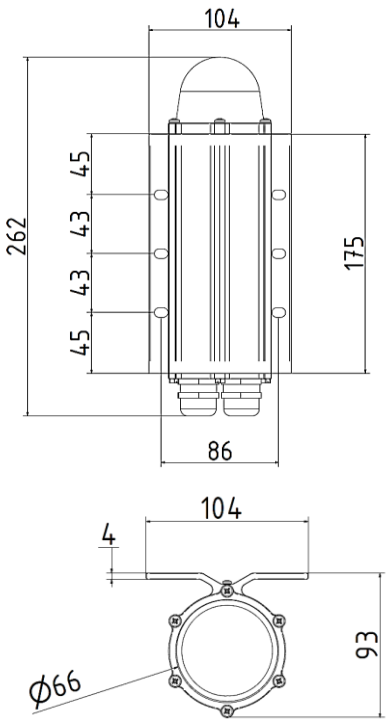
- Low-intensity (vertical angle)
  - Red 10cd (-1°…+10°)
  - IR 150mW/sr (-5°…+15°)
- Medium-intensity
  - Red 100cd (-1°…+10°)
  - IR 600mW/sr (-5°…+15°)
- Horizontal beam 360°
- Day/Night switch function with photocell
- Flash rate: 20fpm (1,4s on / 1,6s off)
- Other flashing rates available upon request

Specifications met

Département fédéral de l'environnement, des transports, de l'énergie et de la communication DETEC
Office fédéral de l'aviation civile OFAC
Division Sécurité des infrastructures

Directive AD I-006 F
Objet: Obstacles à la navigation aérienne Bundesamt für Zivilluftfahrt BAZL (CHE)

Photo only for illustration.



Infrared Obstruction Lights

LED Aviation Obstruction Lights

Obelux low-intensity 10cd and medium-intensity 100cd red lights incorporate infrared which makes them completely Night Vision Goggle (NVG) compatible obstruction light. The lights are designed for marking tall structures such as wind turbines, chimneys, masts, cranes, and towers. The products offer unique features such as fault monitoring, photocell and switcher incorporated in the light. Lights can also be connected to Obelux aviation light system through Modbus serial lines.

Key Features

- Based on LED-technology
- RED 10cd steady and 100cd flashing light
- NVG compliant 150mW/sr and 600mW/sr infrared (IR)
- Incorporated photocell for Day/Night switching
- GPS synchronization
- Both stand-alone (incorporated alarm signal) and Modbus operations available
- Extremely low power consumption
- Provides long maintenance-free operating time
- Heater (AC models), Smart Heater (DC models)
- 5-year warranty
- Deep discharge protection
  Battery powered operation (DC models)

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Electrical Characteristics

- AC models: AC voltage range: Nominal 100-250VAC @ 50-60Hz
- DC models: DC voltage range: 10-60VDC
- Robust overvoltage protection (Type II)
- Isolated RS-485
- Integrated thermostat controlled heater
- Manual ON/OFF (DIP switch)
- Battery deep discharge protection (DDP) (DC models) 12/24/48V
- Alarm relay Ratings: 250VAC @ 8A; 50VDC @ 1A

Operation

Low-intensity 10cd and infrared

- 10cd RED steady
- >150mW/sr (<1200mW/sr) flashing (20 FPM)

Medium-intensity 100cd and infrared

- 100cd RED flashing (20fpm)
- >600mW/sr (<1200mW/sr) flashing (20 FPM)

Mechanical Characteristics

- Anodized, marine grade aluminium body and end parts
- AISI316 acid-proof stainless-steel screws
- Glass cover, degree of protection IP65
- Acrylic lenses, UV protected
- Operating temperature range -40...+55 °C
- Height 255 mm, diameter 104 mm
- Weight 1,3 kg (without mounting set)
- Terminal blocks for 0.2 … 4mm² (24-12 AWG) wires

