AHD-AP N2K
NMEA 2000 Engine Data Converter



Operation Manual

Read this manual before beginning any work!

CE UK CA

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Change History

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		Formats updated	n.a.	

1 General Information

1.1 About this Manual

Read this manual carefully before beginning any work! It is part of the product and must be kept in the product's immediate vicinity, so that it is always available to the personnel.

Include this manual when handing the device over to third parties.

This manual gives important product handling instructions. On the following pages, this manual describes

the NMEA 2000 Engine Data Converter AHD-AP N2K (Item number 20330) .

This manual gives specific information, if further and more detailed documentation is available for particular components or functions.

Adhering to all product safety and handling instructions for the product and all connected components is a prerequisite for safe operation.

In addition, the local accident prevention and general safety regulations for the device's area of operation must be observed.

The illustrations in this manual are intended to demonstrate the contents more clearly. They are not necessarily drawn to scale and can vary from the actual product in minor details.

This operating manual is to be understood as a single unit. It is not permitted to use excerpts from this manual as standalone documentation without referring to the entire document.

1.2 Explanation of Symbols

1.2.1 Warnings

In this manual, warnings are marked with symbols. The warnings are introduced by signal words indicating the degree of danger.

It is important to heed these warnings and act with caution to avoid accidents, personal injury, and property damage.



DANGER!

… indicates an imminently hazardous situation that can result in death or severe injury, if not avoided.



WARNING!

… indicates a potentially hazardous situation which can result in death or severe injury, if not avoided.



CAUTION!

… indicates a potentially hazardous situation that can result in minor or light injury, if not avoided.



CAUTION!

… indicates a potentially hazardous situation that can result in equipment damage, if not avoided.

1.2.2 Tips and Recommendations



NOTICE!

… indicates useful tips and recommendations and information for efficient and error-free operation.

1.3 Illustrations

Illustrations in this document may deviate slightly from actual devices, without this being pointed out separately.

In particular, illustrations of declarations of conformity may deviate from the current status.

1.4 Limitation of Liability

All information and instructions in this manual have been compiled in consideration of current norms and regulations, the state of technology, and our knowledge and experience of many years.

The manufacturer is not responsible for damages due to:

- Failure to follow the instructions in this manual
- Unintended use
- Employment of untrained personnel
- Unauthorized modifications
- Technical modifications
- Use of unauthorized spare parts
- Device and system configurations created by the user or third parties

The actual scope of delivery may vary from the explanations and illustrations in this manual in case of customized models, special ordering options or the latest technical improvements.

In addition, the agreed upon obligations in the delivery contract, the general terms and conditions, the manufacturer's delivery terms and the legal regulations current at the contract signing are in force.

We reserve the right to make changes to improve the device's performance and to further develop the product.

1.5 Copyright and Nondisclosure

This manual must be treated confidentially. It is intended only for those persons handling the product. It is not permitted to hand this operation manual over to third parties without the manufacturer's prior written permission.

NOTICE!

The information, texts, drawings, illustrations, and other descriptions in this manual are protected by copyright laws and are subject to industrial property rights. Any misuse is subject to prosecution.

It is not permitted to duplicate this manual in any type or form – even in excerpts – or use and/or communicate its contents without the manufacturer's written permission. Contraventions are liable to compensation. We reserve other rights.

1.6 Spare Parts



WARNING!

Danger of injury due to incorrect spare parts!

Incorrect or defective spare parts can cause damages, malfunctions or complete failure and endanger the vessel's safety.

Therefore:

- Only use the manufacturer's original spare parts.

Order spare parts from a contracted reseller or directly from the manufacturer. Refer to page 2 for the address.

1.7 Warranty Terms

The warranty terms can be found in the General Terms and Conditions (GTC) of the manufacturer's sales documents.

1.8 Customer Service

Our customer service department is available to assist you with technical information.

Information about the responsible contact person is always available via telephone, fax, e-mail, or the Internet. Refer to page 2 for the manufacturer's address.

In addition, our staff is always interested in new information and experiences resulting from the use of the product which can be used to further improve our products.

2 Safety

This section gives an overview of all important safety aspects for optimal protection of the personnel and safe and error-free operation.

Noncompliance with the handling and safety instructions in this manual can cause significant hazards.

2.1 Operator's Responsibility

This product is intended for commercial use. Therefore, its operation is subject to legal workplace safety regulations.

In addition to the workplace safety instructions in this manual, the current safety, accident prevention, and environmental protection regulations for the product's place of use must be observed. Especially:

- The operator must keep himself informed about the legal workplace safety regulations and through a risk assessment determine any additional hazards resulting from the specific working conditions at the product's place of use. He must implement these in the form of operating instructions for the product's use.
- During the product's entire period of operation, the operator must verify that his operating instructions comply with current regulations and revise them, if necessary.
- The operator must clearly regulate and define areas of responsibility for installation, operation, regular checks, and cleaning.
- The operator must ensure that all employees handling the product have read and understood this manual.
  In addition, he must train the personnel in regular intervals and inform them about any dangers.

Furthermore, the operator is responsible for always keeping the product in perfect working condition.

2.2 Personnel Requirements

2.2.1 Qualifications



WARNING!

Danger of injury due to insufficient qualification!

Insufficient qualification can lead to significant personal injury and equipment damage.

Therefore:

- Only allow qualified personnel to do any work.

This manual lists the following qualifications for various areas of activity.

- **Trained Person**
  has been trained by the operator through an instruction for the assigned tasks and has been informed about possible hazards from improper execution.
- **Specialist**
  can execute the assigned tasks and recognize and avoid potential hazards independently, based on his professional education, knowledge, and experience as well as knowledge of the norms and regulations relevant to the situation.
- **Electrician**
  can work on electrical systems and independently identify and avoid potential hazards, based on his professional education, knowledge, and experience, as well as knowledge of the norms and regulations relevant to the situation.
  The electrician has been trained for the specific workplace in which he is active and knows the relevant norms and regulations.

Only those persons who can be expected to do their work reliably are allowed as personnel. Persons, whose ability to act is reduced by for example drugs, alcohol, or medication, are not allowed.

- Observe the local age and profession specific regulations when selecting the personnel.

2.2.2 Unauthorized Persons



WARNING!

