TECHNICAL MANUAL
DHR60 LED

MED2014/90/EU
46 CFR 111.75-17

Den Haan Rotterdam
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TECHNICAL DATA

Application
- For all vessels used in (European) inland navigation
- For all seagoing vessels with a length less than 50 meters
- UL1104 (USA): for vessels of 65 feet or more in length

In compliance with:
- Directive 2014/90/EU
- Regulation (EU) 2017/306 Annex A.1/6.1
- US Code of Federal Regulations Title 46 CFR 111.75-17

Conform standards:
- COLREG Annex l/14
- IMO Resolution A.694 (17)
- IMO Resolution MSC.253 (83)
- EN 14744 (2005) + latest amendments
- IEC 60945 (2002) + latest amendments
- UL1104 (USA) + latest revisions

Materials:
- Housing: Seawater resistant aluminium, hard anodised, matt black
- LED driver: epoxy potted
- Screen: Seawater resistant aluminium, hard anodised
- Lens: Borosilicate glass

Min. visibility:

<table>
<thead>
<tr>
<th>Sector lights</th>
<th>All-round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starboard - bright</td>
<td>White - bright</td>
</tr>
<tr>
<td>Port - bright</td>
<td>Manoeuvring</td>
</tr>
<tr>
<td>Masthead - bright</td>
<td>Red - bright</td>
</tr>
<tr>
<td>Stern - bright</td>
<td>Red &amp; White</td>
</tr>
<tr>
<td>Towing - bright</td>
<td>Red &amp; Green</td>
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Min. visibility:

<table>
<thead>
<tr>
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<th>All-round</th>
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<tbody>
<tr>
<td>Starboard - bright</td>
<td>White - bright</td>
</tr>
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<td>Port - bright</td>
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<td>Stern - bright</td>
<td>Red &amp; White</td>
</tr>
<tr>
<td>Towing - bright</td>
<td>Red &amp; Green</td>
</tr>
</tbody>
</table>

- Green - bright 2 NM
- Red - bright 2 NM
- Red & White 2 NM
- Red & Green 2 NM
- White - bright 2 NM
- Manoeuvring 5 NM
- Yellow - bright 2 NM
- Blue - normal 1 NM

Electrical insulation class:
- I, (grounded) / III

Power supply:
- 24VDC -20% +30%

Protection class:
- IP X6

Life time:
- 50,000 Hours

Operation temperature:
- -30°C up to +55°C

Mounting:
- Base

Cable entry:
Two cable glands M20x1.5, for cable diameter 6 - 9 mm
PRODUCT PHOTOS
ALL DIMENSIONS IN MM.
### AVAILABLE MODELS

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Starboard</td>
<td>2 NM</td>
<td>Green</td>
<td>4.2 W</td>
<td>60.01.00.00</td>
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<tr>
<td>Port</td>
<td>2 NM</td>
<td>Red</td>
<td>4.3 W</td>
<td>60.02.00.00</td>
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<tr>
<td>Masthead</td>
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<td>White</td>
<td>11.7 W</td>
<td>60.03.00.00</td>
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<tr>
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<td>4.1 W</td>
<td>60.04.00.00</td>
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<tr>
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<td>60.04.07.00</td>
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<td>Blue</td>
<td>4.1 W</td>
<td>60.04.10.00</td>
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</thead>
<tbody>
<tr>
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<td>2 NM</td>
<td>White</td>
<td>4.1 W</td>
<td>60.06.00.00</td>
</tr>
<tr>
<td>Manoeuvring</td>
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<td>White</td>
<td>15.9 W</td>
<td>60.06.10.00</td>
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<tr>
<td>Red</td>
<td>2 NM</td>
<td>Red</td>
<td>4.3 W</td>
<td>60.07.00.00</td>
</tr>
<tr>
<td>Red &amp; White</td>
<td>2 NM</td>
<td>Red/White</td>
<td>4.3 / 5.7 W</td>
<td>60.07.06.00</td>
</tr>
<tr>
<td>Red &amp; Green</td>
<td>2 NM</td>
<td>Red/Green</td>
<td>4.3 / 5.9 W</td>
<td>60.07.08.00</td>
</tr>
<tr>
<td>Green</td>
<td>2 NM</td>
<td>Green</td>
<td>4.2 W</td>
<td>60.08.00.00</td>
</tr>
<tr>
<td>Yellow^1</td>
<td>2 NM</td>
<td>Yellow</td>
<td>4.3 W</td>
<td>60.09.00.00</td>
</tr>
<tr>
<td>Blue</td>
<td>1 NM</td>
<td>Blue</td>
<td>4.1 W</td>
<td>60.10.00.00</td>
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</tbody>
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<table>
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<tbody>
<tr>
<td>White 180°</td>
<td>2 NM</td>
<td>White</td>
<td>4.1 W</td>
<td>60.06.01.80</td>
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<tr>
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<td>2 NM</td>
<td>Red</td>
<td>4.3 W</td>
<td>60.07.01.80</td>
</tr>
<tr>
<td>Green 180°</td>
<td>2 NM</td>
<td>Green</td>
<td>4.2 W</td>
<td>60.08.01.80</td>
</tr>
</tbody>
</table>