Mounting Set Options

- MS-HV80
- MS-EV60
- MS-EV100
- MS-EV150
- MS-DEV60
- MS-DEV100
- MS-RW
- MS-LVU/LVA
- MS-N1B
- MS-WT1/5

Optional Controllers

- CP Series
- CP-M1 Series

Product Codes

Order code	Output	Operating voltage	Power consumption	IR	Photocell	Alarm Relay	Modbus	GPS sync	Fault monitoring	Heater
AC MODELS										
LI-AC-CH-A	10cd+IR	100-250VAC	4.3 VA	Yes	Yes	Yes	No	No	Yes	Yes
LI-AC-CH-A-1	10cd+IR	100-250VAC	6.3 VA	Yes	Yes (not used)	Yes	No	No	Yes	Yes
LI-AC-CH-GAM	10cd+IR	100-250VAC	8 VA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MI-AC-CH-GAM	100cd+IR	100-250VAC	<10 VA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DC MODELS										
LI-DC-CH-A	10cd+IR	10-60VDC	TBD	Yes	Yes	Yes	No	No	Yes	Yes
LI-DC-CH-A-1	10cd+IR	10-60VDC	TBD	Yes	Yes (not used)	Yes	No	No	Yes	Yes
LI-DC-CH-GAM	10cd+IR	10-60VDC	6 W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MI-DC-CH-GAM	100cd+IR	10-60VDC	<10 W	Yes	Yes	Yes	Yes	Yes	Yes	Yes

LI-AC/DC-CH-A-1 has Red and IR fixed burning
Heater increases power consumption by 7W; heater turns on when temperature drops below 10 °C; heater can be set ON/OFF
Factory setting: Heater ON
Avoid using heater in battery mode to save energy
Water protection class IP65 applies when the device is mounted vertically glass cover facing up
All models available with IP67 water protection class (append -67 to product code, e.g. LI-AC-CH-GAM-67)
Packing dimensions: 280x130x100, 1,5kg

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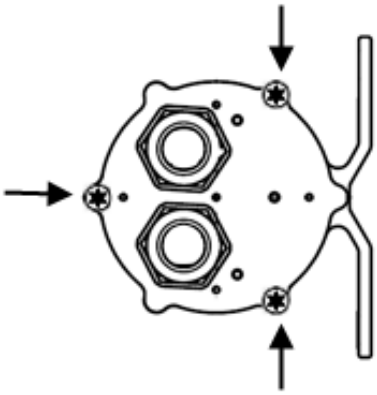
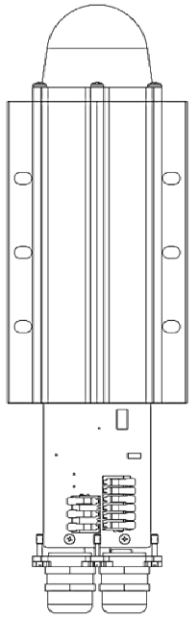
Cabling specifications

- Cable gland M25
- Cable diameter 11-17 mm (includes cable gland seal 6-13mm)
- Wire diameter max. 4 mm^2
- Recommended cable
  - 3x1.5 mm^2 or 3x2.5 mm^2



