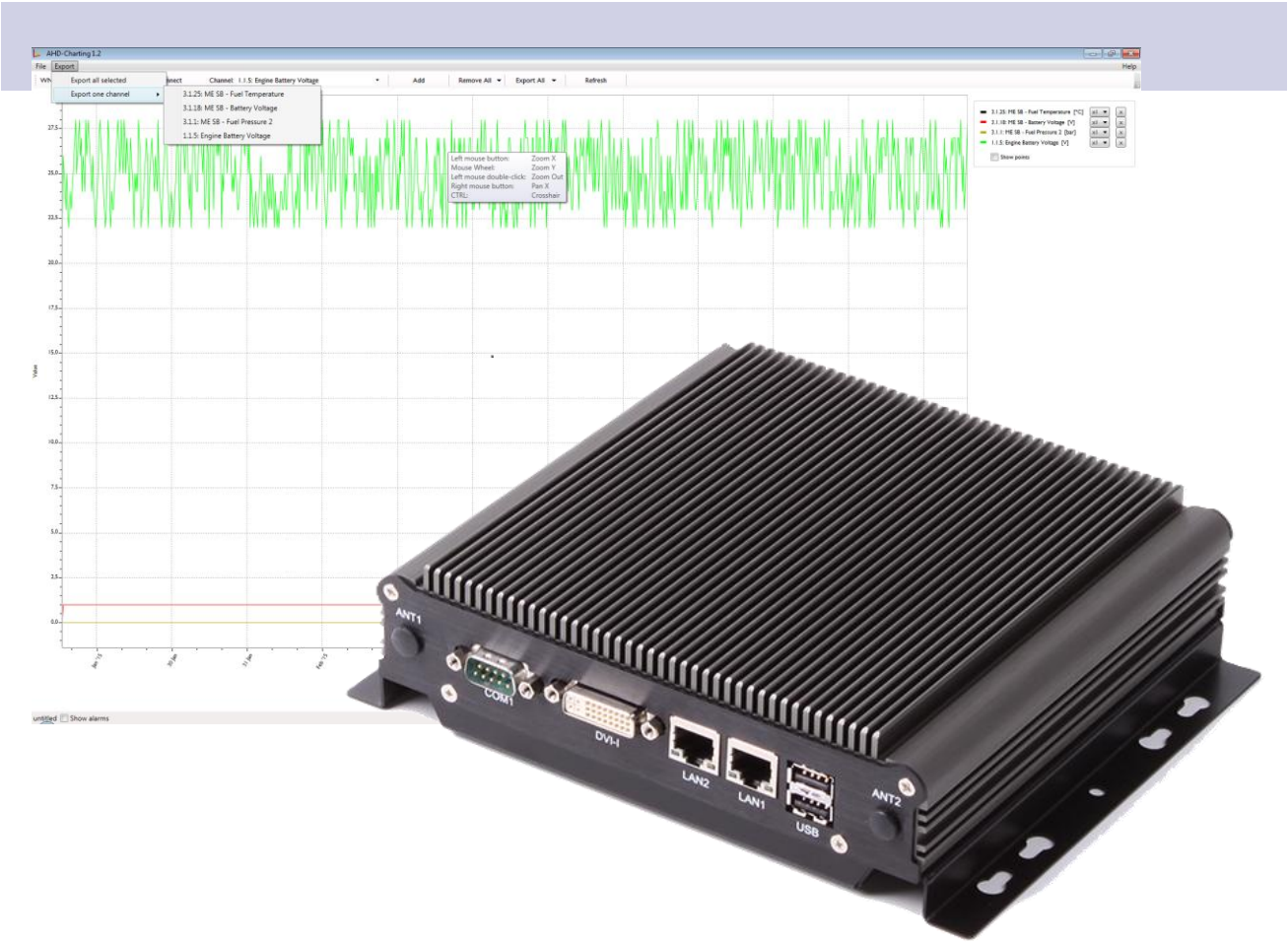
AHD-WNL Logging / AHD-Charting



Operating Manual

Read the operating instructions before starting any work!

