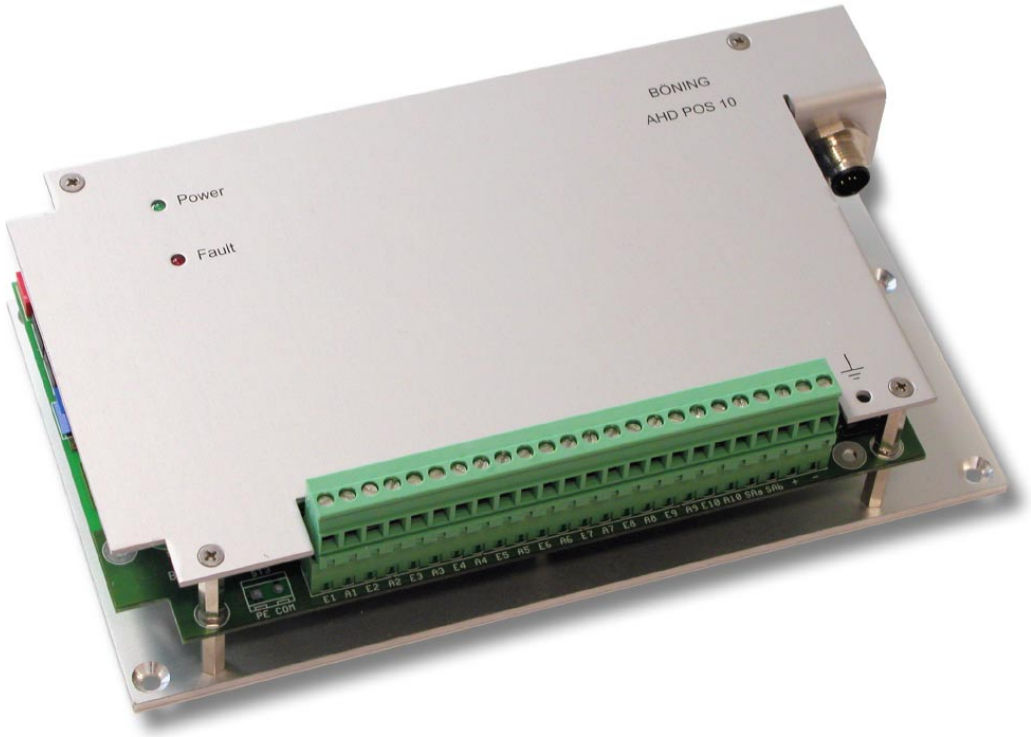
BÖNING
AHD POS 10
Power
Fault

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BÖNING Automationstechnologie GmbH & Co. KG

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1 Introduction

A ship´s navigation lights show its heading in dim light and bad weather.

They are internationally prescribed and prevent collisions at sea.

Moving Vessels have to activate their navigation lights from sunset to sunrise and also at daytime, if the viewing distance is restricted. Every ship must have a white masthead light, a red portside light, a green starboard side light and a white stern light. Special work boats, as well as fishing boats and vessels not under command require a different setup of lights. Sailing and sports boats can have combined lights.

Navigation lights are safety relevant, which is why their operation is usually monitored. Certified ships must have a monitoring system for navigation lights.