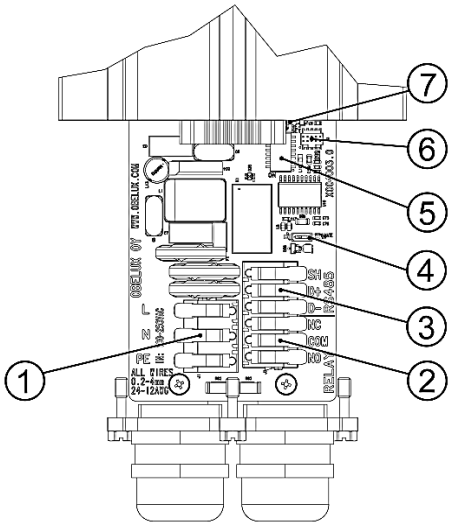
Back plate screws



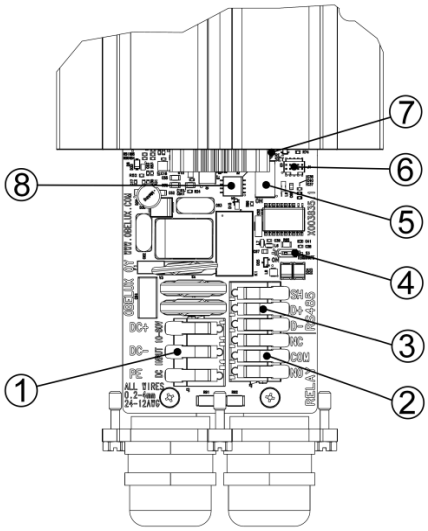
Light opened up

Installation instructions

Open the three T20 back plate screws. The bottom plate and the main circuit board slide out. Route power and data cables using cable gland(s) on the back side of the light. Connect the cable wires securely to appropriate terminal block connectors. Slide the bottom plate properly in its place and securely tighten all screws. Make sure that all unused glands or gland holes are sealed.



AC models



DC models

1 Power input

Mark	Description	Information
L	Live	Connect to power supply live terminal
N	Neutral	Connect to power supply neutral terminal
PE	Ground	Protective earth

Mark	Description	Information
DC+	Positive	Connect to power supply positive terminal
DC−	Negative	Connect to power supply negative terminal
PE	Ground	Protective earth

2 Alarm relay output

3 RS-485 port

Mark	Description	Information
D+	Data+	RS-485 non-inverting pin
D−	Data−	RS-485 inverting pin
SH	Shield	Cable shield connection

4 RS-485 termination DIP switch

5 Configuration DIP switches

6 Programming terminal

7 Reset button

8 Deep discharge protection switches (DC models)

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Configuration

Stand-alone mode

Configuration DIP switches 1-2 are used to control photocell threshold values. The factory default setting is steady-burning mode without photocell control. With the photocell operation enabled, the obstruction light turns on when the ambient light level has dropped below the selected level. The light turns off when the ambient light level has exceeded the selected value. The turn-on and turn-off times are approx. 3 min.

DIP switch		Photocell threshold
1	2	
off	off	Photocell disabled * (light is in steady-burning mode)
on	off	150 lx (dark)
off	on	350 lx (twilight)
on	on	1600 lx (between twilight and midday), recommended if photocell is used

DIP switch		
3	4	Reserved

With DIP switch 6, heater can be set on or off. In cold climates, the heater prevents moisture build-up and keeps the light clean from snow and ice. The power consumption of the low-intensity light is low while producing minimum heat. Using the heater in cold and damp conditions is recommended. The heater is beneficial to keep the light operating more reliably.

DIP switch 5	Infrared
off	OFF
on	ON *

DIP switch 6	Heater **
off	OFF
on	ON *

With DIP switch 7, the light can be set to Master or Slave mode. In Master mode, the light can monitor and control a network of lights. The Master light uses its alarm relay if any of the lights has an alarm. Software configuration is required for the lights. If the light isn't used as a Master, set the light in Slave mode.

Turn off DIP switch 8 for stand-alone operation.

DIP switch 7	Master/Slave mode
off	Slave *
on	Master

DIP switch 8	Operating mode
off	Standalone *
on	Modbus

* Factory setting
** In DC models, in battery power, it is recommended to set to OFF or use Smart heater feature to reduce power consumption.

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Modbus mode

Configuration DIP switches 1-5 are used to set the light a Modbus address. Duplicate addresses on the same bus are not allowed. Give each device a unique address. The addresses need to be set from lowest to highest in order. E.g. if 3 devices are used, they need to be in addresses 1, 2 and 3.

Note: No address is set to a Master light (DIP switch 7: Master – Slave functionality).

DIP switch					Modbus Address
1	2	3	4	5	
on	off	off	off	off	Address 01
off	on	off	off	off	Address 02
on	on	off	off	off	Address 03
off	off	on	off	off	Address 04
on	off	on	off	off	Address 05
off	on	on	off	off	Address 06
on	on	on	off	off	Address 07
off	off	off	on	off	Address 08
on	off	off	on	off	Address 09
off	on	off	on	off	Address 10
on	on	off	on	off	Address 11
off	off	on	on	off	Address 12
on	off	on	on	off	Address 13
off	on	on	on	off	Address 14
on	on	on	on	off	Address 15
off	off	off	off	on	Address 16
on	off	off	off	on	Address 17
off	on	off	off	on	Address 18
on	on	off	off	on	Address 19
off	off	on	off	on	Address 20
on	off	on	off	on	Address 21
off	on	on	off	on	Address 22
on	on	on	off	on	Address 23
off	off	off	on	on	Address 24
on	off	off	on	on	Address 25
off	on	off	on	on	Address 26
on	on	off	on	on	Address 27
off	off	on	on	on	Address 28
on	off	on	on	on	Address 29
off	on	on	on	on	Address 30
on	on	on	on	on	Address 31

