



**Navigations- und Signalleuchten mit
LED-Technik Serie 65**

**Navigation- and Signal Lights with
LED technology Series 65**

**Feux de navigation en technologie
LED série 65**

Betriebsanleitung

Operating Manual

Instructions de service

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Die Betriebsanleitung ist vor Einsatz der Navigationsleuchte sorgfältig zu lesen.

Please read the Operating Manual for your navigation lights carefully!

Il est recommandé de lire attentivement les pages suivantes et de suivre les instructions de service avec la même attention.

AQUA SIGNAL BEHÄLT SICH VOR, AN DEN BESCHRIEBENEN PRODUKTEN TECHNISCHE ÄNDERUNGEN VORZUNEHMEN.

AQUA SIGNAL RESERVE THE RIGHT TO MAKE TECHNICAL AND DESIGN CHANGES TO THE PRODUCTS.

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Rev.: 00

Print date: 2008-09-09

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1 Foreword

The LED navigation and signal lights are designed and constructed with state-of-the-art technology according to the recognized safety regulations. However, hazards can arise for persons or objects, as not all hazard points can be avoided if the functional capacity is to be maintained. Accidents on account of these hazards and faults can, nevertheless, be prevented by observing the operating manual and the information during the training and instruction. Furthermore, you will then be able to utilize the full capacity of the LED navigation light and avoid unnecessary faults.



Therefore always read this operating manual carefully before operating your LED navigation light. Always observe the notes and information contained therein, in particular the safety information.

Keep the operating manual in a convenient location after first reading through it so that you can refer to it again later.

All data, figures and dimensions in this operating manual are not binding. Claims of any kind cannot be derived from these.

Reprinting and duplication of any kind, also in extracts, requires the written approval of the manufacturer.

Conversion or modifications to the LED navigation light are not permissible. Modifications made by the user himself will result in revocation of the approval and any liability of the manufacturer as well as the warranty.

Only use original spare parts and accessories approved by the manufacturer. Otherwise, properties of the LED navigation light specified by the design as well as the functional capacity or safety could be negatively affected. The use of other parts therefore annuls liability for the consequences resulting from this.

Contact the Customer Service for ordering spare parts or accessories.

2 Hazard Information



Warning of optical radiation!

Eye injuries possible.

Do not look into the LED lighting.



Warning of electrical voltage.

Life-threatening electrical voltages are present in the electrical components of the device.

Do not work on live components!


Operation of the LED navigation light is at the user's own risk and hazard. The manufacturer is not liable for damage which arises when using the LED navigation light, unless this damage can be traced back to grossly negligent or intentional violation of contract.

The manufacturer cannot predict every danger! The warnings contained in this information and attached to the LED navigation light might not therefore include all hazards.

In addition to the information in this operating manual, the statutory regulations must be observed, in particular the safety and accident prevention regulations.

3 Intended Use

These navigation/signal lights correspond to the national and international provisions in respect to the minimum visibility ranges, light distribution and colour type for water vessels of 20 and more meters in length (Convention on the International Regulations for preventing Collisions at Sea, 1972 - COLREG).

Navigation lights which are also marked with the  D in addition to the BSH marking can also not be used on inland waterway vessels.

The navigation and signal lights¹

AQUA SIGNAL Series 65

are approved corresponding to the Collision Prevention Regulations of 1972 by the relevant national authorities. The approval number, prototype number and order number can be found on the type plate of the light.

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This navigation light is intended and approved for international merchant shipping.

The operational reliability of the LED navigation light is only ensured when used as intended. It must therefore only be used for its intended purpose. Consequently, it is important to read the following pages carefully.

¹ Partial and full circuit

4 Order Numbers

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		Black plastic housing			White plastic housing			Brass housing		
Main system ⇒		115 V ...230 V	115 V ...230 V	24 V DC	115 V ...230 V	115 V ...230 V	24 V DC	115 V ...230 V	115 V ...230 V	24 V DC
Reserve system ⇒		115 V ...230 V	24 V DC	24 V DC	115 V ...230 V	24 V DC	24 V DC	115 V ...230 V	24 V	24 V DC
Port	3 sm	3664205000	3664206000	3664203000	3664215000	3664216000	3664213000	3664225000	3664226000	3664223000
Starboard	3 sm	3663105000	3663106000	3663103000	3663115000	3663116000	3663113000	3663125000	3663126000	3663123000
Masthead	6 sm	3661005000	3661006000	3661003000	3661015000	3661016000	3661013000	3661025000	3661026000	3661023000
Stern white	3 sm	3662705000	3662706000	3662703000	3662715000	3662716000	3662713000	3662725000	3662726000	3662723000
Stern yellow	3 sm	3662405000	3662406000	3662403000	3662415000	3662416000	3662413000	3662425000	3662426000	3662423000
Signal white	3 sm	3660705000	3660706000	3660703000	3660715000	3660716000	3660713000	3660725000	3660726000	3660723000
Signal green	3 sm	3660105000	3660106000	3660103000	3660115000	3660116000	3660113000	3660125000	3660126000	3660123000
Signal red	3 sm	3660205000	3660206000	3660203000	3660215000	3660216000	3660213000	3660225000	3660226000	3660223000
Signal yellow	3 sm	3660405000	3660406000	3660403000	3660415000	3660416000	3660413000	3660425000	3660426000	3660423000
Manoeuvre	5 sm	3660005000	3660006000	3660003000	3660015000	3660016000	3660013000	3660025000	3660026000	3660023000

5 Product Observation

The use of LEDs in navigation and signal lights is the clear application of a new and innovative technology.