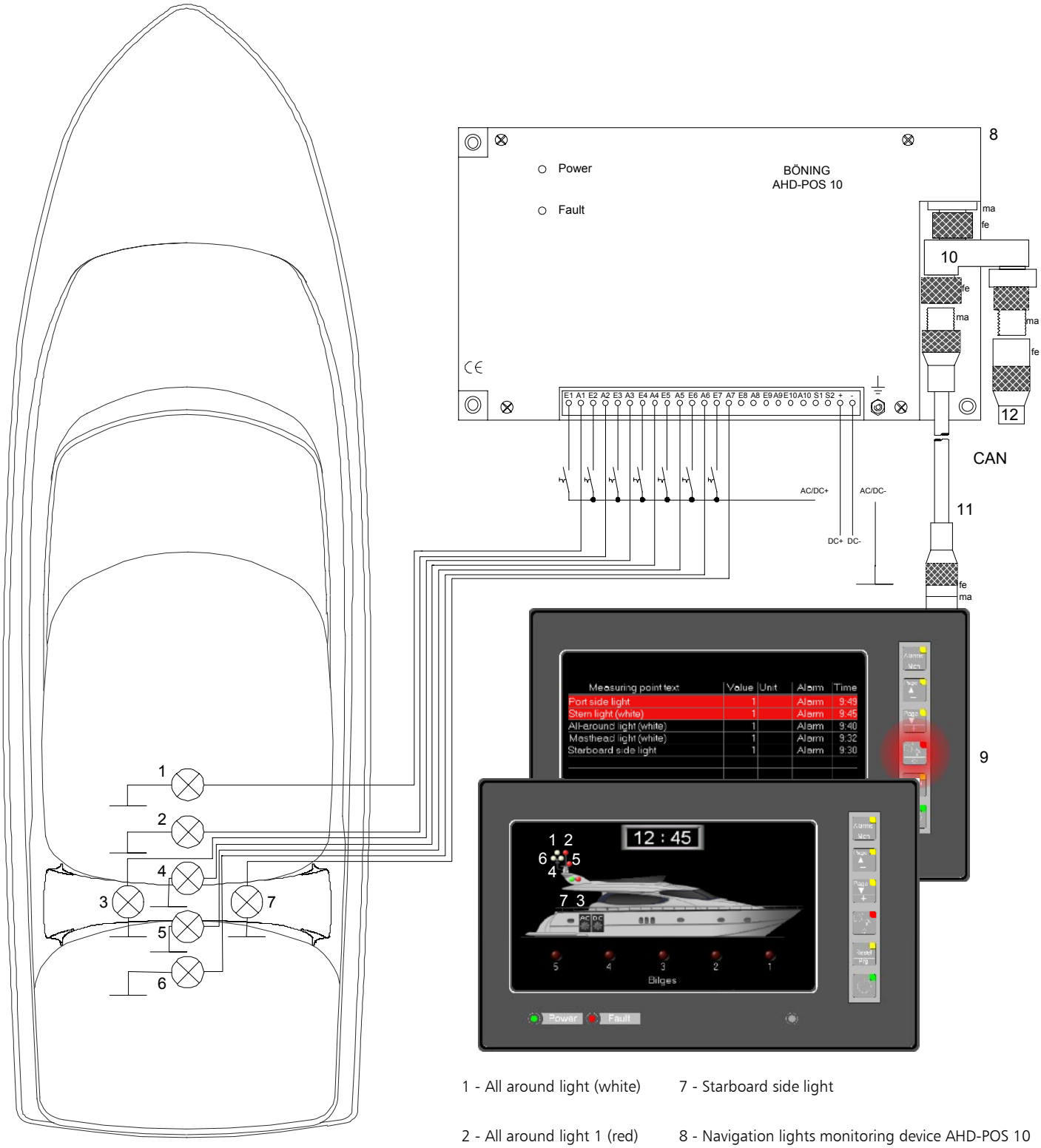
2 Functional description

The navigation lights monitoring system AHD-POS 10 has been designed for up to ten lights. It monitors whether the lights are on, off or defective.

The device is located in the electric circuit between switch and lamp. When a lamp is switched on, the lamp´s voltage is applied to the AHD-POS 10 input and passed on to the lamp at the output. The AHD-POS 10 registers if the lamp is switched on, and verifies if a current is flowing through the lamp. An alarm is released in the event of no current flow. The alarm message is sent on the one hand via CAN-Bus, on the other hand by means of a collective alarm relay, which has an NC contact. Upon failure of other lamps, the relay contact closes for approx. 3 sec. before reopening (collective alarm retriggering).

In combination with CAN-Bus colour display, the navigation lights status can be visualized on the monitor. Upon failure of a lamp, an optical and acoustic alarm is released and signalled by a buzzer and flashing graphics on the display. The display automatically switches to the alarm page and the acknowledgement button flashes red until the alarm is quit. The alarm text and flashing of the specifically represented lamp remains until the defective lamp has been replaced or switched off. The alarm list depicts all non-working lamps, with all unacknowledged alarms highlighted in red.