Danger for unauthorized persons!

Unauthorized persons who do not meet the requirements described in this manual do not know the workplace dangers.

Therefore:

- Keep unauthorized persons out of the work area.
- When in doubt, approach persons and remove them from the work area.
- Interrupt all work while unauthorized persons remain in the work area.

2.3 Intended Use

AHD-AP N2K has been designed and constructed exclusively for the use described in this manual.

The data converter AHD-AP N2K was developed for the connection to the CAN bus of the MAN engines of the series EDC, CR and VNew with the engine control devices EDC5 or EDC7 and for connection to standard J1939 engines. Messages received from the engine CAN bus are converted to NMEA 2000 messages, in order to connect external devices to the second galvanically isolated CAN bus for the display of engine data and alarms without affecting the engine CAN bus.

AHD-AP N2K signals alarms, warnings and sensor failures with LEDs and an internal buzzer. With integrated acknowledgement and reset buttons the alarm message can be acknowledged, and alarms can be reset.



WARNING!

Danger due to unintended use!

Any use other than and/or beyond the product's intended use can lead to dangerous situations.

Therefore:

- Only use the product as intended.
- Strictly adhere to all instructions in this manual.
- In particular, avoid the following unintended use:
  - Using a supply voltage other than the one indicated in this manual

Any claims for damages resulting from unintended use are excluded.

The operator is solely responsible for any damages resulting from unintended use.



WARNING!

Danger due to improper operation of the device!

Device failure or malfunction can lead to personal injury or equipment damage in the overall system.

Therefore:

- Although the device itself is not especially dangerous, the effects of failures or malfunctions on the overall system must be considered.
- Always discontinue using the devices when they develop smoke or abnormal heat.

3 Function and Structure

3.1 Function

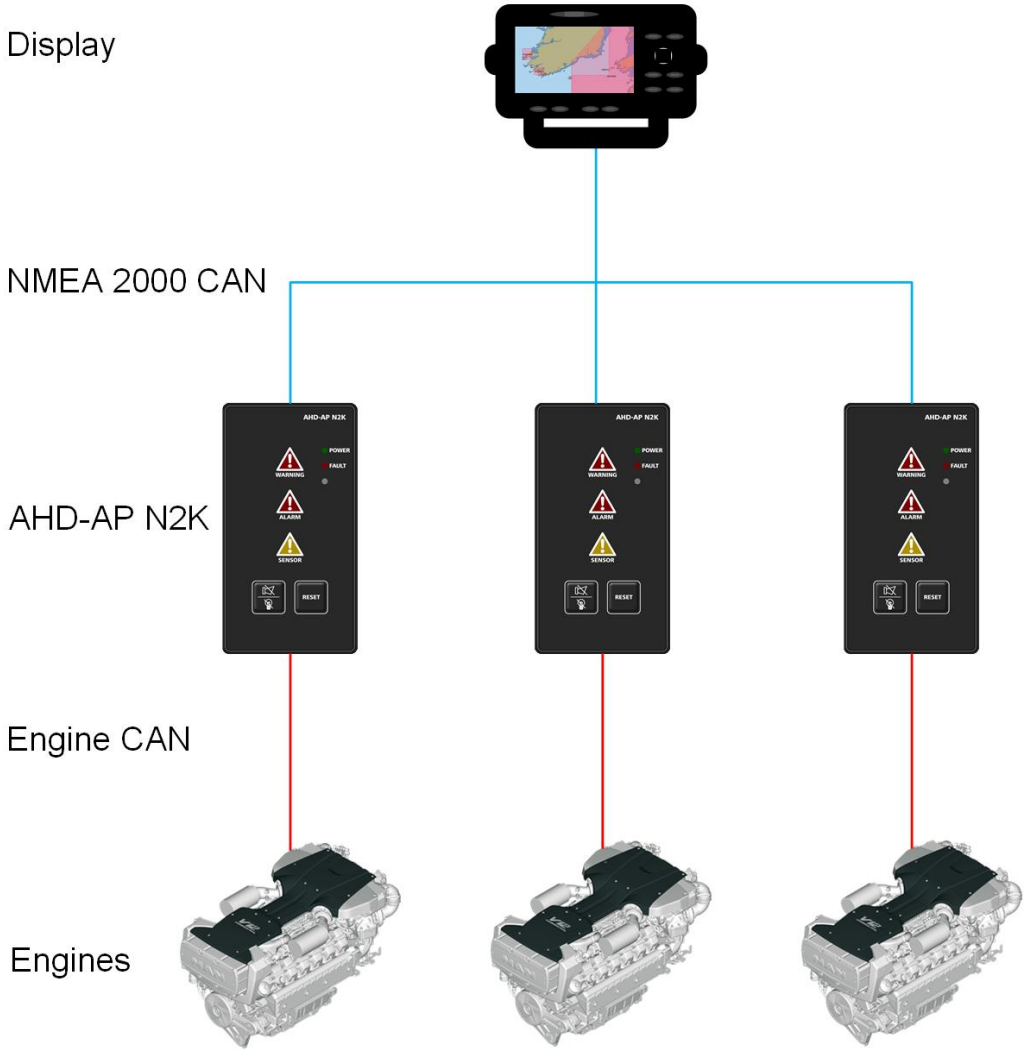


Illustration 1: Application example

From the engine terminal box, the alarm panel AHD-AP N2K receives over the CAN bus the data of a supported engine including the alarm messages for alarms, warnings, and sensor failures. These messages are processed as collective alarms and they are signaled with the respective symbols. Additionally, the internal buzzer is activated in the case of an alarm. With the integrated acknowledgement button, the alarm message can be acknowledged acoustically and optically and, if required, the alarm can be reset with the button “Reset”.

At a galvanically isolated CAN connection the received engine data are forwarded as NMEA 2000 messages to other devices, for example for display. AHD-AP N2K can indicate from which of up to 3 engines it receives the data.