DIP switch 6	Heater **
off	OFF
on	ON *

DIP switch 7 must be off (Slave mode).

DIP switch 7	Master/Slave mode
off	Slave *
on	Master

Turn on DIP switch 8 to configure the light into Modbus operation.

DIP switch 8	Operating mode
off	Standalone *
on	Modbus

* Factory setting
** In DC models, in battery power, it is recommended to set to OFF or use Smart heater feature to reduce power consumption.

The RS-485 bus should be terminated with the on-board 120ohm resistors at both ends of the communications bus. Turn on termination DIP switch from these devices.

Programming terminal

Light software and configuration settings are upgradable via programming terminal or RS-485 (Modbus) terminal. The programming terminal is used in lights that don't have the Modbus option. Setting a flash rate, photocell threshold and special flash sequences are possible, e.g. Morse code. Updates can be made either with a RS-485 configuration cable (Part code: CONFIG01-RS-485) via RS-485 port by or with a RS-232 configuration cable (Part code: CONFIG01-RXTX) via the programming terminal. The configuration cables connect to a computer via USB. Obelux lamp configuration tool software in the computer establishes a connection to the light and makes the updates.

DC models features on battery power

Smart heater

- Monitors light's input voltage and turns off the heater if the input voltage falls below a configured value
- Software and thermostat controlled, the heater is OFF if temperature is above 10 °C
- Heater must be set on with configuration DIP switch 6 (this is the Factory default)
- Smart heater configurable via RS-485 (Modbus) and programming terminals and configuration software on a computer.
- Settable threshold voltage in which the heater will be disabled.
  The voltage is set slightly below battery's charging voltage. The charging voltage depends on the types of battery and charger.
  Recommendation: Set the heater threshold voltage 1V below battery charging voltage (with 24V battery)
  Example: 24V battery, battery charging voltage 27.5V, set the threshold voltage to 26.5V
- Heater off during battery discharge enables longer power on time for the light
- Factory setting: Smart heater not in use

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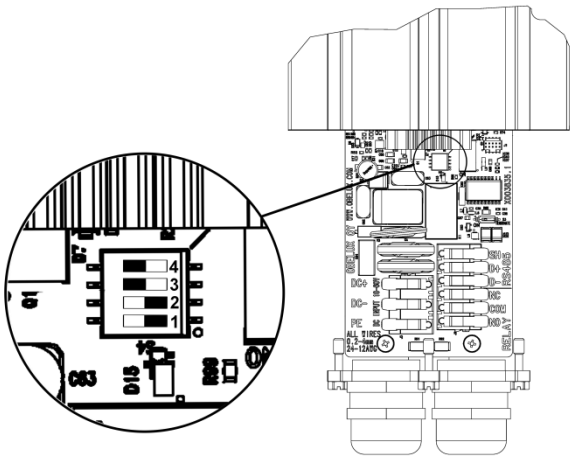
Battery deep discharge protection (DDP) (DC models only)

DDP protects the battery from over-discharge by limiting the battery terminal voltage from dropping below a value that might cause damage or degradation to the battery. This way, no external deep discharge protection is needed. A typical application for battery-powered lights is cranes.