Despite careful development and quality assurance, not all technical circumstances are foreseeable.

Please observe our product and feel free to report to us if any unusual operating states are discernible which lead to or could lead to hazardous situations in certain conditions.

We shall carefully examine your experience and incorporate the insights gained into our work.

Contact: See Customer Service section

6 Safety and Accident Prevention Regulations

In addition to the safety and accident prevention regulations of the trade associations, the following information must be heeded, in order to avoid damage to persons and objects:

- Electrical lines must be replaced immediately if crack forma-

tions or other damage is discernible.

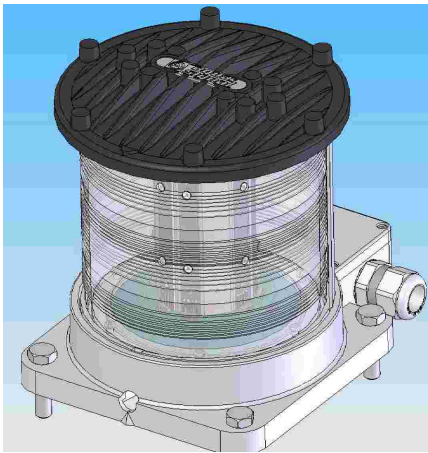
- Only original spare parts and accessories approved by the manufacturer may be used. Otherwise, the liability by the manufacturer for any resultant consequences will be rendered null and void.

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7 Technical Data



- | | |
|----------------------------------|------------------------|
| 1 Voltage supply, main system | 115...230 V
or 24 V |
| 2 Voltage supply, reserve system | 115...230 V
or 24 V |
| Illuminant: | Pro LED 1 W |

Permissible ambient temperature for storage and operation	$-20^{\circ}\text{C} \leq T \leq 45^{\circ}\text{C}$
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Protection class:	IP X6
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Dimensions:	234 mm x 176 mm x 206 mm (see section 0)
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Weight:	3.3 kg
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	Line voltage 1	Line voltage 2
Line voltages, nominal	115/230V AC	24V DC
Line voltage, minimum	92V (115V-20%)	19.2V (24V-20%)
Line voltage, maximum	276V (230V+20%)	28.8V (24V+20%)
Line frequency	50/60Hz	
Power factor	0.4 - 0.6	

Power and current consumption of all navigation and signal lights at different line voltages					
Lamp type	Colour	Range	115V AC	230V AC	24V DC
Masthead	White	6sm	11W / 0.15A	12W / 0.09A	11W / 0.33A
Stern	White	3sm	2W / 0.03A	3W / 0.02A	2W / 0.08A
Stern	Yellow	3sm	2W / 0.03A	3W / 0.02A	2W / 0.08A
Port	Red	3sm	3W / 0.04A	4W / 0.03A	3W / 0.13A
Starboard	Green	3sm	4W / 0.06A	5W / 0.04A	4W / 0.17A
Signal	White	3sm	4W / 0.06A	5W / 0.04A	4W / 0.17A
Signal	Red	3sm	4W / 0.07A	4W / 0.04A	4W / 0.17A
Signal	Green	3sm	6W / 0.08A	7W / 0.06A	6W / 0.25A
Signal	Yellow	3sm	2W / 0.03A	3W / 0.02A	2W / 0.08A
Signal manoeuvre	White	5sm	7W / 0.10A	8W / 0.07A	7W / 0.30A