3.2 Supported Engines

The following MAN marine engines of the types EDC, CR and VNew with the engine control devices EDC5 and EDC7 are supported:

D 0836 LE 401	D 2842 LE 404	D 2848 LE 403	D 2868 LE 426
D 0836 LE 402	D 2842 LE 407	D 2848 LE 422	D 2868 LE 436
D 0836 LE 404	D 2842 LE 409	D 2848 LE 423	
D 0836 LE 423	D 2842 LE 410	D 2848 LE 426	D 2876 LE 401
	D 2842 LE 416	D 2848 LE 436	D 2876 LE 402
D 2676 LE 423	D 2842 LE 417		D 2876 LE 404
D 2676 LE 443	D 2842 LE 418	D 2862 LE 426	D 2876 LE 405
	D 2842 LE 423	D 2862 LE 436	D 2876 LE 423
D 2840 LE 403	D 2842 LE 433	D 2862 LE 446	D 2876 LE 426
D 2840 LE 404	D 2842 LE 443	D 2862 LE 456	D 2876 LE 433
D 2840 LE 422	D 2842 LE 453	D 2862 LE 476	
D 2840 LE 423			

For the support of other MAN engines refer to Böning.

AHD-AP N2K supports also standard J1939 diesel engines of other manufacturers (CAT, MTU, John Deer, Cummins…)

3.3 Sent NMEA 2000 Messages

Currently, AHD-AP N2K sends the following NMEA 2000 messages:

3.3.1 Messages

Field Name	Identifier	Identifier Name
Engine Speed	127488	Engine Parameters, Rapid Update
Engine Boost Pressure	127488	Engine Parameters, Rapid Update
Engine oil pressure	127489	Engine Parameters, Dynamic
Engine oil temp	127489	Engine Parameters, Dynamic
Engine temp.	127489	Engine Parameters, Dynamic
Alternator potential	127489	Engine Parameters, Dynamic
Fuel rate	127489	Engine Parameters, Dynamic
Total engine hours	127489	Engine Parameters, Dynamic
Engine coolant pressure	127489	Engine Parameters, Dynamic

Field Name	Identifier	Identifier Name
Fuel Pressure	127489	Engine Parameters, Dynamic
Percent Engine Load	127489	Engine Parameters, Dynamic
Percent Engine Torque	127489	Engine Parameters, Dynamic
Transmission gear	127493	Transmission Parameters, Dynamic
Transmission oil pressure	127493	Transmission Parameters, Dynamic
Transmission oil temperaure	127493	Transmission Parameters, Dynamic
Trip fuel used	127497	Trip Fuel Consumption (Only VNew)
Rated engine speed	127498	Engine Parameters, Static
Atmospheric Pressure	130314	Actual Pressure
Exhaust Gas Temperature	130316	Temperature, Extended Range

3.3.2 PGNs

PGN	Identifier Name
59392	ISO Acknowledgment
60160	ISO Transport Protocol, Data Transfer
60416	ISO Transport Protocol, Connection Management
60928	ISO Address Claim
126208	NMEA - Request/Command/Acknowledge group function
126464	PGN List - Transmit/Received PGN's group function
126983	Alert
126985	Alert Text
126993	Heartbeat
126996	Product Information
126998	Configuration Information
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127497	Trip Fuel Consumption (Vneu only)
127498	Engine Parameters, Static
130314	Actual Pressure
130316	Temperature, Extended Range

3.4 Structure

AHD-AP N2K is a microprocessor-controlled device for the installation in panels and switchboards.

The device's front contains all display and control elements. It is covered with water-tight, UV resistant and wear resistant plastic sheeting.

For operation at night the control elements and display elements are illuminated glare-free. The brightness is automatically adjusted to the ambient brightness with an integrated light sensor. When a sufficient power supply has been established the device signals its readiness for operation with the LED "POWER". Internal device faults and communication failures are signaled with the LED "FAULT".

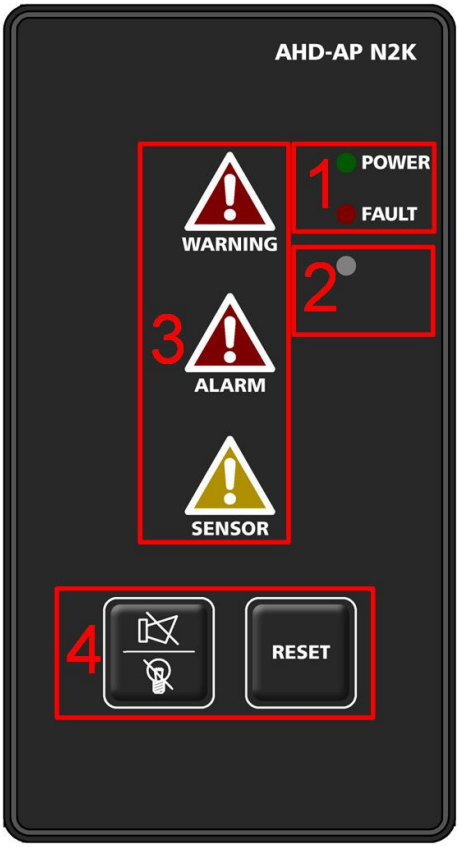


Illustration 2: Front side of AHD-AP N2K

The device's front side contains:

1. The LEDs "POWER" and "FAULT"
2. The sensor for automatic brightness control
3. Illuminated symbols for signaling warnings, alarms, and sensor failures
4. Buttons for acoustical and optical alarm acknowledgement and for resetting alarms

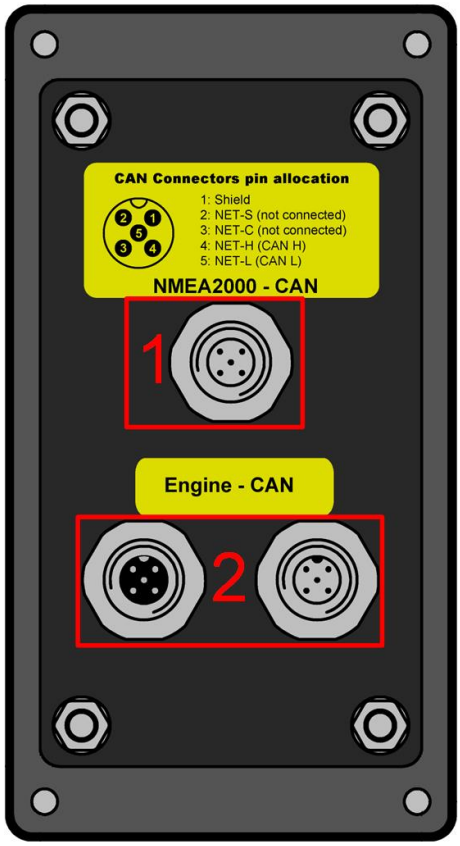


Illustration 3: Rear side of AHD-AP N2K

The device's connectors are on its rear side:

1. CAN connection for forwarding NMEA 2000 messages
2. CAN connections for the connection to the engine terminal box

3.5 Mechanical Structure

On the rear side of AHD-AP N2K there are 3 Lumberg DeviceNet connectors. 2 connectors (CAN IN/CAN OUT) are used for the connection to the CAN bus of the engines, the third is used for forwarding NMEA 2000 messages.