CE

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Revision History

for the AHD-WNL User Manual and Charting Software

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1 General

1.1 Information on the Operating Instructions

Read the operating instructions carefully before starting any work! They are part of the product and must be kept in the immediate vicinity of the product where they are accessible to personnel at all times.

If the product is transferred to a third party, also provide the operating instructions.

This user manual provides important information on how to use the product. The manual describes the AHD-WNL logging system and its accompanying data analysis software.

Compliance with all specified safety instructions and operating instructions for the product and all components connected to it is a prerequisite for safe operation.

In addition, all local accident prevention regulations and general safety regulations applicable to the product's intended use must be observed.

The illustrations in this manual are not necessarily to scale and may differ slightly from the actual design of the product.

These operating instructions are to be understood exclusively as a single unit. The use of excerpts from these operating instructions as standalone documentation without reference to the complete document is not permitted.

1.2 Explanation of Symbols

Warnings

Warnings in this operating manual are indicated by symbols. The warnings are introduced by signal words that indicate the severity of the hazard.

Always follow the instructions and act with caution to prevent accidents, personal injury, and property damage!

DANGER!

… indicates an immediately dangerous situation that can lead to death or serious injury if not avoided.

WARNING!

… indicates a potentially dangerous situation that can lead to death or serious injury if not avoided.

CAUTION!

… indicates a potentially dangerous situation that could result in minor or slight injuries if not avoided.

CAUTION!

… indicates a potentially dangerous situation that could result in property damage if not avoided.

Tips and Recommendations

NOTE!

… highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

1.3 Limitation of Liability

All information and instructions in this manual have been compiled in accordance with applicable standards and regulations, the state of the art, and our many years of knowledge and experience.

The manufacturer assumes no liability for damages resulting from:

- Failure to follow the manual
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical modifications
- Use of non-approved replacement parts

The actual scope of delivery may differ from the descriptions and illustrations provided here in the case of special versions, the use of additional ordering options, or due to the latest technical modifications.

In all other respects, the obligations agreed upon in the delivery contract, the General Terms and Conditions, the manufacturer's delivery terms, and the legal regulations in effect at the time the contract is concluded shall apply.

We reserve the right to make technical changes for the purpose of improving performance characteristics and further development.

1.4 Copyright

The operating instructions must be treated as confidential. They are intended exclusively for persons working with the product. The transfer of the operating instructions to third parties without the manufacturer's written permission is prohibited.

NOTICE!

The content, texts, drawings, images, and other representations are protected by copyright and subject to industrial property rights. Any unauthorized use is punishable by law.

Reproduction in any form or manner - including in part - as well as the use and/or disclosure of the content is prohibited without the manufacturer's written consent. Violations will result in liability for damages. We reserve the right to assert further claims.

1.5 Warranty Terms

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

1.6 Customer Service

Our customer service is available for technical inquiries.

Information regarding the responsible contact person is available at any time by phone, fax, email, or via the Internet; see the manufacturer's address on page 2.

In addition, our employees are always interested in new information and experiences arising from product use that may be valuable for improving our products.

2 AHD-WNL Protocol PC

2.1 General

The AHD-WNL is a black-box PC with a closed operating system that has been specifically designed as a protocol computer with logging functionality. The system enables the storage of system-relevant logging data and logs measurement values and events captured via the ship's network of the connected alarm and monitoring system. All collected data can be displayed on the ship system's panel PCs or displays or exported in various formats.

Figure 1: AHD-WNL (Black-Box PC System)

AHD-WNL was developed specifically for the shipbuilding industry. The passive cooling system and the use of a solid-state drive allow for a design without moving parts that offers very high shock resistance. The integrated battery pack ensures the controlled shutdown of the PC even in the event of a sudden power failure. Alternatively, the shutdown can also be controlled via an external digital input (e.g., ignition detection in engine systems).