8 Handling, Function and Regulations

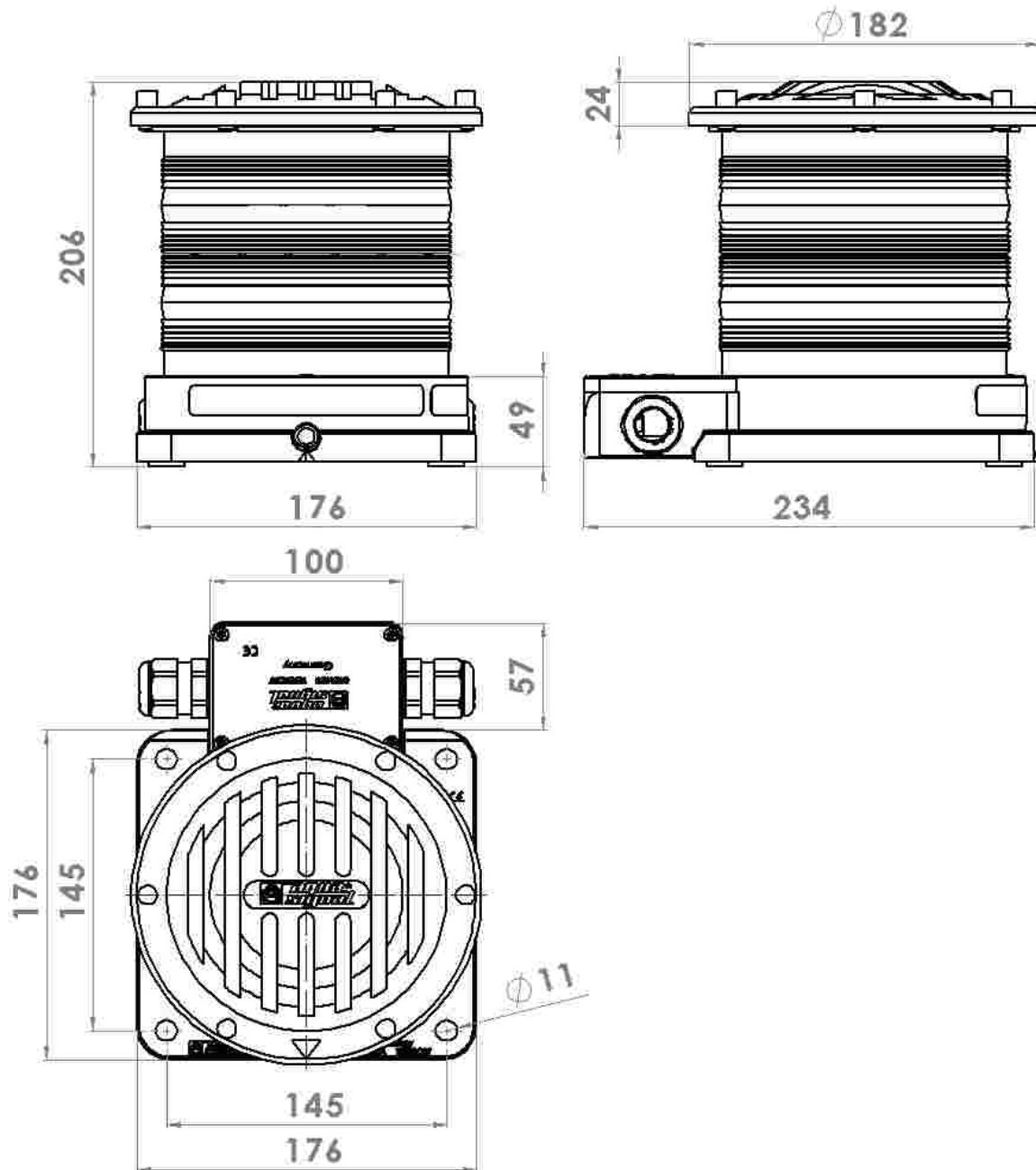
Installation of the navigation lights indicated here on German ships is required by the Collision Prevention Regulations 1972, the German Waterways Regulations (SeeSchStrO) and the Conditions of the Federal Maritime and Hydrographic Agency (formerly German Hydrographic Institute) for the installation of navigation and signal lights, acoustic signal systems and manoeuvre signal systems.

For vessels sailing the German flag which are subject to the Ship Safety Ordinance (SchSV), the installation of the navigation lights must be approved by the Federal Maritime and Hydrographic Agency. This also applies for conversions, insofar as navigation lights are affected by these.

The regulations of the Collision Prevention Regulations – Location and Technical Details for Lights and Signal Bodies – indicated in Appendix 1 must be complied with for all ships. The technical data in relation to the horizontal and vertical position-

ing and the distances between the navigation and signal lights which are described in this operating manual apply for all ships, irrespective of their flag.

9 Dimensions and Installation Sizes



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10 Installation

10.1 General mounting information

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The navigation lights must be installed corresponding to the conditions for the installation of navigation and signal lights, acoustic signal systems and manoeuvre signal systems.

The function of the navigation lights is then only ensured and in compliance with the regulations if the following points are observed during the installation and maintenance: The correct positioning of the navigation lights on board is derived from the Collision Prevention Regulations 1972 / COLREG's 1972. The navigation lights must be installed in and above the keel line or parallel to it.

Their horizontal plane of symmetry **(A)** must be parallel to the load water line **(CWL)**. A direction arrow must be marked on the navigation lights for this, which is arranged parallel to the keel line.

The light outlet must not be covered by parts of the vessel or by objects or persons situated on board. Their position to the vessel must not change during the operating duration.