The AHD-POS 10 is constructed for the surveillance of AC and DC lamps, as their inputs are insolated from their power source by optocouplers.



1 - All around light (white)

2 - All around light 1 (red)

3 - Port side light

4 - Masthead light

5 - All around light 2 (red)

6 - Stern light

7 - Starboard side light

8 - Navigation lights monitoring device AHD-POS 10

9 - Colour display

10 - T-piece for CAN-Bus

11 - CAN-Bus cable

12 - Termination resistor for CAN-Bus

Illustration 2-1: Navigation lights monitoring with 7 of up to 10 monitored lamps

3 Apparatus assembly

The navigation lights monitoring system has a pluggable terminal block with 10 in- and outputs each for the lamps to be monitored as well as power supply inputs and collective alarm relay outputs.

The AHD-POS 10 is connected via t-piece with the colour display or other devices. If no further devices are connected, the output must be terminated with a termination resistor. There are four mounting holes in the base plate of the device. It is meant for installation inside a distribution box or switch cabinet.

4 Terminal connection

4.1 Terminal assignment

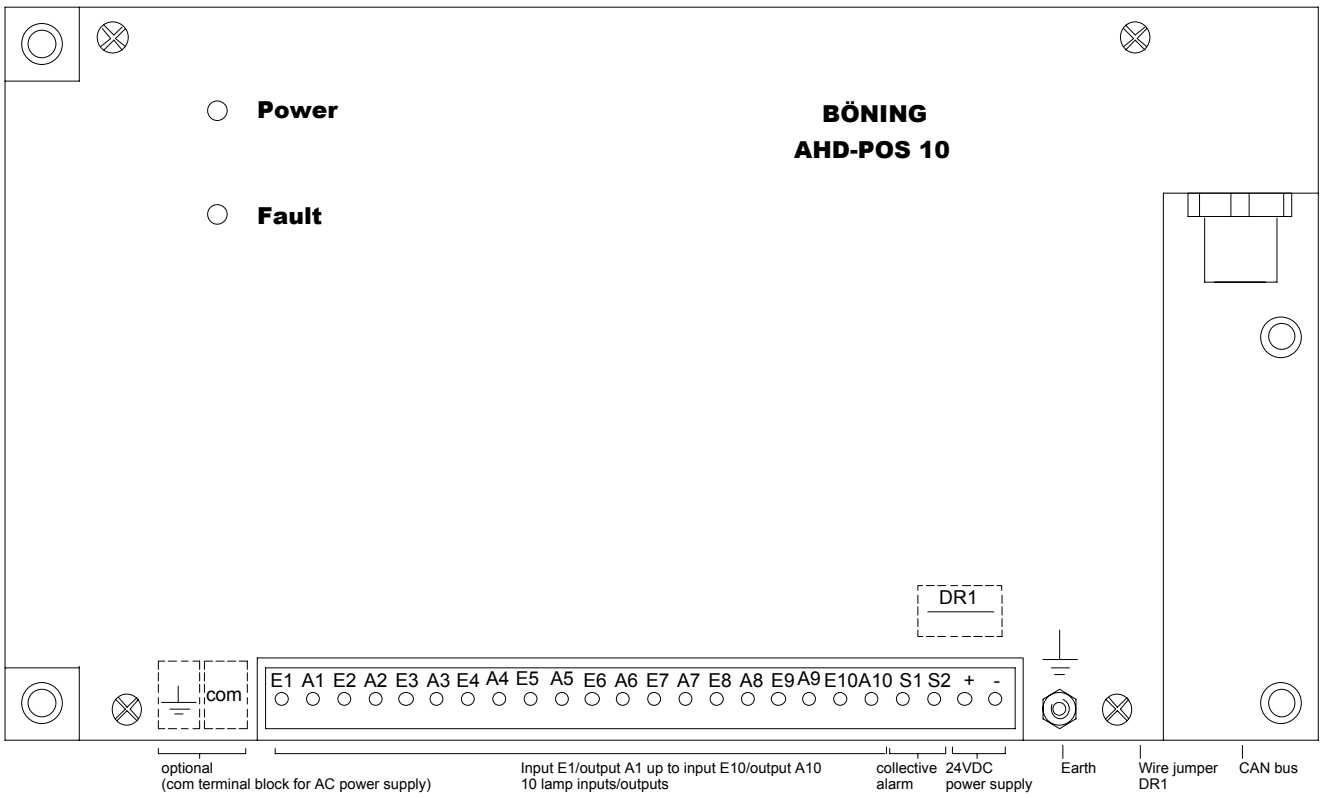


Illustration 4-1: Terminal assignment AHD-POS 10

4.2 Terminal diagram for direct current lamps

Wire jumper DR1 placed, optional terminal block not placed

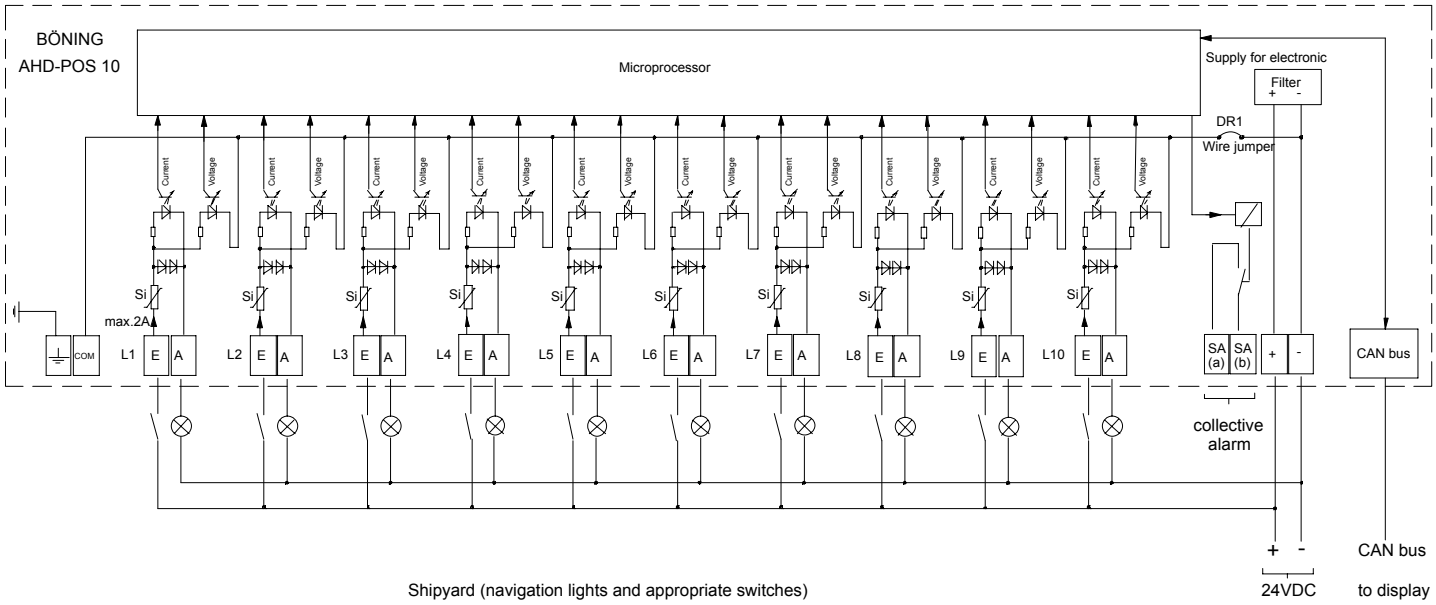


Illustration 4-2: Terminal diagram for direct current lamps at AHD-POS 10

4.3 Terminal diagram for alternating current lamps

Wire jumper DR1 not placed, optional terminal block placed

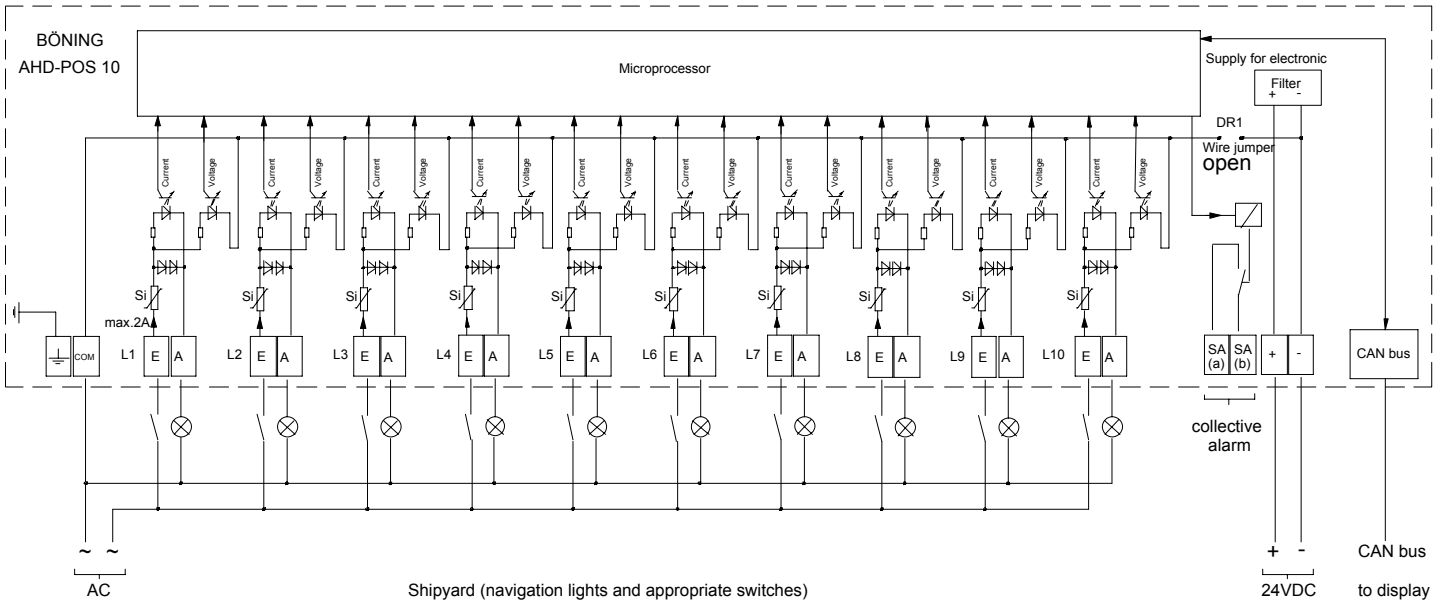


Illustration 4-3: Terminal diagram for alternating current lamps at AHD-POS 10

5 Assembly and commissioning

5.1 Fitting

There are four mounting holes in the base plate of the AHD-POS 10. It is meant for installation inside a distribution box or switch cabinet. The AHD-POS 10 has a plugable terminal block.

The inputs and outputs of the AHD-POS 10 navigation lights monitoring system must be installed between switch and lamp. Clamp E1 represents input 1, A1 output 1 for connection with the monitored lamp no. 1. The same principle applies to the following lamps, up to lamp 10. Where several lamps are switched parallelly with one switch the outputs of the AHD-POS 10 must be connected to each lamp separately, while the inputs of the AHD-POS 10 are connected parallelly.

5.2 Operation

The AHD-POS 10 is maintenance-free and does not contain lead fuses. In the event of a short circuit or overcurrent in the lamp circuit, semiconductor fuses in the AHD-POS 10 stop current flow. After elimination of the cause, the normal state is reestablished, without the necessity of manual intervention.

Upon failure of the AHD-POS 10 electronics, the lamp circuits are not interrupted and can still be switched whereas merely the monitoring fails. Operation of the device is signalled by a "power" LED and its failure by means of a "fault" LED at the device and an error message (communication failure POS 10) on the colour display.

Acquired data of the AHD-POS 10 (lamp is switched off, lamp is switched on and ok, lamp is switched on and defective) are transmitted via CAN-Bus to the colour display or other CAN-Bus devices.