2.2 Connection to the Böning ship network

AHD-WNL is directly connected via LAN-1 to an AHD-DPU 9 data station within the Böning ship network. The existing system configuration is adjusted so that all relevant measurement channels are transmitted to the AHD-WNL. The assigned measurement points and events are processed and permanently stored on a solid-state drive (SSD). The AHD-WNL has a storage capacity for approximately 50 million measurement values and 100,000 events.

2.3 Data Recording

The measurement channels received by AHD-WNL are recorded either event-driven or cyclically, depending on their configuration. Depending on the data type, the following storage cycles can be selected:

- Binary data:
  on status changes or max. every 2 seconds
- Rapidly changing analog data:
  on status changes or max. every 2 seconds
- Slow-changing analog data:
  on status changes or every 10 seconds to 1 hour
  (Applications such as tank levels, temperatures, or operating hours)

The maximum possible recording duration depends on the selected storage cycles and is determined on a customer-specific basis. All stored data can be displayed on the ship system's panel PCs or displays or exported in various formats.

2.4 Data output

Data output is typically handled within the graphical system configuration by embedding so-called "logging pages". These are created within the project-specific visualization and enable the implementation of predefined query functions tailored to customer requirements. Frequently recurring queries for key data points or sensors can thus be executed easily and conveniently (see example views at Figure 2 and Figure 3).

Figure 2: Data Logging / Trending page including preset buttons for predefined measurement channels

Figure 3: Data logging / trending page with multiple graphs (up to 8 measurement channels possible)

As an alternative to the embedded logging pages, the data analysis software described below can also be used:

3 Data Analysis Software

Böning has developed two different software tools for data display, evaluation, and data backup via an export function. These are installed on any PC or laptop and connected to the AHD-WNL's customer network (LAN-2).

- AHD-Charting Tool:
  With "AHD-Charting" (see pos. 3.1), the values logged in the AHD-WNL can be read out, displayed graphically, and exported as a Microsoft Excel file (xls). Frequently used settings can be saved as profiles within AHD-Charting.

- WNL Exporter Tool:
  With "WNL Exporter" (see pos. 3.2), the data to be logged is exported directly to an Excel file. Fixed timestamps can be defined, which allows for better value comparison based on a common time reference. Furthermore, data export can be automated on a cyclical basis using a batch file or a task scheduler.

3.1 AHD-Charting Tool

Within the AHD-WNL configuration, you specify which channels of the connected ship network are to be logged. With "AHD-Charting," the logged values can be read out using a computer or laptop, displayed graphically, and exported as a Microsoft Excel file (xls). The querying PC is connected to the customer network (LAN-2) for this purpose.

3.1.1 Requirements for Software- Installation

The following requirements must be met to use AHD-Charting:

- AHD-WNL installed and running, which logs data channels according to the configuration
- Computer (PC or laptop) running Microsoft Windows XP® or later
- Ethernet cable
- The IP address of one of the AHD-WNL's LAN interfaces must be known
- Microsoft .NET Framework 4 Client Profile (x86 or x64)
- 20 MB of free space on the hard drive or another storage medium where the program will be copied for installation.
- The computer running AHD-Charting and the AHD-WNL LAN interface being used must be on the same network. Upon delivery, AHD-WNL uses the following configurable settings for LAN1:
  - IP address 192.168.11.200
  - Subnet mask 255.255.255.0
  - Default gateway

  The IP address 192.168.1.200 is used for LAN-2.

  Accordingly, the computer's LAN interface must have an IP address in the form 192.168.11.XXX for connection to LAN1 or 192.168.1.XXX for connection to LAN2. For XXX, enter a value between 1 and 255 that is not already in use on the respective network. Use 255.255.255.0 as the subnet mask. Configuring the LAN interface requires administrator rights. The procedure depends on the operating system used and is described in the AHD-WNL operating instructions.

3.1.2 AHD-Charting Installation

AHD-Charting is available on the manufacturer's website.

To install AHD-Charting, copy the downloaded files to a folder where you have write permissions.

The AHD-Charting installation folder contains the executable file AHD-Charting.exe, which is used to launch AHD-Charting.