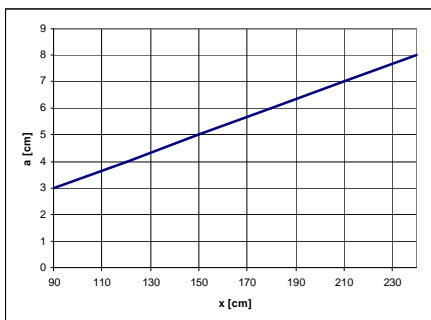
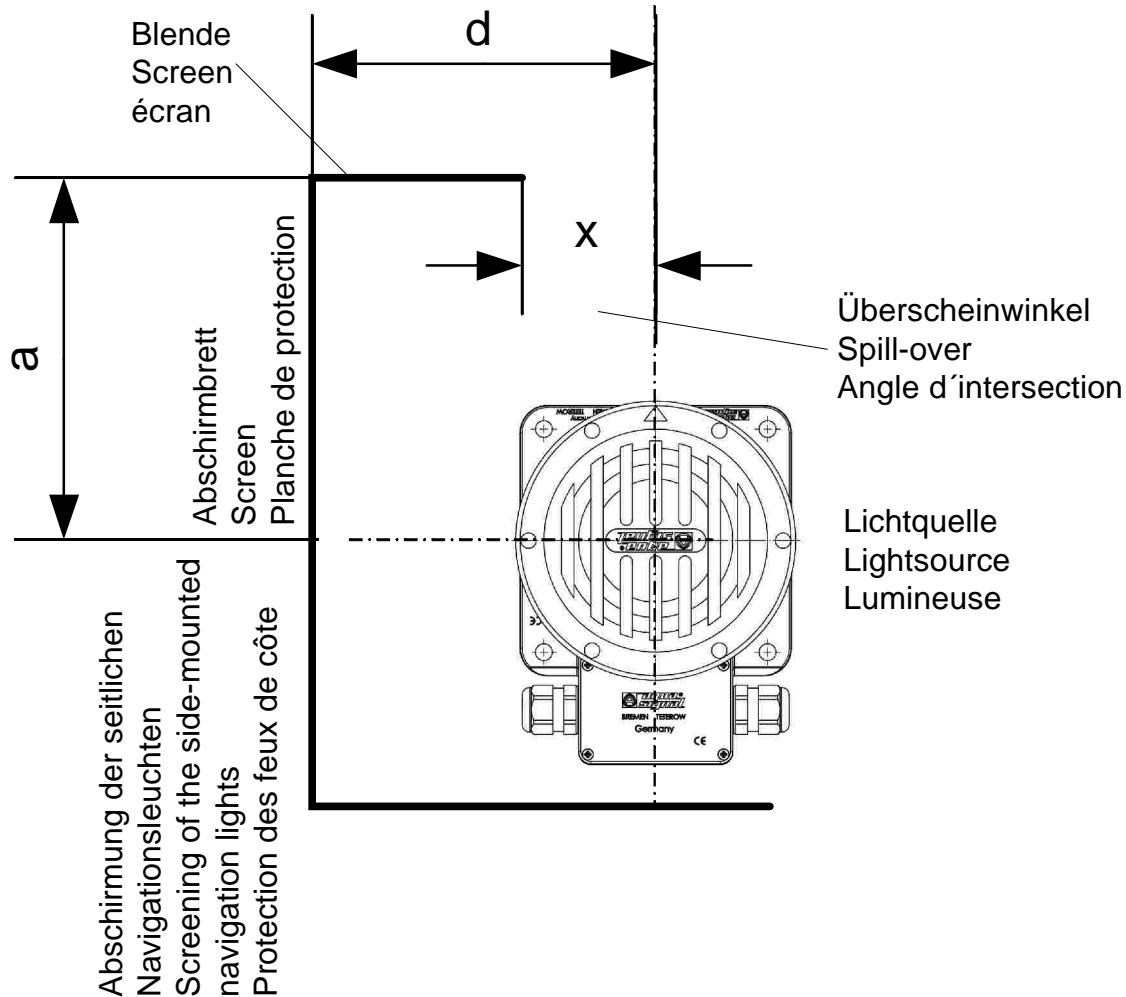
The vertical distance (C) must be at least 4.5 m or be large enough in all trim positions so that the rear top light can be seen above and separate from the front top light at 1000 m distance.

Divergent from the regulations of the Collision Prevention Regulations, the front top light only needs to be placed 5 m above the ship's hull and the rear top light only at least 3 m above the front top light for inland waterway vessels.

10.2 Side navigation light

Horizontal angle of emission 112.5°

Range 3 sm



The "signal zero direction" marked on the navigation light must be parallel to the keel line and correspond to the marking indicated on board: The dimensions of the light can be found in section 0. Special attention must be paid to the right heading course. The dimension x must remain free, as otherwise the full luminous intensity in the heading course can be impaired.

