

DATA SHEET

# GPI GLIDE PATH INDICATOR

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The powerful GPI light beams enable the pilot to easily locate the helideck from a distance of approx. 5 nm and will guide the helicopter to a position above the landing area. The light beams consist of three different vertical sectors: A steady green sector in the center that indicates the correct approach angle of abt. 4°, a yellow/amber, slow flashing upper sector above the green sector and a red, fast flashing lower sector warning the pilot of a dangerously low approach angle.

ARTICLE NO. | 02001-00-0003 GPI

The two fully redundant LED driven light beams are stabilized to  $\pm 0.3^\circ$  using an internal motion sensor (Inertial Measurement Unit IMU) and powerful servo actuators to compensate up to  $\pm 45^\circ$  of roll and pitch motions, irrespective of the relevant helicopter approach course.

A high resolution camera with motorized zoom facing towards the approaching helicopter will assist visual surveillance of helideck landing operations. When not used as GPI, the camera can be integrated in the CCTV system and act as pan/tilt camera for additional observations.

System integrity and operational reliability is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the GPI's status. In that respect, the GPI will show an upcoming malfunction before it actually fails. Easily exchangeable standard dry agent cartridges provide effective absorption of residual humidity. Nitrogen filling, as alternative mode of humidity control, is available as optional feature.

### ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	250 W

### OPERATING CONDITIONS

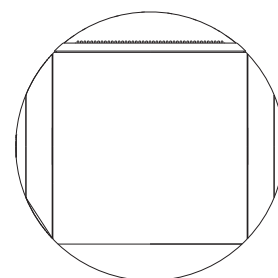
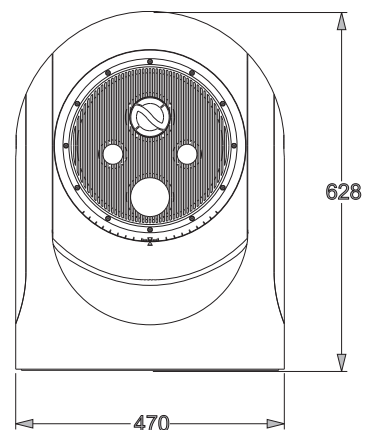
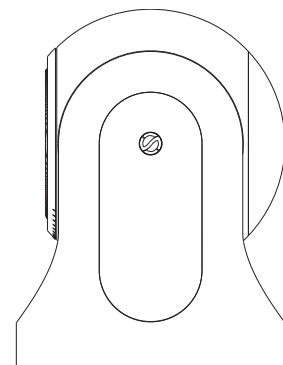
Temperature	-20°C to 50°C
Ingress Protection	IP66

### MECHANICAL SPECIFICATIONS

Dimensions (Ø × H)	470 × 629 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	approx. 49 kg

### OPTICAL SPECIFICATIONS

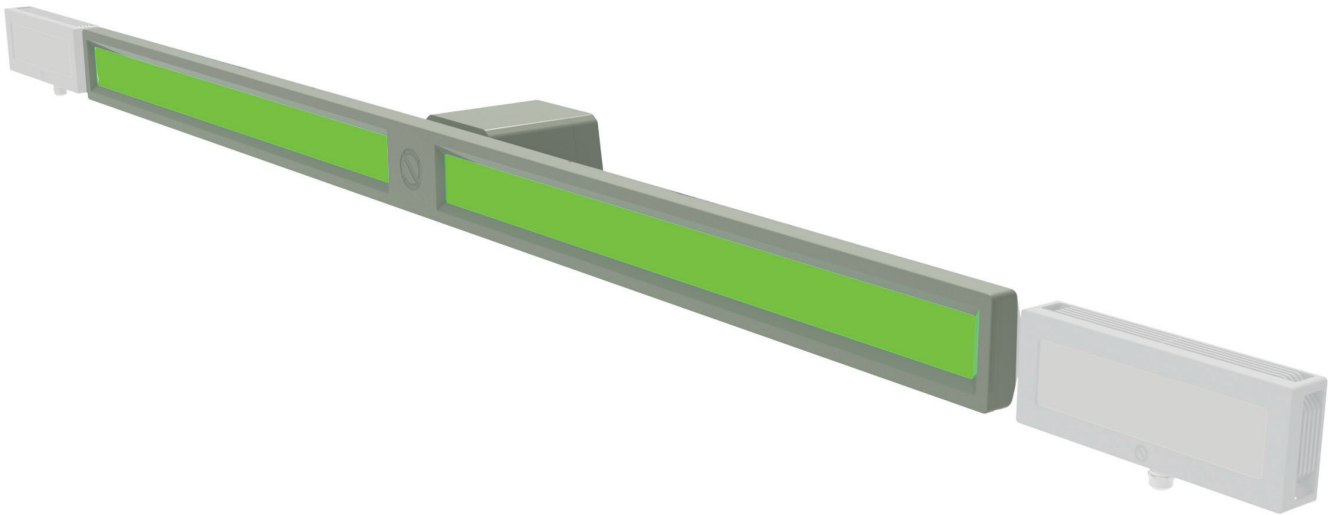
Light Source	Redundant 2 × LED Light Engine
Optical Characteristics	STANAG 1445 / 1236
NVG compatible	Acc. to MIL-STD-3009