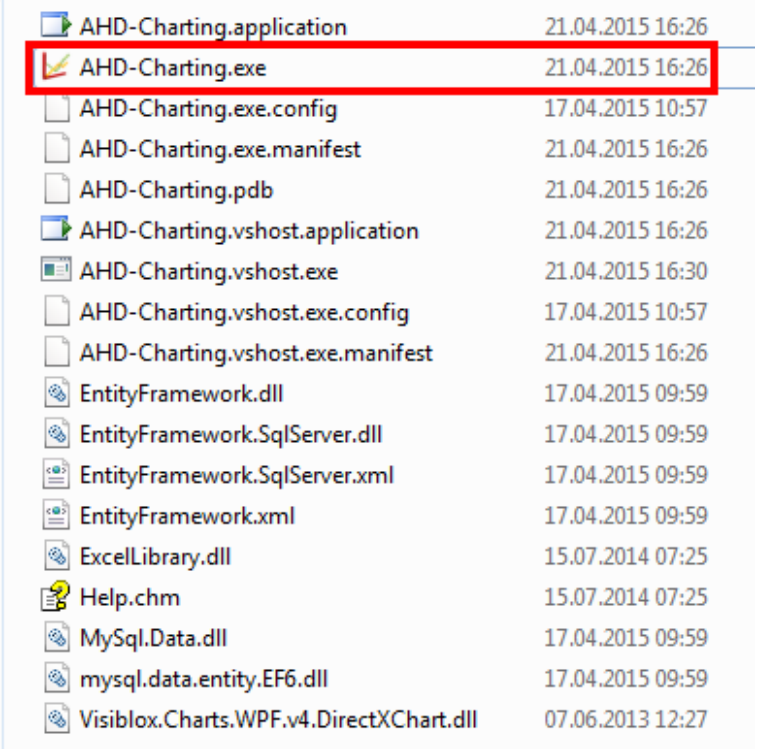

Figure 4: AHD-Charting.exe

NOTE!

To make it easier to launch AHD-Charting, you can create a shortcut to the AHD-Charting.exe file, for example, on the desktop.

3.1.3 AHD-Charting Operation

3.1.3.1 Starting

To start AHD-Charting, double-click the AHD-Charting.exe file in the AHD-Charting installation folder or, if available, a shortcut to this file.

The AHD-Charting startup screen appears:

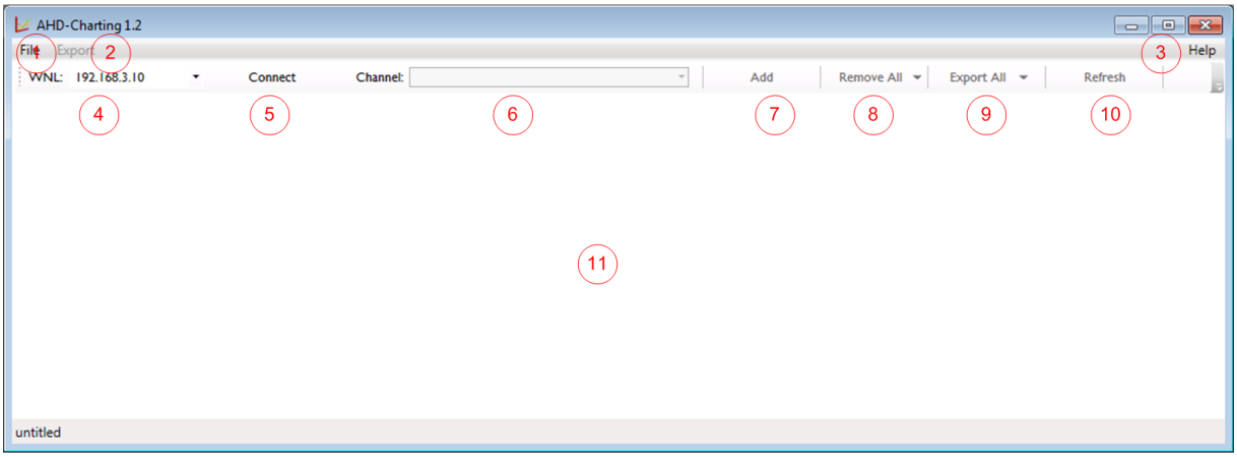

Figure 5: Start Screen

The AHD-Charting startup screen contains the following elements:

1. The "File" menu for working with profiles and exiting AHD-Charting
2. The "Export" menu for exporting data
3. The "Help" menu for accessing information about AHD-Charting and the help
4. The "WNL" combo box for selecting the IP address of the AHD-WNL
5. The "Connect" button for connecting to the selected AHD-WNL.
   Once the connection is established, the button is labeled "Disconnect."
6. The "Channel" list box for selecting channels
7. The "Add" button for adding a channel to the chart area
8. The "Remove All" button to remove channels from the graph area
9. The “Export All” button for exporting data
10. The "Refresh" button to update the values
11. The empty chart area

3.1.3.2 Version information and help

The version number of AHD-Charting is displayed in its title bar.

To view more information about AHD-Charting, open the "Help" menu and select "About."

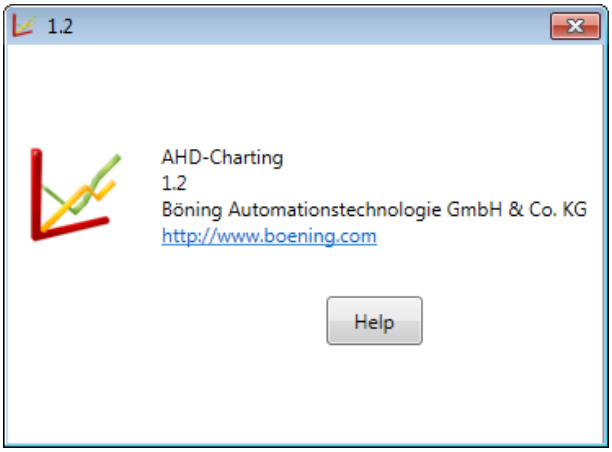

Figure 6: Information about AHD-Charting

To open this manual as a Windows help file, press the F1 key, select the "Help" entry in the "Help" menu, or click "Help" in the window containing information about AHD-Charting.

When channels are loaded, a brief help message on using the mouse appears in the chart area.

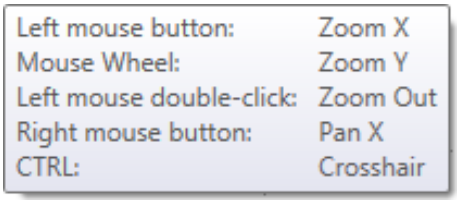

Figure 7: Help on using the mouse

3.1.3.3 Connecting to AHD-WNL

AHD Charting reads the logged data from the AHD-WNL via its LAN-2 interfaces (Default setting). If necessary, an Ethernet switch can also be used.

In the "WNL" field, enter the IP address of the AHD-WNL LAN interface being used. Previously entered IP addresses can be selected from a list by clicking the arrow to the right of the field.

To establish the connection, click the "Connect" button (5).

If the connection cannot be established, the following message is displayed:

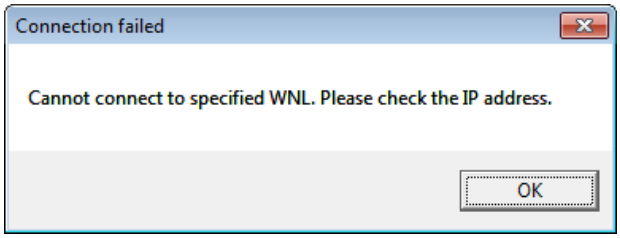

Figure 8: Connection to AHD-WNL not established

In this case, check the entered IP address and the connection to AHD-WNL.

Once the connection to AHD-WNL is established, the AHD-Charting interface will display additional elements.