a [cm]	x [cm]
90	3
120	4
150	5
180	6
210	7
240	8

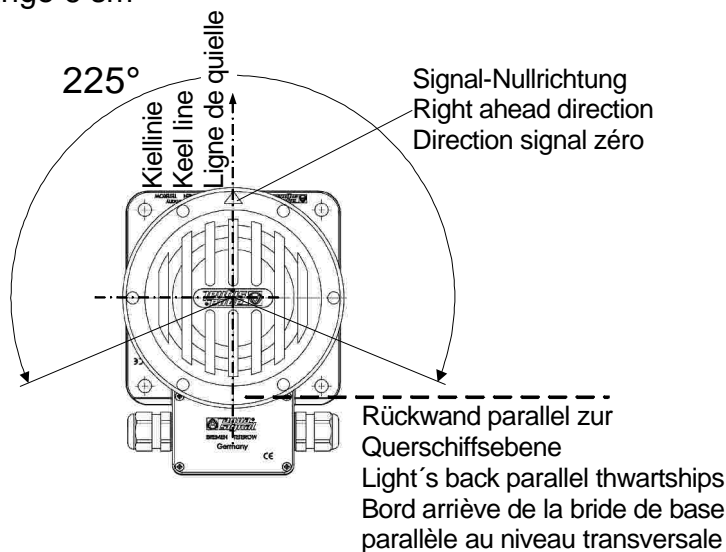
Important note for starboard and port lights

If old lamp boards are still present, the relevant front cross beam must be removed. This is superfluous and prevents the necessary emission in the "right heading course".

10.3 Top navigation light

Horizontal angle of emission 225°

Range 6 sm

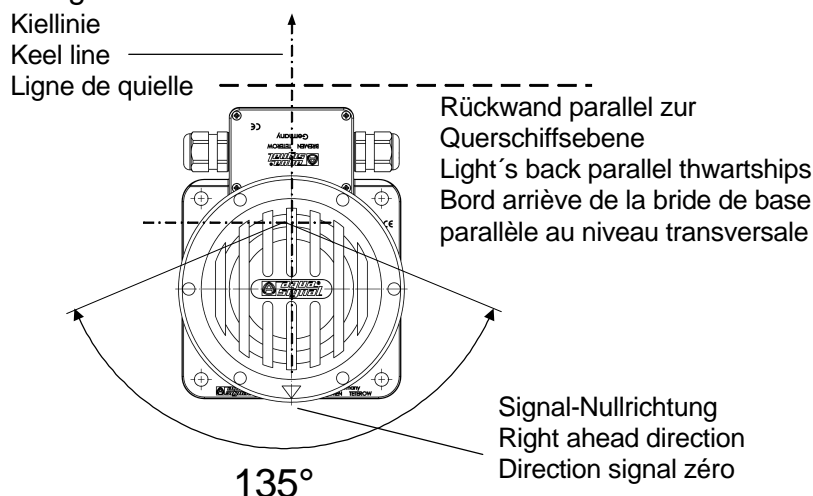


The signal zero direction marked on the navigation light must be in and above the keel line and correspond to the marking indicated on board: Refer to the figure for the exact installation.

10.4 Rear navigation light

Horizontal angle of emission 135°

Range 3 sm



The signal zero direction marked on the navigation light must be in and above the keel line and correspond to the marking indicated on board: It must point astern in the case of rear lamps.

Refer to the figure for the exact installation.

10.5 Signal lights

e.g. Manoeuvre light

Horizontal angle of emission 360°

Range 5 sm

e.g. Morse signal light

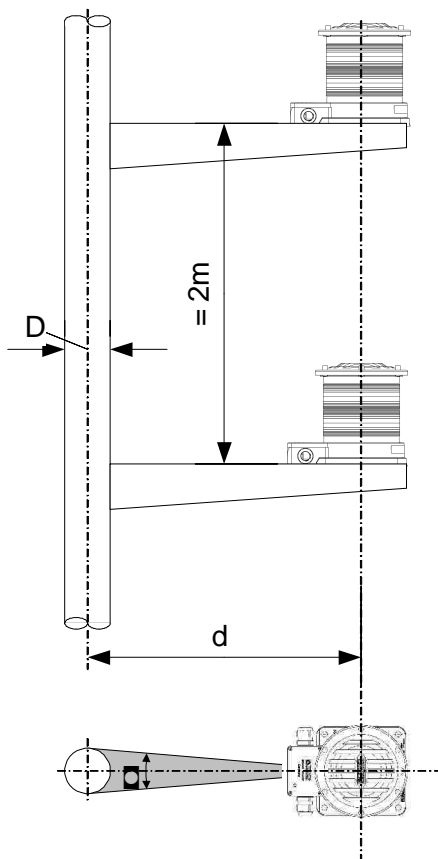
Horizontal angle of emission 360°

Range 3 sm

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Both lamps may only be used with approved transmitters.

Signal lights can be permanently installed or mobile in operation. If they are permanently installed, it must be ensured that their angle of emission is no longer unavoidably affected by parts of the ship. A range of 6° should not be exceeded here.

The distance "d" from the centre navigation light to the centre mast can be seen in the diagram. If two white signal lights are utilized as anchor lights, these must be mounted so that one of them is visible above the entire horizon.

If 2 or 3 signal lights are positioned vertically above one another, the spacing between them must be minimum 2 m.