All important engine data received from the engine CAN bus as proprietary CAN messages are converted to NMEA 2000 messages and they are output at the second CAN connection for connection to the NMEA 2000 system. External devices for the display of engine data and alarm can be connected to this CAN connection.

Due to the galvanic isolation the engine system cannot be affected by the NMEA 2000 system.

The labeling on the rear of the device clearly indicates the assignment of the CAN connectors to the CAN busses.

3.6 Device Electronics

AHD-AP N2K is supplied with power via its CAN connection to the engine terminal box.

AHD-AP N2K has an internal power control the provides the required supply voltages. The power supply provided to the device may vary in the range from 9 V DC to 32 V DC.

3.7 Interfaces

On the device's rear side there are 3 Lumberg connectors for the connection to the CAN busses, see Illustration 3.

1. CAN connection for forwarding NMEA 2000 messages
2. CAN connections for the connection to the engine terminal box.
   This connection is also used to supply AHD-AP N2K with power.

3.8 Connection

AHD-AP N2K may be looped into the engine CAN bus or it may be connected to the end of the engine CAN bus. In this case, the CAN bus must be terminated at AHD-AP N2K with a termination resistor, see Illustration 4.

NOTICE!

The output for forwarding the NMEA 2000 messages is internally terminated with a 120 Ω resistor. Therefore, AHD-AP N2K must always be connected to an end of the NMEA 2000 CAN bus.

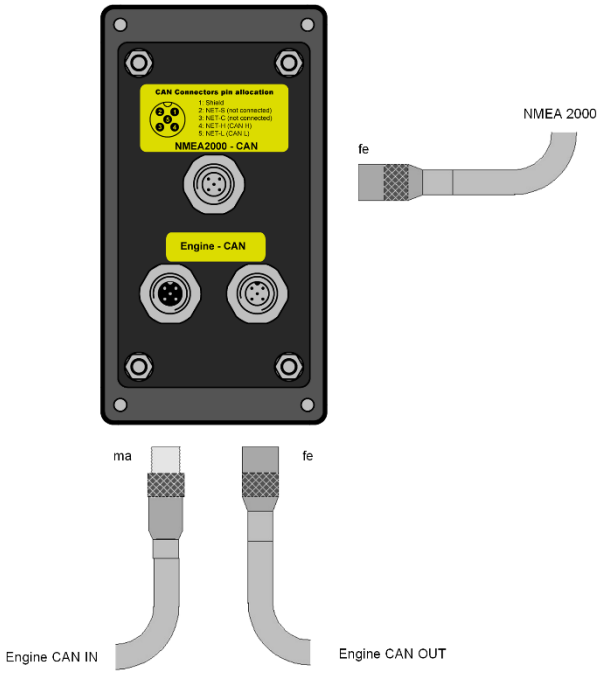


Illustration 4: Connection when looping-in into the engine CAN bus

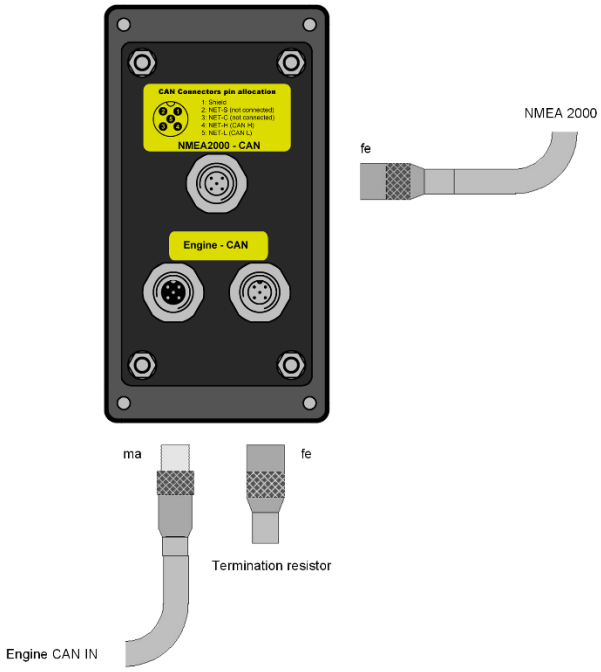


Illustration 5: Connection as last device in the engine CAN bus

3.9 Configuration

AHD-AP N2K is configured with the buttons on its front side.

The configuration specifies for the output to NMEA 2000 which of up to 3 engines AHD-AP N2K monitors.

The following settings are possible:

1. The number of monitored engines.
   The maximum number is 3.
2. The engine (Instance) whose data are received and converted by AHD-AP N2K.

3.9.1 Configuration Mode

To put AHD-AP N2K into configuration mode, press the acknowledgement button and the button “Reset” simultaneously until the LED “POWER” flashes. This takes about 4 seconds.



Illustration 6: Putting AHD-AP N2K into configuration mode

3.9.2 Number of Engines in the System

When the LED “POWER” flashes and the LED “FAULT” is not lit, the number of engines in the system is selected.

The default is 2 engines.



Each press of the button “Reset” increases the number of engines by 1. When the current number of engines is 3, the next press of the button sets it to 1.

The symbols for warnings, alarms and sensor failures indicate the set number of engines by flashing:

Warning	Alarm	Sensor	Number of Engines
ON	OFF	OFF	1
ON	ON	OFF	2
ON	ON	ON	3

3.9.3 Selection of the Engine (Instance)



After pressing the acknowledgement button, the instance can be selected. The LEDs “POWER” and “FAULT” are flashing.