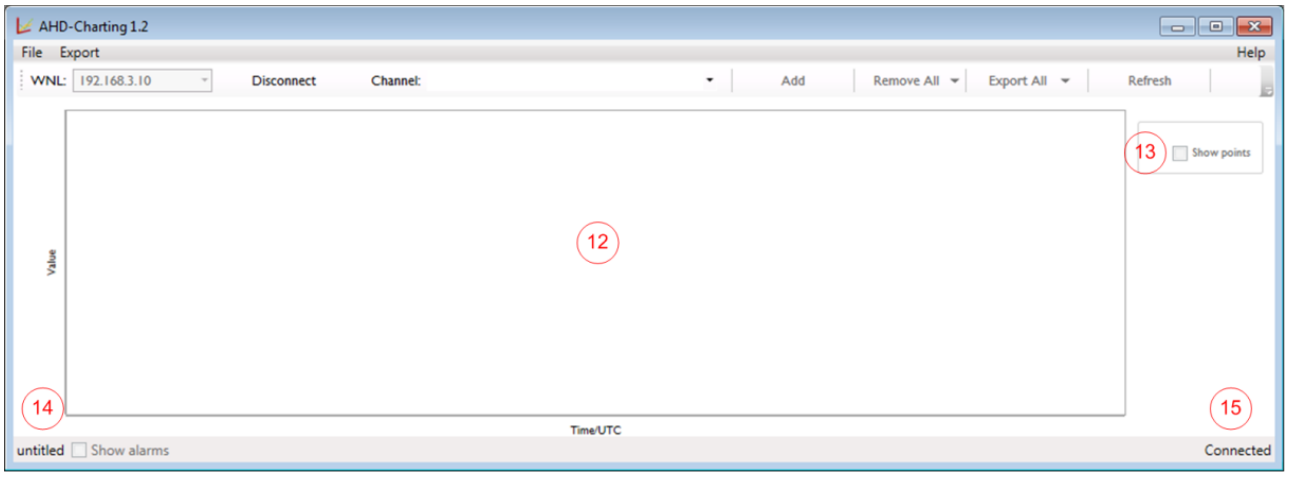

Figure 9: Interface after connecting to AHD-WNL

12. The chart area with the "Time/UTC" time axis and the "Value" value axis
13. The “Show Points” checkbox
14. The name of the loaded profile
15. The connection status with AHD-WNL

3.1.3.4 Display channels

After the connection to AHD-WNL has been established, the channels configured for logging are displayed in the “Channel” list box (6).

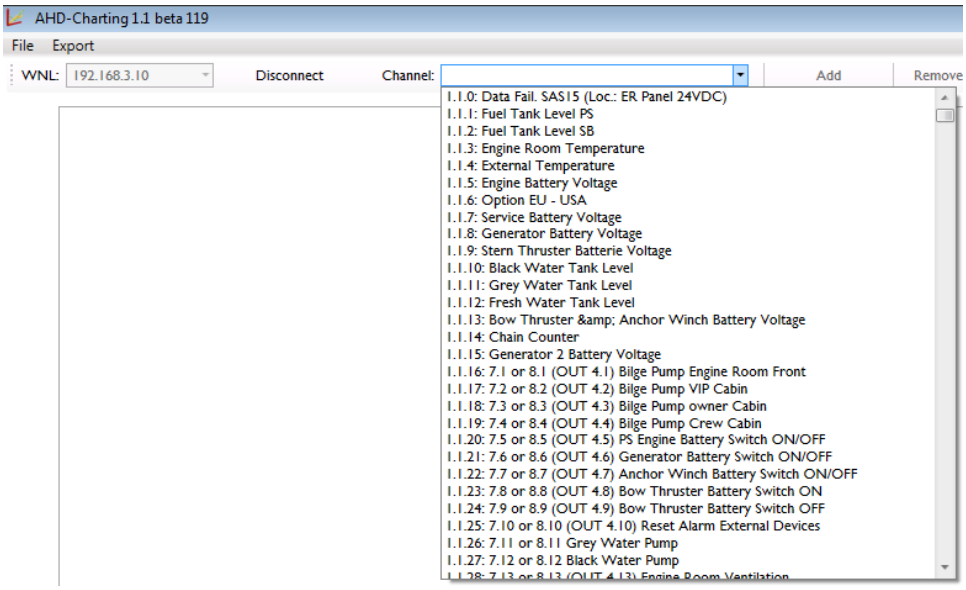

Figure 10: List of channels

To display a channel in the graph area, select it in the "Channel" list box (6) and click "Add" (7). The channel is displayed in the graph area (12).