10.6 Mounting

The level foundation plate must be provided with 4 bore holes or blind tapped holes corresponding to the bore hole diagram in section 0. The housing must be placed on the assembly surface and aligned (note arrow direction!).

Tighten the fastening bolts after assembly! Note the maximum tightening torque for this ($T_{max} = 10 \text{ Nm}$).

Conventional bolts M 10 with flat bearing face can be used for fastening the navigation lights (e.g. cylinder head bolts or hexagon bolts). Corresponding bolts can be ordered as acces-

sories (see section 0). When selecting the material, please note the material information cited below (section 10.9).

The operating life expectancy of the LEDs is subject to the influence of external temperatures that occur (see section 0). Sufficient heat dissipation must be ensured ! Avoid close enclosure of the navigation lights.

10.7 Electrical Installation

The electrical connections are made in accordance with the applicable regulations of electrical engineering.

The corresponding current circuits must be disconnected before starting work.

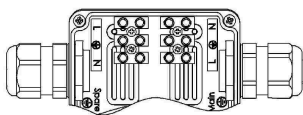
Only the junction box has to be opened for the installation. The navigation light itself does not need to be opened for the assembly.

Route the installation cables (main and reserve) through the cable entries into the inside of the junction box.

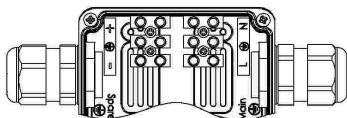
The maximum cable length must not exceed 400 m, the cross-section of the lines must be minimum 1.5 mm².

Important information:

The upper part of the main lighting and the lower part of the reserve lighting must always be used for navigation lights with a main and reserve system.



Reserve	Main
115/230V AC	115/230V AC

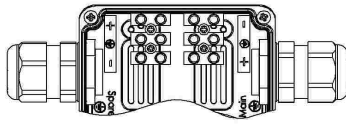


Reserve	Main
24V DC	115/230V AC

The connection terminals inside the junction box must be connected to the stripped wire ends of the cable.

The polarity must be observed for navigation lights with a 24V reserve system! The lines must be laid corresponding to the labelling in the junction box.

Connect the red cable to the + pole, the black or blue cable to the - pole.



Reserve
24V DC

Main
24V DC

Check the function of the navigation lights!

No functioning of the LED if connection is incorrect!

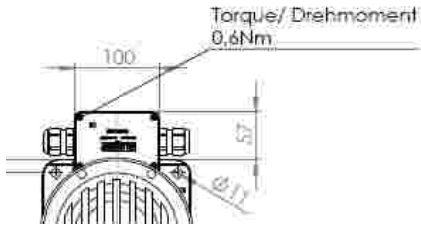
Close the junction box carefully. Ensure that the seal is in a perfect condition.

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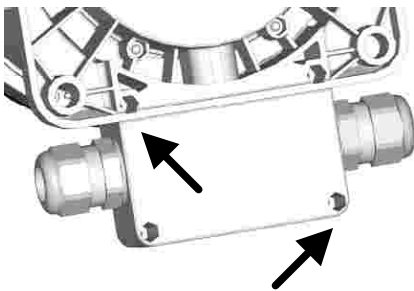
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10.8 Closing the Junction Box



Close the junction box with the cover. Ensure that the seal is in the correct position.

When doing so, note the maximum tightening torque for this of $T_{max} = 0.6 \text{ Nm}$.



If the maximum tightening torque of the bolts is exceeded when closing the junction box, there is a risk that the bolt will be overtightened with the result that the socket will no longer be completely tight.

In this case, the bolt can be replaced by a threaded joint with metrical thread. For this purpose, a conventional hexagon nut M6 can be pressed into the plastic housing on the rear.

10.9 Material Information

The housing components of the navigation lights are made from UV-resistant plastic, sea-water-resistant aluminium or brass.

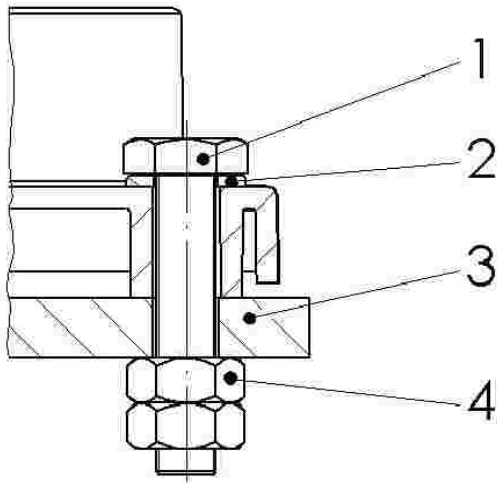
When choosing the fastening (bolts), we recommend the use of high-quality, stainless steel. Consider the resistance to sea water!

We recommend the use of self-locking nuts to secure the bolts.

Bolt locking adhesive is unsuitable for various reasons and must not come into contact with the housing components.