DATA SHEET

# HRB HORIZON REFERENCE BAR

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The Horizon Reference Bar (HRB) is the central component of the Horizontal Reference System (HRS), which consists of the HRB and two fixed Structure Reference Lights (SRL). The HRB is stabilized to a  $< 0.5^\circ$  reference to the true horizon by an internal motion sensor (Inertial Measurement Unit IMU) and a powerful servo actuator. It can follow the vessels roll motion up to  $\pm 30^\circ$ .

ARTICLE NO. | 02002-00-0002 HRB

The standard HRB light color is green to ensure compatibility with NVG mode acc. to STANAG 1445. Other colors are available on request incl. multicolor LEDs. The rigid design in full body seawater resistant aluminum is optimized for performance in extreme marine environments.

System integrity and operational reliability is controlled by Optonaval's internal electronics combining multiple sensors

measuring temperature, humidity and electric current, providing 24/7 monitoring of the HRB's status. In that respect, the HRB will show an upcoming malfunction before it actually fails. Easily exchangeable standard dry agent cartridges provide effective absorption of residual humidity. Nitrogen filling - as alternative mode of humidity control - is available as optional feature.

## ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	25 W

## OPERATING CONDITIONS

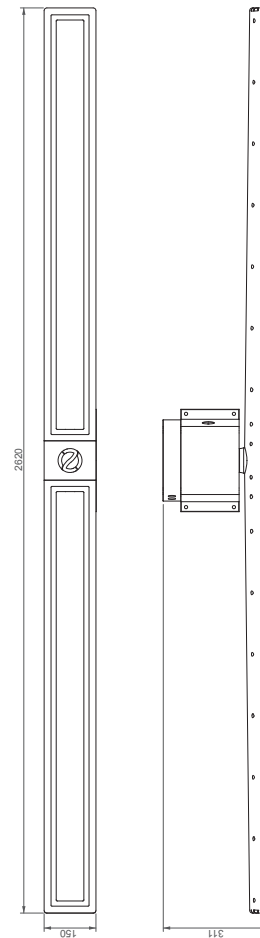
Ambient Temperature	-20°C to 50°C
Ingress protection level	IP 66/67
Shock	acc. to MIL-STD-810G w/CHG1
Vibration	acc. to MIL-STD-810G w/CHG1
EMC	acc. to MIL-STD-461G
NVG compatible	acc. to MIL-STD-3009

## MECHANICAL SPECIFICATIONS

Dimensions (W × H × D)	2620 × 150 × 311 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	approx. 40 kg

## OPTICAL SPECIFICATIONS

Light Source	LED
NVG compatible	Acc. to MIL-STD-3009 compliant with STANAG 1445.
Luminous flux	max. 2500 lm
Beam angle	110°



DATA SHEET

# CFD / EL COMBINED FLIGHT DECK EDGE LIGHT

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The Combined Flight Deck / Deck Edge Light (CFD / EL) is designed to mark the deck's outer limits (perimeter circle) and illuminate the entire flight deck in a way which does not dazzle pilots vision. It has a low and compact housing profile, which is made of massive seawater resistant aluminum for performance in extreme marine environments.

