

## Data sheet

# LED 160 GPS NAI

- **For use as a 5 nautical mile beacon on offshore wind turbines**
- **Maintenance-free LED technology**
- **Exact day-night switching and GPS-precise synchronisation of all flashcode generators according to IALA standard in the NAI network**
- **Standard NAI bus interface for power supply and communication**
- **Suitable for series connection of multiple NAI components**

This nautical lantern is intended for use on offshore wind turbines. It satisfies the requirements of the IALA recommendation O-139<sup>1</sup> and the guideline 'offshore structures'<sup>2</sup> of the WSV<sup>3</sup> according to the 'Technical Requirements' TF01 '5 nautical mile beacon (yellow)'.

The device is distinguished by low power consumption, a long service life and robust construction.

Equipped with light emitting diodes (LEDs) as light sources the optical systems is designed for long maintenance intervals. Utilising LED technology provides the greatest possible light output.

The lantern's integrated NAI bus interface is used to supply power, to control the flashcode and intensity, and to transmit status and error messages to the central NAI controller, so that they are available to the central SCADA system.

The integrated GPS module provides day-night information and synchronisation pulses for the flashcodes in the network of a structure marking system, based on a very precise GPS/GLONASS time base and an integrated ambient light sensor.

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<sup>1</sup> IALA Recommendations O-139, "The marking of man-made offshore structures"

<sup>2</sup> Guideline 'Offshore Structures' [German version: Richtlinie „Offshore-Anlagen“ zur Gewährleistung der Sicherheit und Leichtigkeit des Schiffsverkehrs Version 2.0]

<sup>3</sup> Federal German Waterways and Shipping Administration



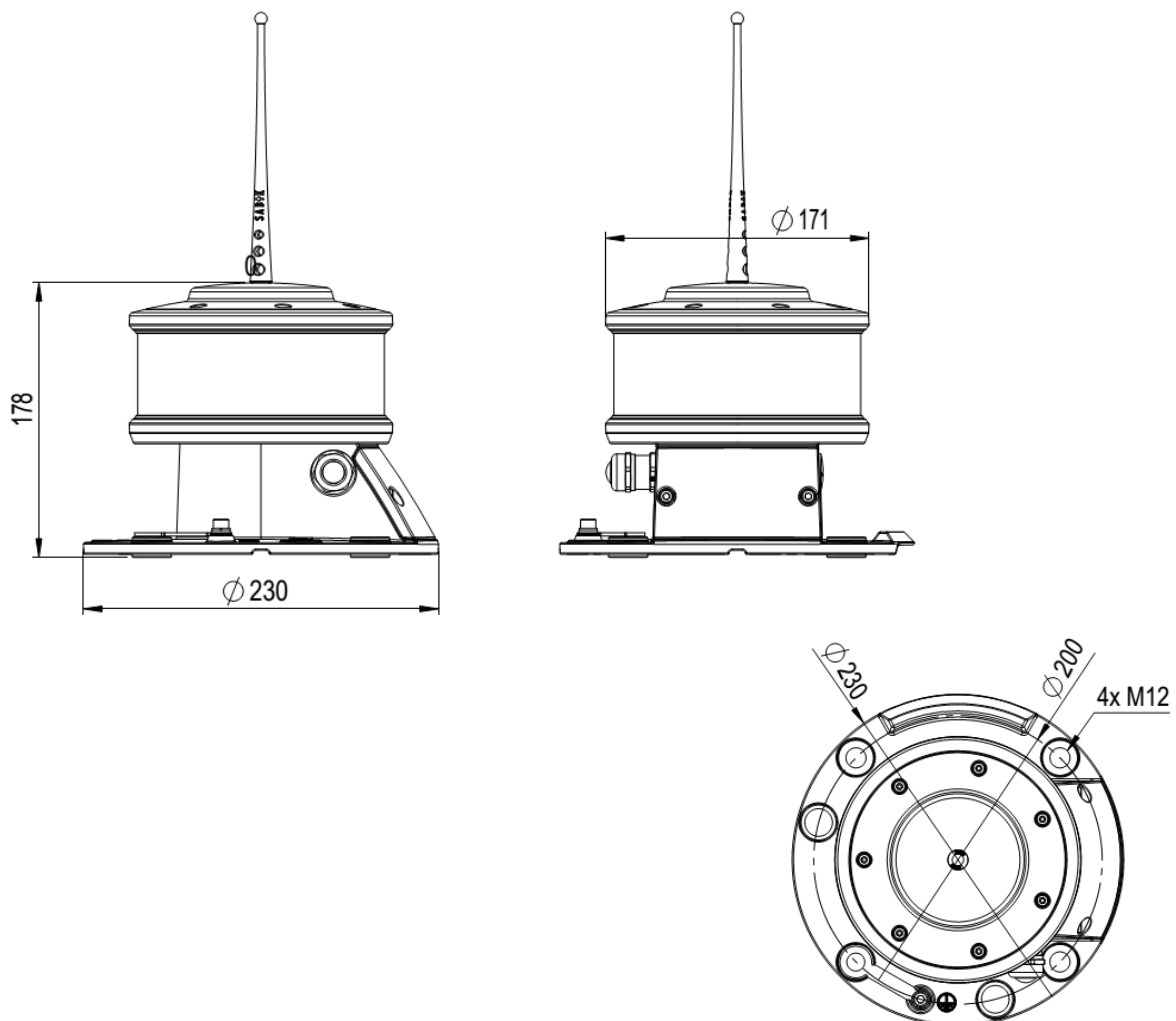
The day-night switching occurs depending

- on the ambient brightness **and**
- the current date in conjunction with the Cuxhaven calendar (North Sea or Baltic Sea) **or**
- the geographic position of the device according to the astronomical clock.