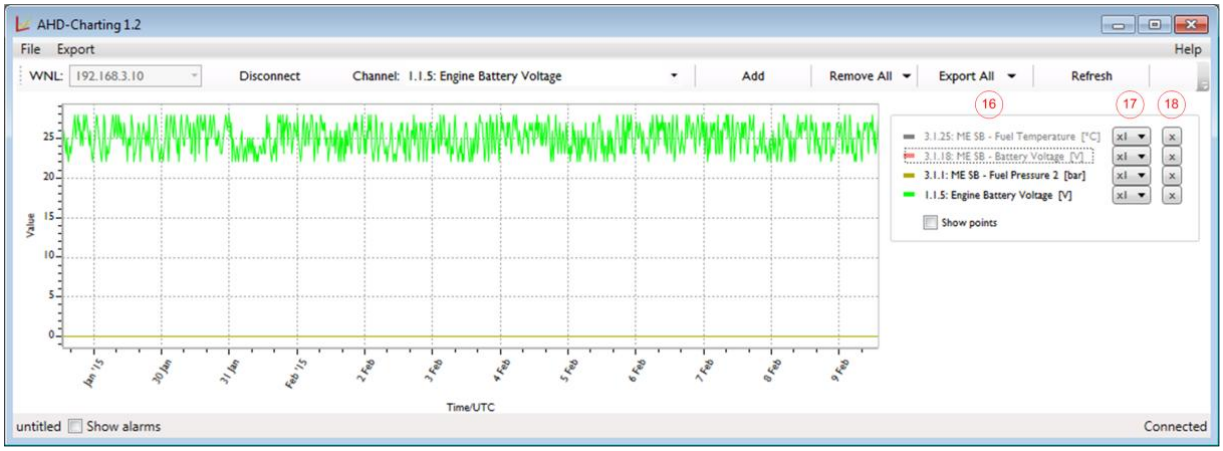

Figure 11: Interface with loaded channels

A list of the loaded channels is displayed on the right side of the graph area.

16. The color used to display the channel, the channel name, and, if applicable, the unit of the measured value
17. Buttons for scaling the curve
18. Buttons for removing the channel from the graph

3.1.3.5 Show points

By default, the logged values are displayed as curves. To additionally display the individual values as points, enable “Show points” (13).

3.1.3.6 Hide Channels

Loaded channels can be hidden in the chart area.

To hide a channel, click on the channel name in the list of loaded channels (16). The names of hidden channels are displayed in gray.

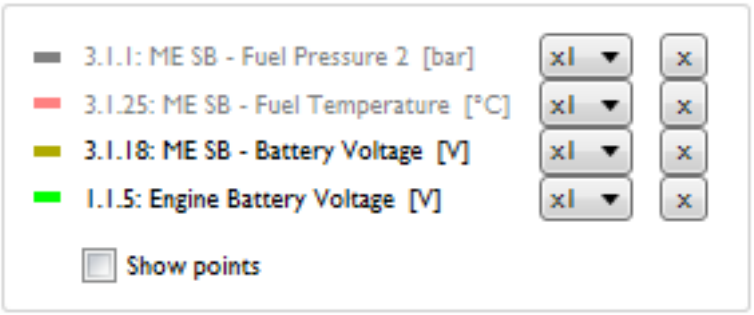

Figure 12: Channel list with hidden channels

3.1.3.7 Removing Channels

To remove a channel from the graph, click the cross icon in the list of loaded channels.

You can also remove a channel by clicking “Remove All” (8), opening the “Remove one” menu, and selecting the desired channel.