1. Yellow signal light to be used in conjunction with sound signal and only applicable for vessels navigating the European Inland Waterways
2. Screened navigation lights should NOT be considered as an official sectored navigation light, but as two navigation lights with horizontal sectors that combined form a single all round light of 360°
   - The interpretation of screened navigation lights are stipulated in IMO MSC.1/Circ.1260
EXPLODED VIEW

Item | Part | Material
---|---|---
1 | Cover | Seawater resistant aluminium, hard anodized black
2 | Gasket Ø91x4mm | EPDM - shore 30
3 | Screen | Seawater resistant aluminium, hard anodized black
4 | Glass Tube | Borosilicate glass
5 | Heatsink | Seawater resistant aluminium
6 | LED PCB | MC-PCB, aluminium 1.55 mm
7 | Cable gland M20x15 | Body: Polyamide
| Gasket 28x20x1,5 | Seal: Neoprene
| Housing | PTFE
8 | LED driver | Seawater resistant aluminium, hard anodized black
9 | Base plate gasket | Potting material: Polyurethane
10 | Base plate | EPDM - shore 30
11 | Insulation sleeve Ø8,5 | Seawater resistant aluminium, hard anodized black
12 | Membrane Vent | Delrin - black
| Body: Silicone rubber | Membrane: ePTFE
13 | Plug M20x1,5 | Polyamide
| Gasket 28x20x1,5 | PTFE

REPAIR KIT

<table>
<thead>
<tr>
<th>Item</th>
<th>Navigation light</th>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
</table>
A | Starboard All-round green | Maintenance kit for: green | 60.99.00.30 |
B | Port light Stern Red All-round red | Maintenance kit for: red | 60.99.00.31 |
C | Masthead | Maintenance kit for: white 5NM | 60.99.00.32 |
D | Stern All-round white | Maintenance kit for: white 2NM | 60.99.00.33 |
E | Towing light All-round yellow | Maintenance kit for: yellow | 60.99.00.34 |
F | All-round blue | Maintenance kit for: Blue 1NM | 60.99.00.35 |
G | Manoeuvring light | Maintenance kit for: Manoeuvring | 60.99.00.36 |
H | All-round Red & White | Maintenance kit for: Red & white | 60.99.00.37 |
I | All-round Red & Green | Maintenance kit for: Red & Green | 60.99.00.38 |
ELECTRICAL SPECIFICATION

Grounding (PE) is not required, but gives better ESD/EMI protection

<table>
<thead>
<tr>
<th>Navigation light</th>
<th>Power supply</th>
<th>Nominal voltage</th>
<th>Typical wattage*</th>
<th>Typical current*</th>
<th>Minimum operating current</th>
<th>Error current</th>
<th>Inrush current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starboard</td>
<td>350 mA</td>
<td></td>
<td>4.2 W</td>
<td>174 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>500 mA</td>
<td></td>
<td>4.3 W</td>
<td>179 mA</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Masthead</td>
<td>700 mA</td>
<td></td>
<td>11.7 W</td>
<td>489 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stern</td>
<td>350 mA</td>
<td></td>
<td>4.1 W</td>
<td>169 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stern red (Suez light)</td>
<td>500 mA</td>
<td></td>
<td>4.3 W</td>
<td>179 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Towing</td>
<td>500 mA</td>
<td></td>
<td>4.3 W</td>
<td>179 mA</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Convoy light</td>
<td>350 mA</td>
<td>24 VDC</td>
<td>4.1 W</td>
<td>169 mA</td>
<td>&gt;40 mA</td>
<td>&lt;10 mA</td>
<td>20 A</td>
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<td>All-round white</td>
<td>350 mA</td>
<td></td>
<td>4.1 W</td>
<td>169 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-round green</td>
<td>350 mA</td>
<td></td>
<td>4.2 W</td>
<td>174 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-round red</td>
<td>500 mA</td>
<td></td>
<td>4.3 W</td>
<td>179 mA</td>
<td></td>
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<td></td>
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<tr>
<td>All-round red/White</td>
<td>500 mA</td>
<td></td>
<td>4.3/5.7 W</td>
<td>179/235 mA</td>
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<tr>
<td>All-round red/Green</td>
<td>500 mA</td>
<td></td>
<td>4.3/5.9 W</td>
<td>179/244 mA</td>
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<td></td>
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<td>All-round yellow</td>
<td>500 mA</td>
<td></td>
<td>4.3 W</td>
<td>179 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-round blue</td>
<td>350 mA</td>
<td></td>
<td>4.1 W</td>
<td>169 mA</td>
<td></td>
<td></td>
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</tbody>
</table>