Illustration 2-1: *Navigation lights monitoring with 7 of up to 10 monitored lamps* depicts the navigation lights monitoring system AHD-POS 10 and colour display with a customer specific representation of the respective ship and navigation lights as well as the customer´s measuring point texts in the alarm list using an example of seven monitored DC lamps. If the AHD-POS 10 detects a defective lamp, an alarm message is transmitted to the display and is displayed within an alarm list until the cause is removed or the appropriate lamp is switched off. When alarm occurs, an acoustic signal starts within the display and the red LED at the key for acoustic and optic acknowledgement flashes. Pressing this key stops the acoustic signal (horn quit) and stops flashing of the LED and flashing of the message in the alarm list (optic quit). The customer specific representation of the respective ship shows the state of the individual lamps by means of LED symbols (dark LED = lamp switched off, bright LED = lamp switched on and lamp ok, flashing LED = lamp switched on and lamp defective [flashes until cause is removed or the appropriate lamp is switched off]).

6 Technical documents

6.1 Technical data

AHD-POS 10

Power supply:	18...32 VDC
Power consumption:	150 mA
Storage temperature:	-30°C...85°C
Ambient temperature:	-10°C...65°C
Weight:	0.55 kg
Degree of protection:	IP 00
External dimensions:	215 mm x 120 mm x 55 mm
Interfaces:	1 x CAN, 1 x RS 232
In-/outputs:	10 x lamp 40 W (max.)
Outputs:	1 x relay contact 40 VDC/1 A

Colour display

Power supply:	9...32 VDC
Power consumption:	450 mA
Resolution:	400 x 240 Pixel
Visible range:	6.5“, 143.64 mm x 79.326 mm
Colour depth:	65536
Luminous intensity:	200 cd/m^2, transflective
Operating temperature:	-10°C...85°C
Storage temperature:	-30°C...85°C
Ambient temperature:	-10°C...65°C
Weight:	1.5 kg
Degree of protection:	front side IP 67, back side IP 65
External dimensions:	210 mm x 130 mm x 95 mm
Panel cutout:	190 mm x 118 mm
Interfaces:	1 x CAN, 1 x RS 232
Inputs:	1 x binary (optocouplers)
Outputs:	2 x relay contact 40 VDC/1 A