# CFD/EL COMBINED FLIGHT DECK EDGE LIGHT



ARTICLE NO. | 02014-00-0001 CFD / EL

The CFD/EL offers the following functions with customer specified color schemes:

1. Deck Flood Light, illuminating the flight deck with a downward directed light beam (below the horizon) to illuminate only the flight deck. This light is also available in a very limited horizontal angle of not more than 10° to lighten particular deck markings.
2. Deck Flood Light for NVG mode acc. STANAG 1445 (green)
3. Perimeter Light with Visibility of abt. 2 nm from 0° to abt. 20°
4. Deck Edge Light, > 20° elevation, with low, dazzle free light intensity
5. Helicopter Service Light (HSL) (optional), used after touch down to illuminate the helicopter for service, refueling, rearmament or crew/passenger exchange operations.

System integrity and operational reliability is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the CFD/EL's status. In that respect, the CFD/EL will show an upcoming malfunction before it actually fails. Easily exchangeable standard dry agent cartridges provide effective absorption of residual humidity. Nitrogen filling – as alternative mode of humidity control – is available as optional feature.

## ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	CFD 20 W/EL 5 W
Ingress Protection	IP 66/67

## OPERATING CONDITIONS

Ambient Temperature	-20°C to 50°C
Shock	acc. to BV0230
Vibration	acc. to BV0240
EMC	acc. to VG95373
NVG capability	acc. to MIL-STD-3009

## MECHANICAL SPECIFICATIONS

Dimensions (W × D × H)	254 × 210 × 154 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	4.5 kg

## OPTICAL SPECIFICATIONS

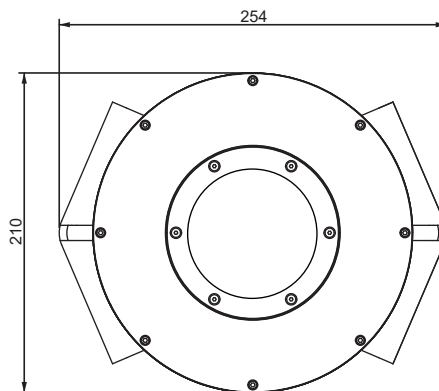
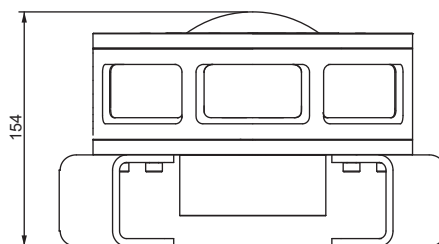
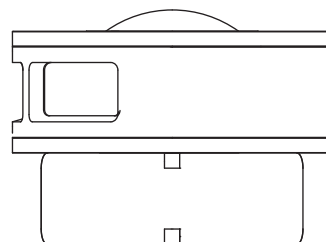
Light Source	LED
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### Flight Deck Light

Beam Angle	130° horizontal/ -8° to 0° vertical
Luminous flux	4800 lm (white), 2100 lm (green) compliant with STANAG 1445

### Edge Light

Luminous flux	100 lm (red), 40 lm (blue),
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DATA SHEET

# LUL LINE UP LIGHT

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The Line-Up-Light's round and very flat corpus is designed for direct integration into the flight deck. The light beam is directed aft with a horizontal spread of  $\pm 40$  degrees relative to the vessels center line. It signals a steady white light or other colors with a vertical elevation of 0 – 10 degrees towards the incoming helicopter. The rigid and ultra-flat design is optimized for obstacle-free flight deck operations, high deck loads and performance in extreme marine environments. The light can be programmed for any desired light sequence (steady, blinking, flash, sequenced flash ... ). When equipped with a second green LED the LUL is NVG compatible acc. STANAG 1445.

ARTICLE NO. | 02013-00-0001 LUL

The Line-Up Lights are typically installed in a straight line on or parallel to the centerline of the flight deck. Combined with the Vertical Drop Line Light (VDL) located aft on the transom and Extended Line Up Light (ELUL) mounted forward on the hangar wall they provide a set of reference markings to assist the helicopter's horizontal positioning (line up) during the final approach.