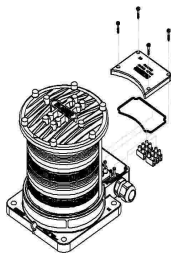
Also consider the resistance to sea water and UV light for the cable used! Also ensure a possible resistance to brittle fracture at low temperatures.

11 Accessories



Fastening kit 836600600
(4 bolts, washers and nuts)

12 Spare Parts



Spare parts assembly: Cover of the junction box including 4 bolts and the seal
8366001200 (2366000801, 9500054800, 236002000)

Spare parts assembly: Cable threaded joint M25 including seal and lock nut
8366001300 (9060073400, 9520013700, 9060042500)

Spare part: Connection terminal
9050013700

13 Disassembly

Open the junction box and remove the electrical connections for disassembly of the navigation light. The fastening bolts can now be undone.

14 Information on Electromagnetic Compatibility (EMC)

The navigation lights are tested in accordance with IEC 60945 and are below the permissible limit values. Nevertheless, it may be the case that interactions result between navigation lights and radio communication systems in exceptional cases. Please ensure a sufficient distance between the navigation lights and radio antennas or radio communication devices.

15 Information on Lighting Protection Compatibility

The protection against an indirect lightning strike corresponds to the specifications of IEC 61000-4-5 (up to 10kV/5kA; hybrid pulse).

16 Operating Life of the LED Navigation and Signal Lights

The operating life of the LED navigation and signal lights of the 65 series is up to 110,000 hours at an ambient temperature $\leq 25^{\circ}\text{C}$. At higher temperatures, also as a result of significant warming in sunlight, the operating life will become shorter. The following table shows the relation of the ambient temperature to the operating life:

Temperature range	Operating life to be expected	Main system: Life expectancy during use - 24h/day - 365 days/year	Reserve system: Life expectancy during use - 24h/day - 365 days/year
$T \leq 25^{\circ}\text{C}$	110,000 operating hours	Approx. 12.5 years	Further 12.5 years
$25^{\circ}\text{C} < T \leq 35^{\circ}\text{C}$	60,000 operating hours	Approx. 6.8 years	Further 6.8 years
$35^{\circ}\text{C} < T \leq 45^{\circ}\text{C}$	35,000 operating hours	Approx. 4 years	Further 4 years

The end of the operating life of the LEDs is reached when the luminous intensity has fallen by 20% due to aging. The navigation or signal light then automatically switches off analogous to a burnt out bulb. The LED navigation and signal light must then be switched over to the reserve system. We recommend keeping replacement lights on board.

When using these navigation lights, ensure a functional monitoring and alarm system on the bridge, which is suitable for the operation of LED navigation lights. We recommend use of the established *aqua control* technology with the corresponding modules for LED navigation lights.

The date of manufacture is indicated on the type plate of the LED navigation light.

17 Care and Maintenance

Special care is not necessary. The housing and optics of the navigation lights should occasionally be cleaned using a soft brush and with clear water. Abrasive cleaning agents (e.g. steel wool) as well as aggressive cleaning agents or those containing solvents must never be used.

The housing itself is watertight. The installed LED electronics are thus ideally protected against dirt and water.

17.1 Changing the Illuminant

It is not necessary and not possible to change the illuminant (as with conventional navigation lights) for this LED navigation light.

17.2 Painting Work on Board

Solvents and their vapours will destroy the optics. We recommend disassembling the lights before painting work or work with solvents.

The colour of the housings must not be changed for lighting technical reasons. In particular, the optics and other plastic parts must not be given any coating with paint.

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17.3 Customer Service

The Customer Service of aqua signal AG is available for the provision of spare parts, for maintenance and repair work as well as for problems and questions.

The address is:

aqua signal AG

P.O.Box 45 01 61

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Phone: +49 421-4893-0

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E-Mail: info@aquasignal.de

Internet: www.aquasignal.de

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19 Approvals

The LED lights of Series 65 from aqua signal are given an identification labelling in accordance with the approval of the Federal Maritime and Hydrographic Agency (BSH) in Germany for merchant shipping:

Signal lights Rhine waterway shipping:  **D.08.940**

Identification labelling for marine shipping:
BSH/4612/6010945/08

<div data-bbox="228 981 308 1064"></div> <div data-bbox="331 985 595 1059"> <p>Bundesrepublik Deutschland Federal Republic of Germany</p> <p>Bundesamt für Seeschifffahrt und Hydrographie Federal Maritime and Hydrographic Agency</p> </div> <div data-bbox="630 947 694 1070">  <p>STAMP 5812/6010945/08 08/10/2008</p> </div> <h3>EC TYPE EXAMINATION (MODULE B) CERTIFICATE</h3> <p>This is to certify that: Bundesamt für Seeschifffahrt und Hydrographie, specified as a "notified body" under the terms of Schiffsicherheitsgesetz, of 8. September 1988 (RStB) i. p. 1985) and dated 08. April 2008 (BGG) i. p. 706), did undertake the relevant type approval procedures for the equipment identified below which was found to be in compliance with the Navigation requirements of Marine Equipment Directive (MED) 96/98/EC and modified by Directive 2004/45/EC.</p> <p>Manufacturer: aqua signal Aktiengesellschaft Address: Von-Thünen-Straße 12, 26307 Bremen, GERMANY</p> <p>Applicant: aqua signal Aktiengesellschaft Address: Von-Thünen-Straße 12, 26307 Bremen, GERMANY</p> <p>Annex A.1 Item (by Annex designation): D.1 Navigation lights</p> <p>Product Name: LED-Serie 65</p> <p>Trade Name(s): LED-Serie 65</p> <p>Regulation (EU) 2006/127 Annex (114): EN 14744, 2005</p> <p>IMO Resolution A.584(17): EC REGS E3.4.0, 2002</p> <p>This certificate remains valid unless cancelled, expired or replaced.</p> <p>Date of issue: 2008-09-31 Issued by: Bundesamt für Seeschifffahrt und Hydrographie, Bundesstraße 201, 78, 20355 Hamburg, Germany Expiry date: 2013-09-31 Notified body: 0735</p> <p>Certificate No.: BSH/4612/6010945/08</p> <p>This certificate consists of 2 pages.</p> <p>by order  Schutz-Reiter</p> <div data-bbox="255 1579 359 1680"></div> <div data-bbox="598 1534 678 1668"></div> <p>The certificate is issued under the authority of the Bundesministerium für Verkehr, Bauwesen und Städtebau. V0808-02-02</p>	<p>EC TYPE EXAMINATION CERTIFICATE No. BSH/4612/6010945/08 Page 2 of 2</p> <h4>Navigation lights of the Serie LED-Serie 65:</h4> <table border="1"> <tr> <td>1.</td> <td>LED S3b 65</td> <td>Port light, red, 112,5°</td> <td>3nm</td> </tr> <tr> <td>2.</td> <td>LED S3b 65</td> <td>Starboard light, green, 112,5°</td> <td>3nm</td> </tr> <tr> <td>3.</td> <td>LED H 65</td> <td>Stemlight, white, 360°</td> <td>3nm</td> </tr> <tr> <td>4.</td> <td>LED Hge 65</td> <td>Towing light, 135°</td> <td>3nm</td> </tr> <tr> <td>5.</td> <td>LED T 65</td> <td>Masthead light, white, 135°</td> <td>3nm</td> </tr> <tr> <td>6.</td> <td>LED SW 65</td> <td>All-round light, white, 360°</td> <td>3nm</td> </tr> <tr> <td>7.</td> <td>LED SR 65</td> <td>All-round light, red, 360°</td> <td>3nm</td> </tr> <tr> <td>8.</td> <td>LED SG 65</td> <td>All-round light, green, 360°</td> <td>3nm</td> </tr> <tr> <td>9.</td> <td>LED SGe 65</td> <td>All-round light, yellow, 360°</td> <td>3nm</td> </tr> <tr> <td>10.</td> <td>LED Manövr</td> <td>Manoeuvring light, white, 360°</td> <td>3nm</td> </tr> </table> <h4>Approval Documentation:</h4> <h4>Places of production:</h4> <p>aqua signal Taktum GmbH & Co. KG Gleadow Weg 5, 17166 Taterow GERMANY</p> <h4>For the following application:</h4> <p>Electric navigation lights on vessels of 20 and more meter length, applicable for 24, 11E, and 230 voltages.</p> <h4>Notes:</h4> <p>The manufacturer shall inform Bundesamt für Seeschifffahrt und Hydrographie, as the notified body, of any modifications to the type-tested product(s) that may affect compliance with the requirements or conditions laid down for use of the product(s).</p> <p>In case the specified regulations or standards are amended during the validity of this certificate, the product(s) must be re-certified before being placed on board vessels to which such amended regulations or standards apply.</p> <p>The Mark of Conformity (wheelmark) may only be affixed to the type approved equipment, and a Manufacturer's Declaration of Conformity may only be issued, if the product quality system fully complies with the Marine Equipment Directive and is certified by a notified body against ANNEX B module D, E, or F of the Directive.</p> <h4>Notice on legal remedies available:</h4> <p>Objection to this document may be filed within one month after notification. The objection must be filed in writing to, or personally to, Federal Maritime and Hydrographic Agency, Bundesstraße 201, 78, 20355 Hamburg, Germany.</p>	1.	LED S3b 65	Port light, red, 112,5°	3nm	2.	LED S3b 65	Starboard light, green, 112,5°	3nm	3.	LED H 65	Stemlight, white, 360°	3nm	4.	LED Hge 65	Towing light, 135°	3nm	5.	LED T 65	Masthead light, white, 135°	3nm	6.	LED SW 65	All-round light, white, 360°	3nm	7.	LED SR 65	All-round light, red, 360°	3nm	8.	LED SG 65	All-round light, green, 360°	3nm	9.	LED SGe 65	All-round light, yellow, 360°	3nm	10.	LED Manövr	Manoeuvring light, white, 360°	3nm
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