The default instance is “Port”.

The instance is selected with the button “Reset”.

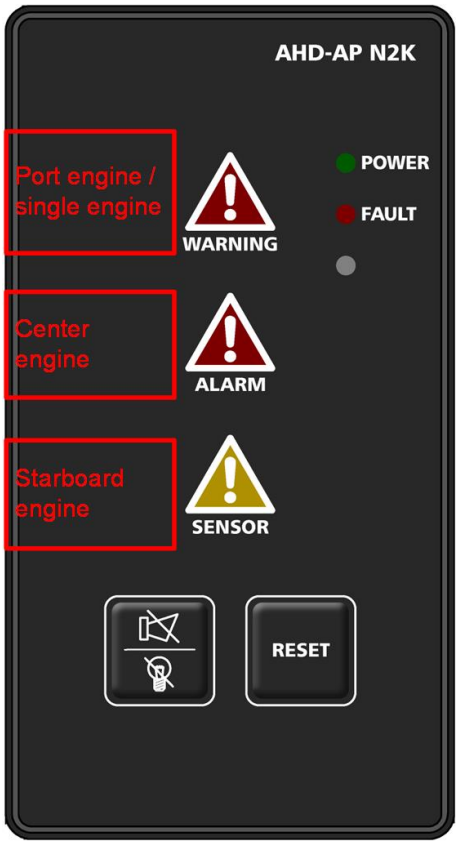


Illustration 7: Configuration: Indication of the instance

The flashing symbols indicate the currently selected instance:

- “Warning”: Port engine or single engine
- “Alarm”: Center engine.
  This setting is only possible if 3 was selected as the number of engines.
- “Sensor”: Starboard.
  This selection is not possible if 1 was selected as the number of engines.

Pressing the acknowledgement button returns to the entry of the number of engines.

3.10 Saving the Settings

To save the settings, press the acknowledgement button and the button “Reset” simultaneously. The buttons must be kept pressed for about 4 seconds until the LED “POWER” stops flashing.

NOTICE!

If a button is pressed before the other (approximately 0.1 seconds), the respective function described above, setting the number of engines or selection of the instance is triggered.

NOTICE!

If no button is pressed for about 30 seconds the device ends configuration mode without saving changed settings.

4 Technical Information

4.1 Technical Data

Description	Value/Unit/Type
General Data	
Installation type	Panel and switchboard
Dimensions, W x H x D	70 x 130 x 65 mm Installation depth with connectors: 130 mm
Panel or wall cutout	60 x 109 mm
Weight	Ca. 0.3 kg
Environmental Data	
Operating temperature	-25°C…~+70°C
Storage temperature	-50°C…~+85°C
Type of protection	IP 66 (front side) IP 54 (rear side)
Electrical Data	
Power supply	9…32 V DC from the engine bus
Current consumption	Ca. 70 mA from the engine bus
Interfaces	
Engine bus	1 x CAN bus (IN and OUT, socket and plug)
NMEA 2000	1 x CAN bus (plug)
Operating Elements	
Alarm acknowledgement	1 x button with background illumination
Reset	1 x button with background illumination
Brightness control	1 x light sensor
Display Elements	

Description	Value/Unit/Type
Warning	Symbol “Warning” (orange)
Alarm	Symbol “Alarm” (red)
Sensor failure	Symbol “Sensor” (yellow)
Power supply	LED “POWER” (blue)
Device fault	LED “FAULT” (red)

4.2 Labels

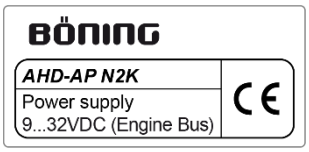


Illustration 8: Name plate

On the rear side of AHD-AP N2K there are labels (Image is similar) with the following information:

- Name plate with the model designation of the device, information about the power supply, and conformity markings
- Serial number
  The two first digits of the serial number indicate the year of production.
  To obtain the exact date of production contact the manufacturer stating the complete serial number.
- Assignment of the NMEA 2000 CAN connections, see also section 4.4.1
- Designations of the connections