For optimal integration into the flight deck the LUL has a height of only 12 mm above deck. With a gradually sloped housing it poses minimal obstacle to flight deck operations. The functionality of the LUL is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

### ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	6 W

### OPERATING CONDITIONS

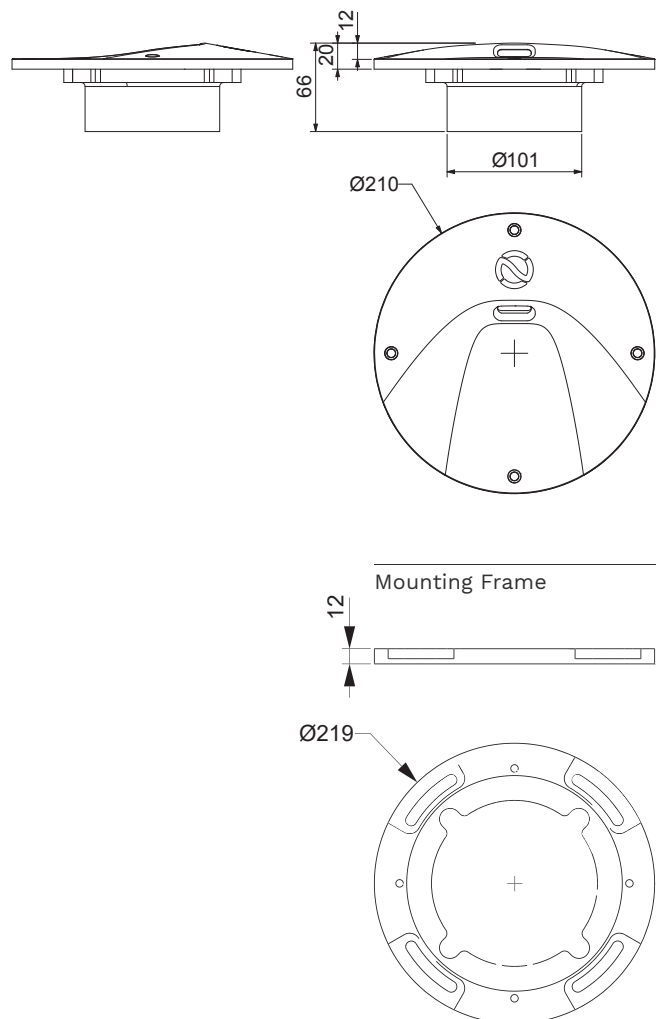
Ambient Temperature	-20°C to 50°C
Ingress protection level	IP 66/67
Shock	acc. to MIL-STD-810G w/CHG1
Vibration	acc. to MIL-STD-810G w/CHG1
EMC	acc. to MIL-STD-461G
NVG compatible	acc. to MIL-STD-3009

### MECHANICAL SPECIFICATIONS

Dimensions	Ø 210 × 66 mm
Dimensions Mounting Frame	Ø 219 × 12 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	2.2 kg

### OPTICAL SPECIFICATIONS

Light Source	LED
FWHM vertical/horizontal	0° to 20° / 80°
Colour	White (6200K)
Luminous flux	< 10 lm
Visibility Range	0.5 nm





DATA SHEET

# OL OBSTRUCTION LIGHT

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The Obstruction Light is a member of the Optonaval marine signal light family, a modular platform based on a universal housing design. The light can be varied in technical setup for various functionalities and performance levels. The rigid design of the massive seawater resistant aluminum body is optimized for performance in extreme marine environments.

ARTICLE NO. | 02010-00-0001 OL

The Obstruction Light marks elevated and protruding structures in the vicinity of the helicopter landing area to facilitate safe maneuvering of the helicopter during landing and take-off operations.

The functionality of the OL is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

The obstruction light is omnidirectional and emits blue light through Hi Power LEDs with a visibility of at least 2 nm in the basic setup. The visibility range, color configuration and specific horizontal and vertical light emitting angles can be adapted to customer requirements.

### ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	8 W

### OPERATING CONDITIONS

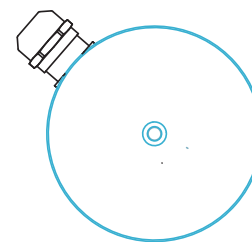
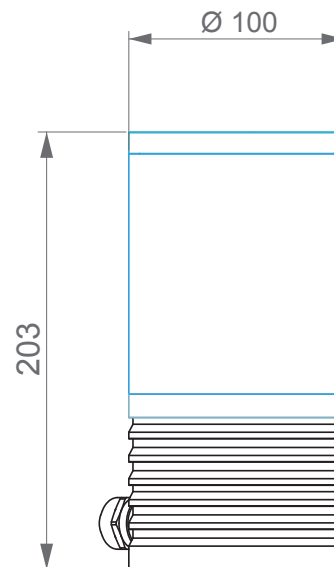
Ambient Temperature	-20°C to 50°C
Ingress protection level	IP 66 / 67
Shock	acc. to MIL-STD-810G w / CHG1
Vibration	acc. to MIL-STD-810G w / CHG1
EMC	acc. to MIL-STD-461G
NVG compatible	acc. to MIL-STD-3009

### MECHANICAL SPECIFICATIONS

Dimensions	Ø 100 × 203 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	2.2 kg

### OPTICAL SPECIFICATIONS

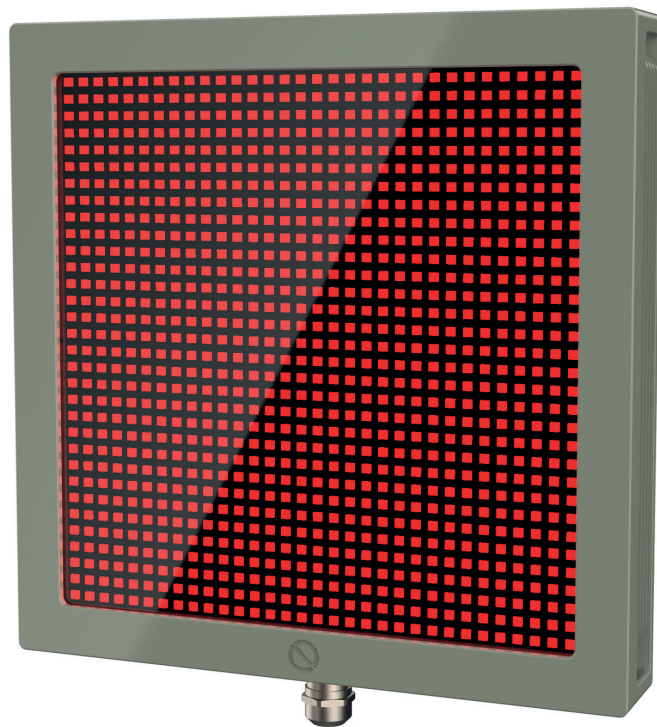
Light Source	LED
FWHM vertical/horizontal	100° / 360°
Luminous flux	60 lm
Colour	Customer specific, (450 nm) standard
Visibility Range	2 nm



DATA SHEET

## **SGL STOP & GO LIGHT**

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The Stop & Go Light is a large and powerful flat-shaped square signal-light with a RGB LED matrix display which can display various colors and/or symbols in the context of the Helicopter Visual Landing Aid System (HVLAS). The SGL is NVG compatible acc. to STANAG 1445. The rigid design in massive, seawater resistant aluminum is optimized for performance in extreme marine environment.

ARTICLE NO. | 02007-00-0001 SGL

The 1024 Pixel RGB LED display light allows for various customization options regarding colors and symbols to be displayed.

The standard colors are green, red and amber. A green circle symbol stands for "GO", a red lying cross stands for "STOP" and an amber triangle stands for "Attention" or "Expect Further Clearance" (EFC). In NVG-mode all symbols are displayed in green. A radiation screen provides excellent visibility in direct sunlight conditions.

The functionality of the Stop & Go Light is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

### ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	10 W

### OPERATING CONDITIONS

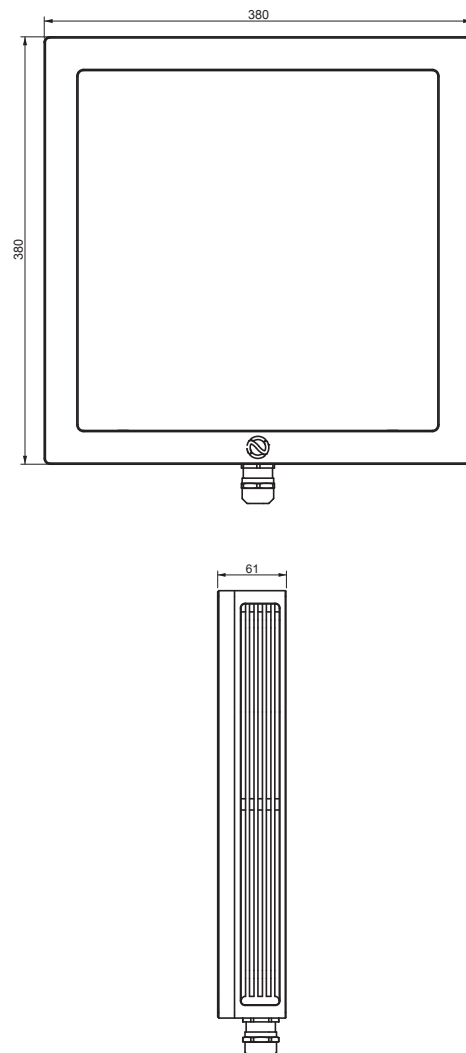
Ambient Temperature	-20 °C to 50 °C
Ingress Protection	IP 66 / 67
Shock	acc. to MIL-STD-810G w / CHG1
Vibration	acc. to MIL-STD-810G w / CHG1
EMC	acc. to MIL-STD-461G
NVG capability	acc. to MIL-STD-3009

### MECHANICAL SPECIFICATIONS

Dimensions (W × H × D)	380 × 380 × 60 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	approx. 9 kg

### OPTICAL SPECIFICATIONS

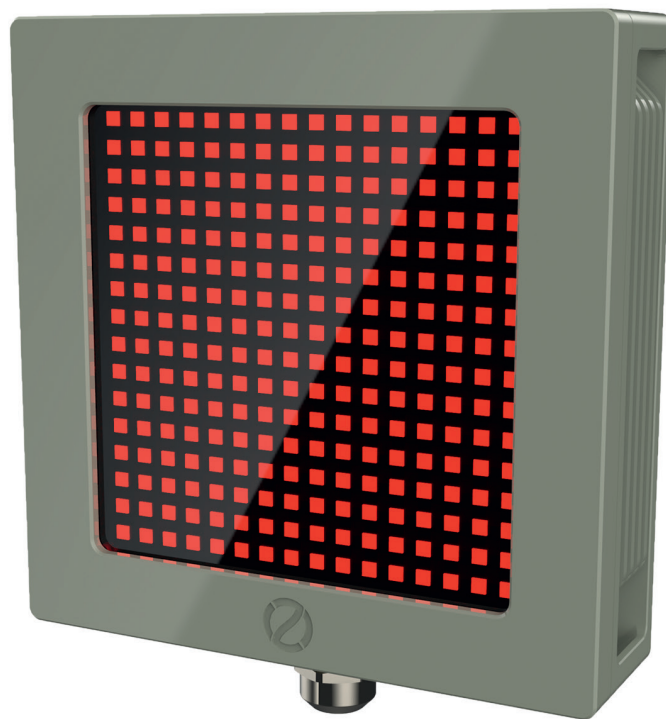
Light Source	LED
Luminous flux	1500 lm
Beam angle	120°



DATA SHEET

# UTL UNIVERSAL TRAFFIC LIGHT

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The universal flat square signal light based on an RGB LED matrix panel that can be customized in color and displayed array/symbol. The rigid design in massive, seawater resistant aluminum is optimized for performance in extreme marine environments.

ARTICLE NO. | **02005-00-0001** ELUL (RED) | **02006-00-0001** VDLL (WHITE)

The UTL can be installed in many positions. Typical installations display a vertical line on the transom below the flight deck level and a vertical arrangement on the hangar wall. Together with the Deck mounted Line-Up Lights they form a straight line parallel to the centerline of the flight deck and provide a perfect set of reference markings for the horizontal alignment of the helicopter during final approach.

A radiation screen provides excellent visibility in direct sunlight conditions. The functionality of the UTL is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

The 256 pixel RGBW LED matrix light source of this signal light platform offers a high level of customization options and can be integrated in a variety of naval safety and signaling systems. The light can display single colors, change colors and can display text or symbols with a resolution of 16 × 16 pixels (LEDs).

## ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	10 W

## OPERATING CONDITIONS

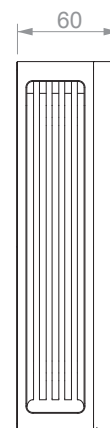
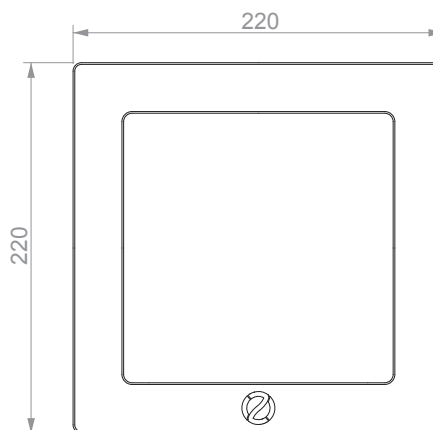
Ambient Temperature	-20°C to 50°C
Ingress Protection	IP 66 / 67
Shock	acc. to MIL-STD-810G w/CHG1
Vibration	acc. to MIL-STD-810G w/CHG1
EMC	acc. to MIL-STD-461G
NVG capability	acc. to MIL-STD-3009

## MECHANICAL SPECIFICATIONS

Dimensions (W × H × D)	220 × 220 × 60 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	approx. 5 kg

## OPTICAL SPECIFICATIONS

Light Source	LED
Luminous flux	30 lm
Beam angle	120°



DATA SHEET

# WOL WAVE OFF LIGHT

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The Wave Off Light (WOL) is a member of the Optonaval marine signal light family, a modular platform based on a universal housing design. The light can be varied in technical setup for various functionalities and performance levels. The rigid design of the massive seawater resistant aluminum body is optimized for performance in extreme marine environments.

ARTICLE NO. | 02015-00-0001 WOL

The Wave Off Light is installed in pairs on top of the hangar above the helicopter landing deck in direct line of visibility to the helicopter pilot. The Wave-Off Lights are only activated in case of emergency to signal immediate abortion of landing operations. Rapid flashes of red light warn that landing/approach is unsafe. In night vision mode acc. to STANAG 1445 the Wave-Off Lights flash in green color.

The functionality of the WOL is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

Wave-Off Lights are semi directional with a 180° angle towards the flight deck and emit red and green light through high power LEDs with a visibility of not less than 2 nm.

### ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	6 W green / 20 W red

### OPERATING CONDITIONS

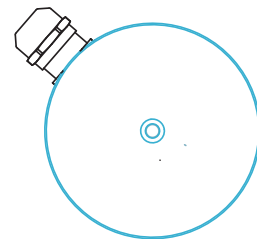
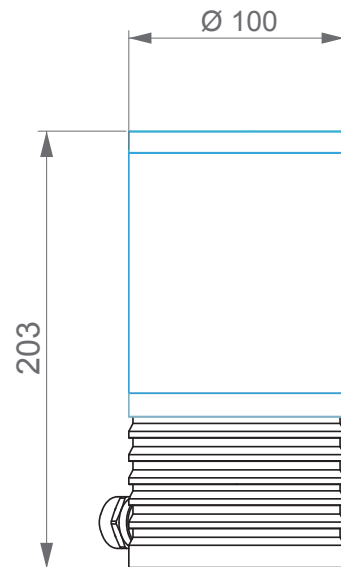
Ambient Temperature	-20°C to 50°C
Ingress protection level	IP 66 / 67
Shock	acc. to MIL-STD-810G w / CHG1
Vibration	acc. to MIL-STD-810G w / CHG1
EMC	acc. to MIL-STD-461G
NVG capability	acc. to MIL-STD-3009

### MECHANICAL SPECIFICATIONS

Dimensions	Ø 100 × 203 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	2.2 kg

### OPTICAL SPECIFICATIONS

Light Source	LED
FWHM vertical / horizontal	100° / 180°
Colour	Green (530nm), red (625nm)
Luminous flux	60 lm green / 1500 lm red
Visibility Range	2 nm





DATA SHEET

# HBL HOMING BEACON LIGHT

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The Homing Beacon (HBL) is a member of the Optonaval marine signal light family, a modular platform, based on a universal housing design. The light can be varied in technical setup for various functionalities and performance levels. The rigid design of the massive seawater resistant aluminum body is optimized for performance in extreme marine environments.