The exact flashcode synchronisation of the connected navigation light components is guaranteed even in the event of a weak or absent GPS/GLONASS signal over a time period of at least 2 hours.

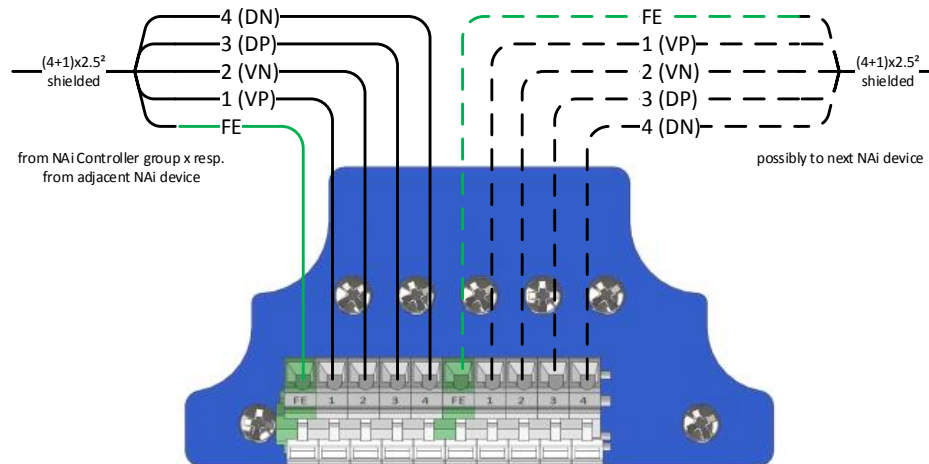
## Technical Data

### Dimensions, weight



<b>Diameter optics</b>	171 mm
<b>Diameter mounting foot</b>	230 mm
<b>Height without bird spikes</b>	178 mm
<b>Weight incl. mounting foot:</b>	2.56 kg

## Electrical connection



<b>Electrical connection</b>	Spring terminal block, max. 2.5 mm <sup>2</sup>
<b>Operating voltage <math>V_{IN}</math></b>	9 to 36 V DC
<b>Power consumption (<math>V_{IN} = 24</math> V DC - max. intensity)</b>	max. 2,2 W

## Optical system

<b>Light colour</b>	Yellow
<b>Maximum light intensity (along the optical axis)</b>	approx. 140 cd
<b>Beam angle (vertical)</b>	8° (FWHM) <sup>4</sup>

## Environmental conditions

<b>Regulations</b>	IEC 60945, device type 'exposed'
<b>Ambient temperature (operation)</b>	-40 to 55 °C
<b>Ambient temperature (storage / transport)</b>	-40 to 70 °C
<b>Humidity (operation / storage / transport)</b>	max. 95 % acc. to IEC 60945
<b>Atmospheric pressure (operation / storage / transport)</b>	80 kPa to 108 kPa
<b>Degree of protection (acc. to IEC 60529)</b>	IP67
<b>Protection class</b>	Class III

## Mechanical requirements

<b>Vibration testing sinusoidal vibrations</b>	acc. to IEC 60945
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## Reliability

<b>MTBF Electronics</b>	1 027 000 h
<b>Minimum LED Lifetime</b>	100 000 h

<sup>4</sup> Specification of the half-value angle: Full width at half maximum (FWHM)

## EMC compliance

EMC requirements		Applied Standard	Test standard/test criteria
Emission	Radiated emission	EN 60945:2002	IEC/CISPR 16-2-3:2010 Antenna distance 3 m
Interference immunity	Electrostatic discharge (ESD)	EN 60945:2002	IEC 61000-4-2:2008 Criterion B 8 kV air discharge 6 kV contact discharge
	Electromagnetic fields	EN 60945:2002	IEC 61000-4-3:2010 Criterion A Field strength 10 V/m
	Fast transients (burst)	EN 60945:2002	IEC 61000-4-4:2012 Criterion B On NAI bus lines (VP, VN, DP, DN): Test voltage 1 kV
	High energy transients (surge)	EN 61000-6-2:2005	IEC 61000-4-5:2005 1 kV on NAI bus line (shield)
	Conducted disturbances, induced by radio-frequency fields	EN 60945:2002	IEC 61000-4-6:2008 Criterion A All lines: Test voltage 10 V

## Components



1. Device head with optics and GPS module
2. Bird spike
3. Indicator LED, light sensor
4. Rating plate
5. Second cable gland M20 or blanking plug
6. Housing cover for socket with spring terminal block
7. Cable gland M20
8. Earthing connection
9. Device foot with integrated socket and third cable gland M20 or blanking plug on the bottom side

**Note:** All housing components including the cable glands satisfy the IP67 degree of protection requirements according to IEC 60529. During connection and assembly, ensure that no moisture or dirt penetrates into the open socket.

EMC cable gland <sup>1)</sup>	Size	for cable diameter	Key width
	M20 x 1.5	7.5-14.0 mm	24 mm

<sup>1)</sup> Typ: HELUTOP® MS-EP4

## Material

<b>Housing (Device foot, head, cover for socket)</b>	Anodised, powder-coated aluminium (AlSi12)
<b>Lens</b>	PMMA
<b>Lens Cover</b>	MAKROLON® (PC)
<b>Cable gland</b>	Nickel-plated brass
<b>Earthing connection</b>	Nickel-plated brass
<b>Cover indicator LED</b>	MAKROLON® (PC)
<b>Insulation sleeve</b>	PA
<b>Seals</b>	TPE, injection-molded
<b>Pressure compensation valve for socket and housing</b>	PTFE membrane