6.2 Dimensional drawings

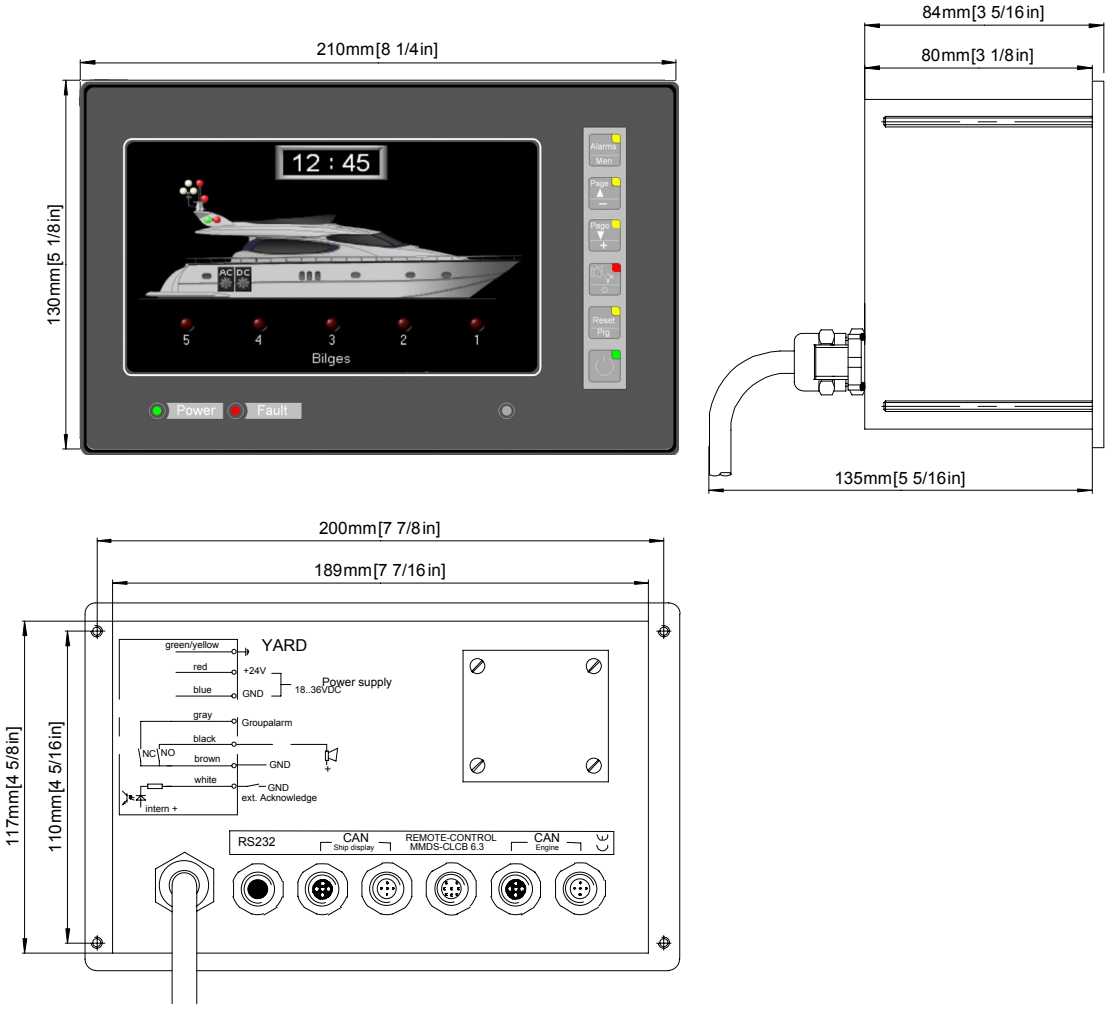


Illustration 6-1: Dimensional drawing colour display

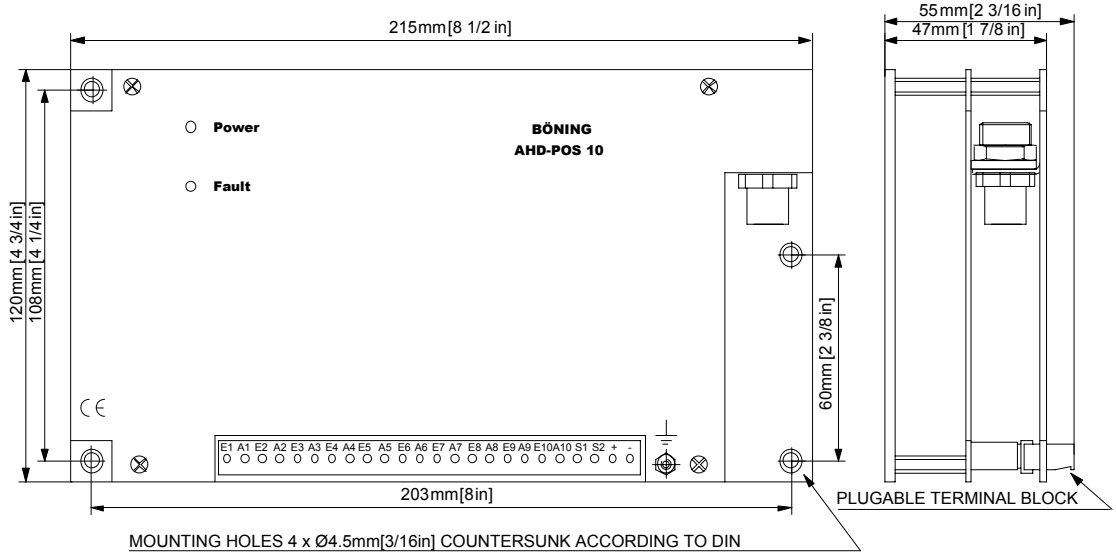


Illustration 6-2: Dimensional drawing AHD-POS 10

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