* Depends on temperature and LED production series
ELECTRICAL SPEC. MANOEUVRING LIGHT

Grounding (PE) is not required, but gives better ESD/EMI protection

**Navigation light** | **Power supply** | **Nominal voltage** | **Typical wattage** | **Typical current** | **Minimum operating current** | **Error current** | **Inrush current**
--- | --- | --- | --- | --- | --- | --- | ---
Manoeuvring | 700 mA | 24 VDC | 15.9 W | 662 mA | >40 mA | <10 mA | 40 A

* Depends on temperature and LED production series

LIFETIME CONTROL

Measurements of the navigation light and specifications retrieved from the OEM, show a conformity with the minimum requirements of COLREG 72 at an operational lifetime of 50000 hrs. To guarantee a proper use of the LED navigation lights, we as a manufacturer advise the following:

- Use the navigation light in combination with a DHR-specified control system, which monitors the status and operational life time of each individual navigation light
- Each navigation light needs to undergo a quality check at least every 5 years of use to verify it still meets the requirements of COLREG 72
POSITIONING LIGHTS

Disclaimer:

- The minimum luminous intensity requirements in the forward direction are only guaranteed if the sidelights are mounted in accordance with this drawing and table.
- This is an illustration to indicate the dimensions of the inboard screens, relative to the keel line of the vessel. By no means may this image be used to determine the position of the sidelights on the vessel. For positioning the lights at the vessel always check for compliance with COLREG 72 or local rules.

Paint the inside matt black

Parallel to the keel line

<table>
<thead>
<tr>
<th>L</th>
<th>H</th>
<th>K</th>
<th>J</th>
</tr>
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<tbody>
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<td>345</td>
<td>0</td>
<td>98</td>
<td>200</td>
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<td>96</td>
<td>216</td>
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<tr>
<td>500</td>
<td>22</td>
<td>92</td>
<td>245</td>
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<tr>
<td>600</td>
<td>36</td>
<td>89</td>
<td>273</td>
</tr>
<tr>
<td>700</td>
<td>50</td>
<td>86</td>
<td>301</td>
</tr>
<tr>
<td>800</td>
<td>64</td>
<td>82</td>
<td>330</td>
</tr>
</tbody>
</table>

[mm]
POSITIONING ALL-ROUND LIGHT

Disclaimer:
This is an illustration to indicate the position of the all-round light so not to be obscured by mast, topmasts or structures within the angular sector of more than 6 degrees. By no means may this image be used to determine the position of the all-round lights on the vessel. For positioning the lights on the vessel always check for compliance with COLREG 72 or local rules.

Diagram for choosing the minimum distance between obstacle and mounting plate.
MOUNTING INSTRUCTIONS

Mounting plate
The mounting plate for navigation lights should be at least 3 mm thick and should not exceed a parallelism of // 00.5.

Fasteners
- The permissible torque should be 6 Nm
- Use only A4-grade stainless steel

Caution!
Even though the housing is made of corrosion resistant materials, galvanic corrosion may still occur. To prevent galvanic corrosion use the insulation sleeves to isolate the aluminium housing from other metal parts.

Cable glands

Remove the plug before placing the cable. If no cable is connected leave the plug in place!

Cable too tight!
This gives unwanted stress at the sealing of the cable gland and water ingress will occur.

Include cable slack at the entering point of the cable gland

Replacing cable gland
- Use gasket between housing and cable gland
- Tighten firmly (6Nm) with wrench

Important
Do not paint or use any other chemical for the lanterns, clean only with fresh water.
Wiring recommendations

EU:
- Neoprene cable H07 RN3x1.5
- Cable diameter 6 - 9 mm

USA:
- Type SJ or equivalent and comply with UL 62 and IEEE 45-83
- Wire gauge 16 AWG
- No. of conductors 3
- Cable diameter 6 - 9 mm
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