DIP switch				Battery	Voltage level (light off)
1	2	3	4		
off	off	off	off	12V	Light off
off	off	off	on	12V	10.84V
off	off	on	off	12V	10.4V
off	off	on	on	12V	10.08V *
off	on	off	off	24V	Light off
off	on	off	on	24V	22.02V
off	on	on	off	24V	21.18V
off	on	on	on	24V	20.38V
on	off	off	off	48V	Light off
on	off	off	on	48V	44.3V
on	off	on	off	48V	42.55V
on	off	on	on	48V	40.9V
on	on	off	off	Reserved	
on	on	off	on	Reserved	
on	on	on	off	Reserved	
on	on	on	on	Reserved	

* Factory setting = lowest operating voltage



DDP switches (switches in factory default setting (off, off, on, on))

The table lists voltage levels where the light turns off if the sensed voltage at the light's input drops below this level. Lower voltage settings allow the use of longer cables (more voltage drop) or longer operation time at the expense of a more discharged battery.

Use settings highlighted in yellow for maximum battery protection.

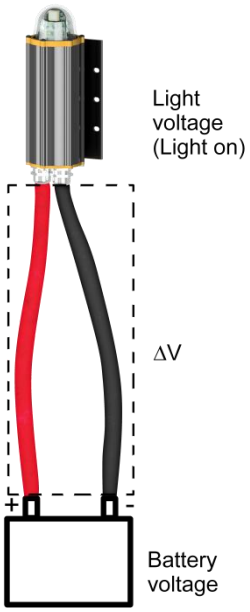
If more battery utilization is needed, use the formula below.

Formula to calculate DC voltage drop in cable: $\Delta V = \frac{2\ell RI}{1000}$, where

I = Current in amperes

Light's current can be calculated from Product Code tables by formula $I = P/U$, where

P = light's power consumption in watts



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U = battery voltage in volts

ℓ = Cable length in meters

R = Cable resistance in ohm/km

Conductor resistance of copper:

1.50 mm^2 - 13.3 ohm/km
2.50 mm^2 - 7.98 ohm/km

Example. LI-DC-CH-GAM (6W), 50m cable 1.5 mm^2, 12V battery

$$\Delta V = \frac{2\ell RI}{1000} = \frac{2\ell R\left(\frac{P}{U}\right)}{1000} = \frac{2 \times 50\text{m} \times 13.3\frac{\Omega}{\text{km}} \times \left(\frac{6\text{W}}{12\text{V}}\right)}{1000} \approx 0.67V$$

DIP switches				Light voltage (DDP voltage level)	Battery voltage
1	2	3	4		
off	off	off	off	OFF	OFF
off	off	off	on	10.84V	11.5V
off	off	on	off	10.4V	11.07V
off	off	on	on	10.08V	10.75V

Voltages at light and battery of the example at light turn off point.

Alternatively, the voltages directly at the battery +/- terminals and the light input +/- terminals can be measured and the difference calculated. The light must be on when measurements are taken.

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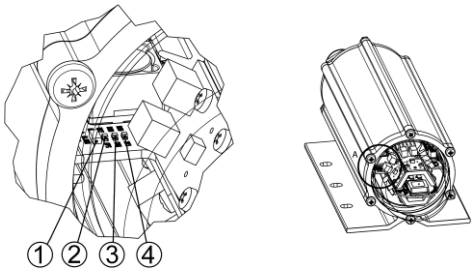
Indicator LEDs

	LED	Description
1	ALARM	**Alarm indicator (RED)** LED OFF: Normal operation, no alarms LED ON: Active alarm condition
2	GPS	**GPS (GREEN)** LED OFF: No GPS fix LED FLASHING: Lights GPS module has malfunction. Light is not synchronized. LED ON: Lights GPS module has fully resolved the UTC time. It may take several minutes for the GPS module to receive the necessary data.
3	COM	**Communication (GREEN)** LED OFF: Waiting for external signals LED FLASHING: Master-slave communications occurring on the network
4	3V3	**Internal operating voltage (GREEN)** LED OFF: power off LED ON: power on



Part codes

Code	Information
CONFIG01-RXTX	configuration RS-232 cable Cable usages: special flash settings, photocell threshold, Smart heater and Master – Slave functionality through programming terminal
CONFIG01-RS-485	configuration RS-485 cable (Modbus) Cable usages: special flash settings, photocell threshold, Smart heater and Master – Slave functionality