4.3 Dimensions

4.3.1 Device Dimensions

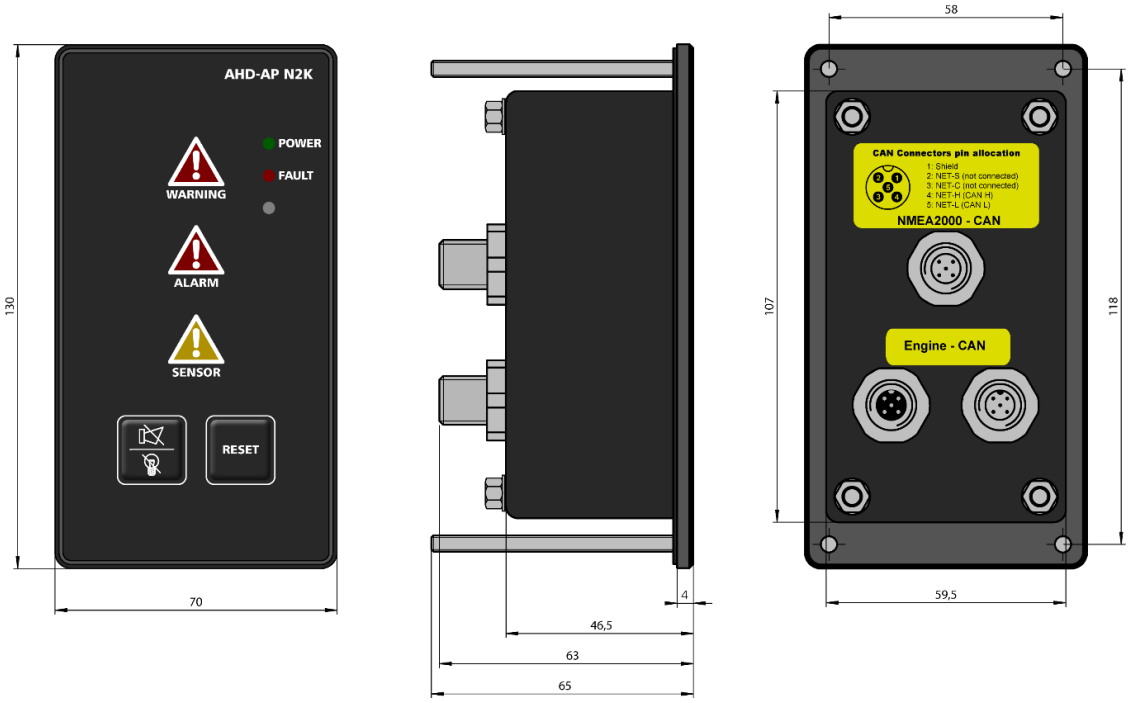


Illustration 9: Dimensions in millimeters

4.4 Device Connections

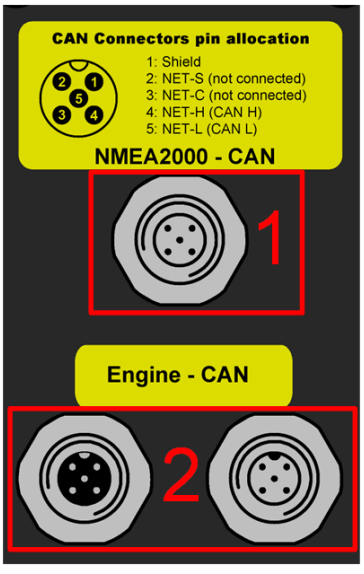


Illustration 10: Device connections (Top view)

1. Connection to NMEA 2000 (plug)
2. Connection to the engine CAN bus (IN/OUT, plug and socket) and for power supply

4.4.1 Pin Assignment

The pin assignment of the CAN connections is indicated on a label on the device's rear side:

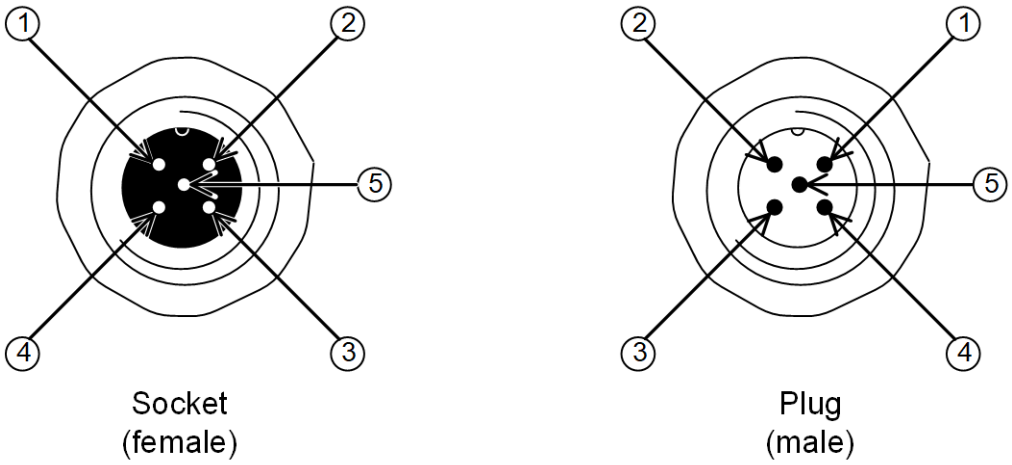


Illustration 11: CAN pin assignment (top view)

1	Shield	
2	NET-S	Not used
3	NET-C	Not used
4	NET-H	CAN H
5	NET-L	CAN L

5 Transport, Packaging and Storage

5.1 Transport Safety Instructions

5.1.1 Improper Transport

CAUTION!

Damages due to improper transport!

Improper transport can cause significant equipment damage.

Therefore:

- Use caution when unloading the packages during delivery and on-site transport and observe the symbols and instructions on the packaging.
- Remove the packaging only shortly before installation.

5.2 Transport Inspection

Upon receipt, the delivery must be checked immediately for completeness and damages during transport.

Proceed as follows when noticing external transport damages:

- Do not accept delivery or accept it only with reservation.
- Note the scope of the damage on the transport documents or the deliverer's bill of delivery.
- File a claim.

NOTICE!

Claim any fault as soon as it is noticed. Damage claims can only be filed within their respective reclamation periods.

5.3 Packaging

5.3.1 About the Packaging

The individual parts are packaged according to the expected transport conditions. Only environmentally friendly materials are used for the packaging.

The packaging is intended to protect the individual parts against transport damages, corrosion, and other damages. Therefore, the packaging must not be destroyed, and it may only be removed shortly before installation.

CAUTION!

Equipment damages due to electrostatic discharge!

When removing the device from its packaging or when packing the device, always observe protective measures against electrostatic discharges (ESD)!

These include the use of antistatic flooring or conductive mats, antistatic clothing made of cotton instead of synthetic fibers or animal hair, control of atmospheric humidity above 50%, and the use of, for example, grounding bracelets.

5.3.2 Handling the Packaging Materials

The packaging materials must be disposed of according to current legal regulations and local ordinances.

CAUTION!

Environmental damages due to improper disposal!

Packaging materials are valuable raw materials and can often be reused or usefully reprocessed and recycled.

Therefore:

- Dispose of packaging materials in an environmentally safe manner.
- Observe the local disposal regulations. When necessary, contract a specialist company.

5.3.3 Storage

Store the packages under the following conditions:

- Do not store them outdoors.
- Store them in a dry, dust free environment.
- Do not expose them to aggressive media.
- Protect them against sunlight.
- Observe the storage temperature, see section 4.1 “Technical Data”.
- Avoid mechanical shock.
- When storing longer than 3 months, regularly inspect the general condition of all parts and the packaging.

NOTICE!

In some cases, the packages contain storage instructions which extend beyond the requirements listed in this manual. These must be observed accordingly.

6 Installation and Initial Startup

6.1 Safety

6.1.1 Personnel

- Installation and initial startup may only be carried out by specially trained personnel.
- Only electricians may work on the electrical system.

6.1.2 Basic Information



CAUTION!

Danger of injury due to improper installation and initial startup!

Improper installation and initial startup can cause personal injury and equipment damage.

Therefore:

- Ensure sufficient installation space before beginning work.
- Handle parts with exposed sharp edges carefully.
- Observe order and cleanness in the work area!
- Install the components professionally.