ARTICLE NO. | 02009-00-0001 HBL

The Homing Beacon is mounted on the top of the mast of the ship and guides the pilot towards the specific ship by emitting the ships unique light signature through a repetitive flashing sequence. The light can be identified from a distance of at least 10 nm. To avoid any glaring distraction of the pilot when in closer vicinity to the ship, the Homing Beacon Light can be customized to emit light only in a narrow angle above and below the horizon.

The Homing Beacon is omnidirectional and emits a flashing white light through Hi Power LEDs with a visibility of at least 10 nm and can be customized in it's visibility range and directional characteristics.

The functionality of the HBL controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

## ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	40 W

## OPERATING CONDITIONS

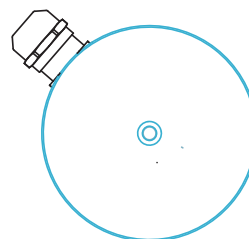
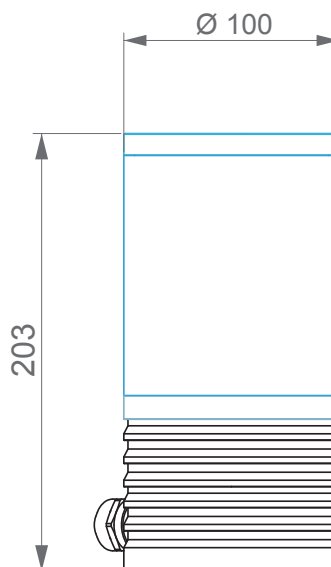
Ambient Temperature	-20°C to 50°C
Ingress protection level	IP 66/67
Shock	acc. to MIL-STD-810G w/CHG1
Vibration	acc. to MIL-STD-810G w/CHG1
EMC	acc. to MIL-STD-461G
NVG compatible	acc. to MIL-STD-3009

## MECHANICAL SPECIFICATIONS

Dimensions	Ø 100 × 203 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	2.2 kg

## OPTICAL SPECIFICATIONS

Light Source	LED
FWHM vertical/horizontal	20° – 100° / 360°
Colour	White (6200K)
Luminous flux	3500 lm
Visibility Range	10 nm



DATA SHEET

# HIFR HELICOPTER IN FLIGHT REFUELING LIGHT

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The Helicopter In Flight Refueling Light (HIFR) is a member of the Optonaval marine signal light family, a modular platform based on a universal housing design. The light can be varied in technical setup for various functionalities and performance levels. The rigid design of the massive seawater resistant aluminum body is optimized for performance in extreme marine environments.

# HIFR HELICOPTER IN FLIGHT REFUELING LIGHT

ARTICLE NO. | 02012-00-0001 HIFRL

The Helicopter In Flight Refueling Lights are installed as offset linear triplets above the hangar on the side where the refueling facility is located. This arrangement aides the pilot in maintaining a steady hovering position above the deck during In Flight refueling.

The functionality of the HIFR is controlled by Optonaval's internal electronics combining multiple sensors measuring temperature, humidity and electric current, providing 24/7 monitoring of the light's status. In that respect, the light will show an upcoming malfunction before it actually fails.

The Helicopter In Flight Refueling Light is omnidirectional and emits a steady amber light through Hi Power LEDs with a visibility of at least 2 nm.

## ELECTRICAL SPECIFICATIONS

Supply Voltage	48 VDC
Power Pmax	6 W

## OPERATING CONDITIONS

Ambient Temperature	-20°C to 50°C
Ingress protection level	IP 66/67
Shock	acc. to MIL-STD-810G w/CHG1
Vibration	acc. to MIL-STD-810G w/CHG1
EMC	acc. to MIL-STD-461G
NVG compatible	acc. to MIL-STD-3009

## MECHANICAL SPECIFICATIONS

Dimensions	Ø 100 × 203 mm
Material	Seawater resistant anodized aluminium alloy
Surface Coating	Customer specific
Colour	Customer specific
Gloss Grade	Customer specific
Weight	2.2 kg

## OPTICAL SPECIFICATIONS

Light Source	LED
FWHM vertical/horizontal	100°/360°
Colour	Amber (590nm)
Luminous flux	60 lm
Visibility Range	2 nm