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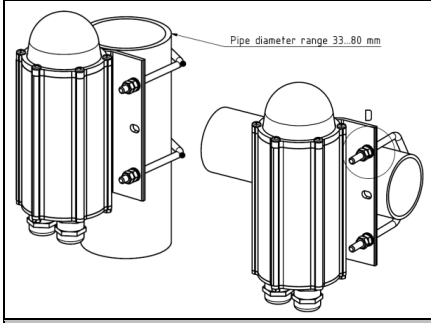
Mounting Sets

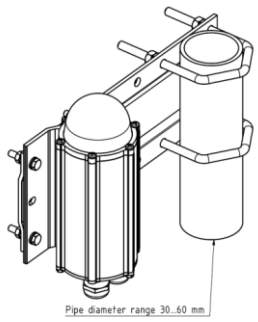


Obelux MS-HV80
Mounting set for 33-80 mm vertical or horizontal pipe.
This mounting set includes:
- 2 pcs M6 U-bolt
- 8 pcs M6 hex nut
- 4 pcs 6/12 mm washer

All parts are AISI316 acid-proof stainless steel.

More detailed mechanical data: see MS-HV80 datasheet

► **Order Code MS-HV80**

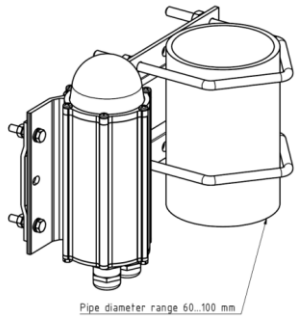


Obelux MS-EV60
Mounting set with extension plate for 30-60 mm vertical pipe installation.
This mounting set includes:
- 2 pcs M8 U-bolt, 8 pcs M8 hex nut
- 4 pcs M6x30 bolt, 8 pcs M6 hex nut, 4 pcs 6/12 washer
- 1 pcs extension plate

Extension plate marine grade anodized aluminium, other parts AISI316 acid-proof stainless steel.

More detailed mechanical data: see MS-EV60 datasheet

► **Order Code: MS-EV60**

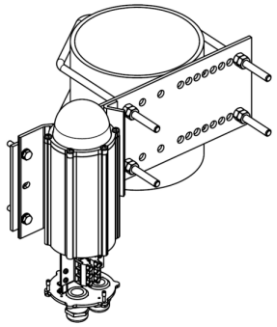


Obelux MS-EV100
Mounting set with extension plate for 60-100 mm vertical pipe installation.
This mounting set includes:
- 2 pcs M8 U-bolt, 8 pcs M8 hex nut
- 4 pcs M6x30 bolt, 8 pcs M6 hex nut, 4 pcs 6/12 washer
- 1 pcs extension plate

Extension plate marine grade anodized aluminium, other parts AISI316 acid-proof stainless steel.

More detailed mechanical data: see MS-EV100 datasheet

► **Order Code: MS-EV100**



Obelux MS-EV150
Mounting set with extension plate for 100-150 mm vertical pipe installation.
This mounting set includes:
- 2 pcs M8 U-bolt, 8 pcs M8 hex nut
- 4 pcs M6x30 bolt, 8 pcs M6 hex nut, 4 pcs 6/12 washer
- 1 pcs extension plate

Extension plate hot dipped galvanised steel, other parts AISI316 acid-proof stainless steel.

More detailed mechanical data: see MS-EV150 datasheet

► **Order Code: MS-EV150**

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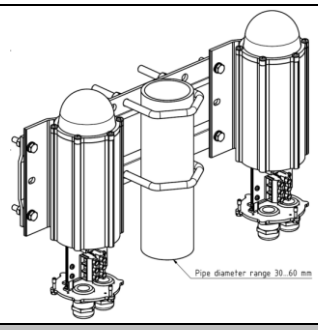
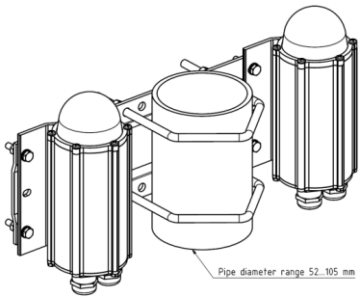


Obelux MS-DEV60
Double mounting set with extension plate for 30-60 mm vertical pipe installation. Mounting set include:
- 2 pcs M8 U-bolt, 8 pcs M8 hex nut
- 8 pcs M6x30 bolt, 16 pcs M6 hex nut, 8 pcs 6/12 washer
- 1 pcs extension plate

Extension plate marine grade anodised aluminium, other parts AISI316 acid-proof stainless steel.