6.2 Installation

6.2.1 General Information

CAUTION!

Equipment damages due to electrostatic discharge!

During all work observe protective measures against electrostatic discharges (ESD)!

These include the use of antistatic flooring or conductive mats, antistatic clothing made of cotton instead of synthetic fibers or animal hair, control of atmospheric humidity above 50%, and the use of, for example, grounding bracelets.

CAUTION!

Equipment damages due to improper handling and selection of the installation location!

Installing the devices in locations that do not meet the requirements of the technical specifications and improper handling can lead to system failures and equipment damage.

Therefore:

- Observe the devices' technical specifications when selecting the installation location.
- Only trained personnel may carry out the installation.
- Never install the devices in areas that are not of the required protection type.
- Never install the devices in extremely high or low temperature areas.
- Never bump or shake the devices vigorously.
- Install the devices in such a manner that the cooling system can function properly.

6.2.2 Installation Requirements

- AHD-AP N2K has been installed at the designated location or the required panel cutouts and drill holes have been created according to the technical documentation.
- All required CAN connection cables with the required plug connectors have been installed according to the technical documentation.
  Free cables are sufficiently long and are secured against short circuit and earth fault.
- The CAN connection cables are connected to the engine terminal box according to the technical documentation.
- The power supply of the engine terminal box is not connected, or it is switched off-circuit.

6.2.3 Installation

1. Install AHD-AP N2K properly in the intended installation location according to technical specifications and project drawings.

NOTICE!

When systems or replacement devices are shipped, AHD-AP N2K is delivered configured according to the project specifications.

The configuration comprises the number of engines and the specific engine monitored by an individual AHD-AP N2K.

The individual devices are identified with labels.

When several devices of the same device type are installed into the system, it is imperative to install each device at its intended installation site.

Installing a device in a site where a device of the same device type with a different configuration must be installed will result in system malfunction!

If required, the project specific configuration can be modified only by specially trained personnel.

If required, refer to the manufacturer or an authorized representative for further information.

2. Connect and screw on all CAN cables and, if required CAN termination resistors, according to the technical documentation.

CAUTION!

Equipment damages due to incorrect cable connections!

Incorrect connection of connection cables and termination resistors can lead to system malfunctions and equipment damage.

Therefore:

- Always check cable and connection designations before connecting.
- Make sure that the cables and termination resistors are connected to the correct connectors.
- Make sure that the cables and termination resistors are securely connected.

3. Test the system for earth/ground fault.

CAUTION!

System failure or malfunction!

During earth/ground fault, incorrect data can be transmitted and lead to overall system failure or malfunctions.

Therefore:

– Immediately correct any discovered earth/ground fault.

6.3 Initial Startup

6.3.1 Startup Requirements

- AHD-AP N2K is properly installed and equipped with all required CAN cables and termination resistors.
- The engine to which AHD-AP N2K is assigned is available and ready for operation.
- The power supply of the engine terminal box is not connected, or it is switched off-circuit.

1. Establish the power supply for the engine terminal box.
2. Establish the power supply for all external devices connected AHD-AP N2K according to their respective operating manuals.
3. Check the power supplies.

CAUTION!

Equipment damages due to incorrect voltage!

Connecting an incorrect supply voltage can lead to equipment damage.

Therefore:

– Review all relevant project documents and operation manuals of the devices used and verify their correct supply voltage and polarity before connecting them.

4. Switch on the power supply of the engine terminal box with the respective circuit breaker in the power distribution.

NOTICE!

AHD-AP N2K is supplied with power from the connected engine CAN bus. AHD-AP N2K is switched on when the power supply of the engine terminal box is established.

5. Establish the power supply of all required connected external devices with the respective circuit breakers in the power supply system and the devices' internal power switches as described in the respective operating manuals.
6. When the power supply has been established, the LED "POWER" is lit.
   When the device works correctly, the LED "FAULT" is not lit.
7. Check the correct data transmission with the engine's current data.
8. Record any errors or functional deviations that may occur and correct errors through appropriate measures, referring to the errors described in section 9, "Errors."
9. You may need to review the installed configuration and adjust it to the required operating conditions. Record the final configuration for the project documentation.

7 Operation

7.1 Power-Up

AHD-AP N2K is supplied with power over the engine CAN connection to the connected engine terminal box. The power supply of AHD-AP N2K is established when the power supply of the engine terminal box is switched on.

After power-up AHD-AP N2K conducts an internal function test. If this test detects no internal faults, AHD-AP N2K signals its correct operational status with the lit LED “POWER”.

The LED “FAULT” is neither lit not flashing.

If the LED “FAULT” is lit or flashing, the functional test after power-up detected an internal device fault. For this case further information is available in section 9, “Errors”.

For information about the correct function of the connected external components of the ship alarm system refer to the manuals of these components or the documentation of the ship alarm system.

7.2 Signaling of Alarms

AHD-AP N2K signals warning, alarm and sensor failure messages received from the engine CAN bus with symbols illuminated by LEDs and its internal buzzer.

NOTICE!

AHD-AP N2K captures all occurring alarms and stores them.

There is no priority for the optical signaling of the occurring alarms with the illuminated symbols. For this reason, all 3 symbols may be illuminated at the same time.



The symbol “Warning” flashes when one or more warnings have been triggered (Collective alarm function).

The internal buzzer sounds.

If the symbol is continuously lit after optical acknowledgement of pending warnings it flashes again when a new warning is triggered.



The symbol “Alarm” flashes when one or more alarms have been triggered (Collective alarm function).

The internal buzzer sounds.

If the symbol is continuously lit after optical acknowledgement of pending alarms, it flashes again when a new alarm is triggered.



The symbol “Sensor” flashes when one or more sensor failure alarms have been triggered (Collective alarm function).

The internal buzzer sounds.

If the symbol is continuously lit after optical acknowledgement of pending sensor failures it flashes again when a new sensor failure alarm is triggered.

7.3 Alarm Acknowledgment



Warnings, alarms, and sensor failures are acoustically and optically with the acknowledgement button.