More detailed mechanical data: see MS-DEV60 datasheet

► **Order Code: MS-DEV60**

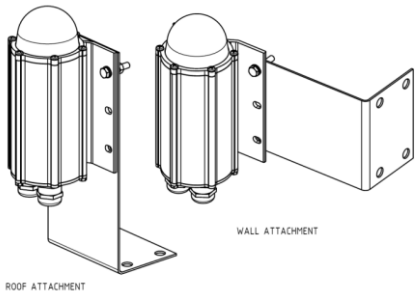


Obelux MS-DEV100
Double mounting set with extension plate for 60-100 mm vertical pipe installation. Mounting set include:
- 2 pcs M8 U-bolt, 8 pcs M8 hex nut
- 8 pcs M6x30 bolt, 16 pcs M6 hex nut, 8 pcs 6/12 washer
- 1 pcs extension plate

Extension plate marine grade anodised aluminium, other parts AISI316 acid-proof stainless steel.

More detailed mechanical data: see MS-DEV100 datasheet

► **Order Code: MS-DEV100**

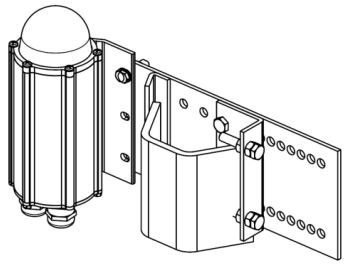


Obelux MS-RW
Mounting set for horizontal plate or wall installation.
Mounting set includes:
- 4 pcs M6x30 bolt, 8 pcs M6 hex nut, 4 pcs 6/12 washer
- 1 pcs L-shape 2 mm plate

All parts AISI 316 acid-proof stainless steel.

More detailed mechanical data: see MS-RW datasheet

► **Order Code: MS-RW**



Obelux MS-LVU/LVA
Mounting set for L and V -shape profiles
Mounting set includes:
- 1 set accessories for light fitting to plate
- 1 pcs extension plate with adjusting plate and accessories

Extension plate hot dip galvanized steel, other parts AISI316 acid-proof stainless steel.

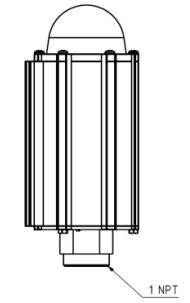
More detailed mechanical data: see MS-LVU/LVA datasheet

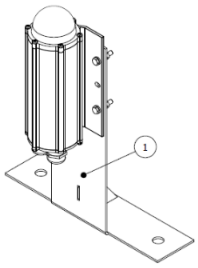
► **Order Code: MS-LVU** (with galvanized extension plate)
► **Order Code: MS-LVA** (with AISI316 extension plate)

Low-intensity 10cd red and infrared
Medium-intensity 100cd red and infrared

OBELUX AVIATION LIGHTS

Federal office of Civil Aviation	FOCA
Bundesamt für Zivilluftfahrt	BAZL
Office federal de l'aviation civile	OFAC
Ufficio federale dell'aviazione	UFAC

	**Obelux MS-N1B** Mounting set for 1" NPT at bottom More detailed mechanical dimensions: see MS-N1B datasheet.
► **Order Code: MS-N1B**	

	**Obelux MS-WT1/5** Mounting set for wind turbines. Mounting set for horizontal plane. Mounting set includes bracket and fasteners. Mounting bracket AISI 304 stainless steel or AISI 316 acid-proof steel, other parts AISI 316 acid-proof steel. More detailed mechanical data: see MS-WT1/5 datasheet.
► **Order Code: MS-WT1**	(Ø15,5 mm holes, AISI 304 stainless steel bracket)
► **Order Code: MS-WT5**	(Ø17,0 mm holes, AISI 316 acid proof steel bracket)
► **Order Code: MS-WT5A**	(Ø17,0 mm holes, AISI 304 stainless steel bracket)