The acknowledgement command triggered by pressing the acknowledgement button is sent to the electronics in the engine terminal box where it is executed. A confirmation of the acknowledgement is sent back to AHD-AP N2K where it has the following effects:

1. The first press of the acknowledgment button acknowledges the alarm message acoustically.
   The internal buzzer is muted for all pending alarms.
   The respective symbol “Warning”, “Alarm” or “Sensor” continues to flash.
2. A second press of the acknowledgement button acknowledges the alarm message optically.
   If the causes of the signaled warnings, alarms or sensor failures are still present the respective symbols are lit continuously instead of flashing.
   If the causes of the signaled warnings, alarms or sensor failures are not present any longer the respective symbol is not lit.

7.4 Reset



Alarms are reset with the button “Reset”.

Before resetting, the alarm must be acknowledged acoustically and optically.

The reset command triggered by pressing the button “Reset” is sent to the electronics in the engine terminal box where it is executed. A confirmation of the reset is sent back to AHD-AP N2K.

If the reset alarm was the only alarm signaled by AHD-AP N2K the symbol “Alarm” is no longer lit.

7.5 Test of the Buzzer and of the Illumination

When there are no pending alarms a short press of the acknowledgement button triggers a test of the LED illumination of the symbols for warnings, alarms, and sensor failures.

A longer press of the acknowledgement button triggers a test of the internal buzzer.

Releasing the acknowledgement button terminates the test.

7.6 Power Down

AHD-AP N2K is supplied with power over the engine CAN connection to the connected engine terminal box. Switching off the power supply of the engine terminal box also switches off AHD-AP N2K.

8 Periodical Checks and Cleaning

NOTICE!

The following tests must be carried out at least once a year:

- *firm connection of the cables in the terminals*
- *firm seating of the fastening screws*

Only use solvent-free, non-abrasive detergents for cleaning.

9 Errors

This section describes possible errors during operation of AHD-AP N2K with information about causes, error detection, and error correction.

9.1 Safety

9.1.1 Personnel

- Some work may only be carried out by specially trained personnel or the manufacturer. This is indicated in the description of the individual errors.
- As a rule, only electricians may work on the electrical system.

9.1.2 Basic Information



CAUTION!

Danger of injury due to dangerous voltages or other hazards

Opening the covers can expose you to dangerous voltages or other hazards.

Therefore:

- Never repair devices yourself.
- Do not open the covers.



WARNING!

Danger of injury due to improper error correction!

Improper error correction can cause severe personal injury and equipment damage.

Therefore:

- Do not repair the device yourself.
- Ensure that there is sufficient space before beginning any work.
- Observe order and cleanness in the work area! Parts and tools that are loosely stacked or lying about are accident sources.
- Observe correct installation procedures when parts have been uninstalled. Reinstall all mounting elements and observe torque limits.

9.1.3 In Case of Error

As a rule:

1. Determine the cause of the error.
2. Immediately inform a responsible party on-site.
3. Depending on the error type, have an authorized specialist correct it, or correct it yourself.
4. Correct the error by replacing or repairing the defective parts (for example cables, plugs, etc.).
5. If the error cannot be determined with the error table, a device defect cannot be excluded. Contact the manufacturer.

NOTICE!

Do not disassemble the device when sending it to the manufacturer!

Pack the device safely when sending it to the manufacturer!

If the device came into contact with hazardous substances it must be professionally cleaned before sending it in and a declaration of decontamination must be enclosed!

9.2 Error Correction

Error	Possible Cause	Error Detection / Correction
LED “POWER” not lit	Power supply of the engine terminal box not switched on.	Check the power supply of the engine terminal box.
	Engine CAN cable for the power supply not correctly connected. Wire break.	Check the connections.
LED “FAULT” lit	Faulty CAN connection to the engine terminal box.	Check the connection to the engine terminal box.
	Internal device fault	Restart the device by disconnecting it from its power supply and reconnecting it to its power supply. If the fault persists, contact the manufacturer.
Alarms are not signaled acoustically	Buzzer defective	Test the buzzer as described in section 7.5.
Alarms are not signaled optically	Illumination of the symbols defective	Test the illumination as described in section 7.5.
No signaling of alarms and alarm acknowledgement	No connection to the engine system.	Check the connection to the engine terminal box
Brightness of the illumination not automatically adjusted	Sensor for brightness control covered.	Remove objects covering the brightness sensor.

10 Disassembly

After the device has reached its end of life, it must be disassembled and disposed of in an environmentally safe manner.

10.1 Safety

10.1.1 Personnel

- Only specially trained personnel may disassemble the device.
- Only electricians may work on the electrical system.

10.1.2 Basic Information



CAUTION!

Danger of injury due to improper disassembly!

Stored residual energy, sharp parts, points, and edges on and inside the device or required tools can cause injury.

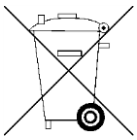
Therefore:

- Ensure sufficient space before beginning any work.
- Proceed with caution when handling parts with exposed sharp edges.
- Observe order and cleanness in the workplace! Parts and tools that are loosely stacked or lying about are accident sources.
- Disassemble parts properly.
- When in doubt, contact the manufacturer.

10.2 Disassembly

- Before beginning disassembly: disconnect the device from its power supply and secure it against reconnection.
- Disconnect the cable connections and mark them, if necessary. Secure free wire ends against short circuit and earth/ground fault.
  If AHD-AP N2K was looped into the engine CAN bus, reconnect it after removing AHD-AP N2K.
  If a termination resistor was connected to AHD-AP N2K terminate the connected engine CAN bus with a suitable termination resistor.
- Loosen the device mountings.
- Uninstall the device through appropriate measures.
- Clean and disassemble the device for disposal according to workplace safety and environmental protection regulations.

10.3 Disposal



In the absence of a return or disposal agreement, recycle the disassembled components:

- Scrap metals.
- Recycle plastic components.
- Dispose of the other components according to their material properties.

CAUTION!

Environmental damages due to improper disposal!

Electrical scraps, electronic components, lubricants, and other auxiliary materials are subject to hazardous waste regulations and may be disposed of only by licensed specialist companies!

Your local authorities or specialized disposal companies can provide you with information about environmentally safe disposal.

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13 List of Abbreviations

C

CAN – Controller Area Network

L

LED – Light Emitting Diode

BÖNING

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