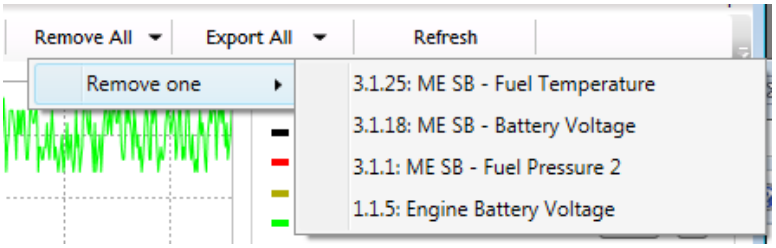

Figure 13: Removing individual channels with Remove All

To remove all channels, click “Remove All” (8).

3.1.3.8 Zoom the timeline

To zoom in on a section of the timeline with the displayed curves, drag the left mouse button to draw a frame around the desired area of the curve. The inside of the frame will be highlighted in blue.

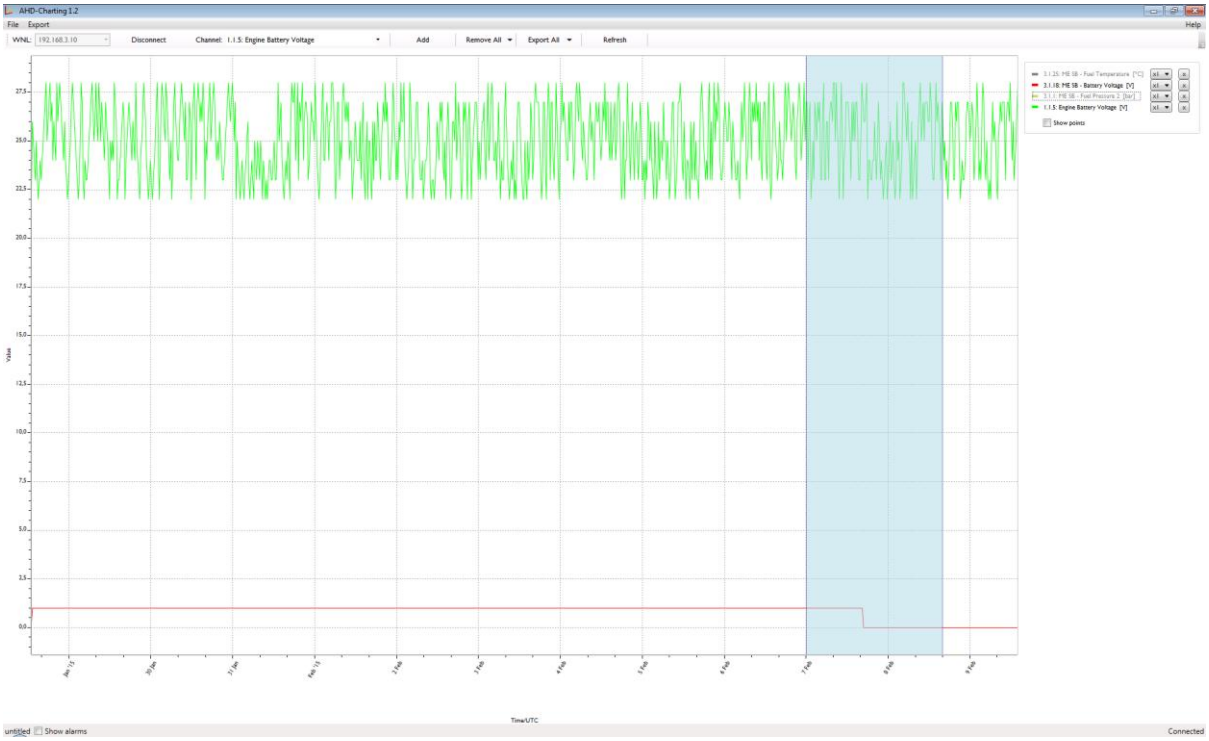

Figure 14: Selecting a time range to zoom

After releasing the mouse button, the blue-highlighted portion of the curve is displayed in a larger view.

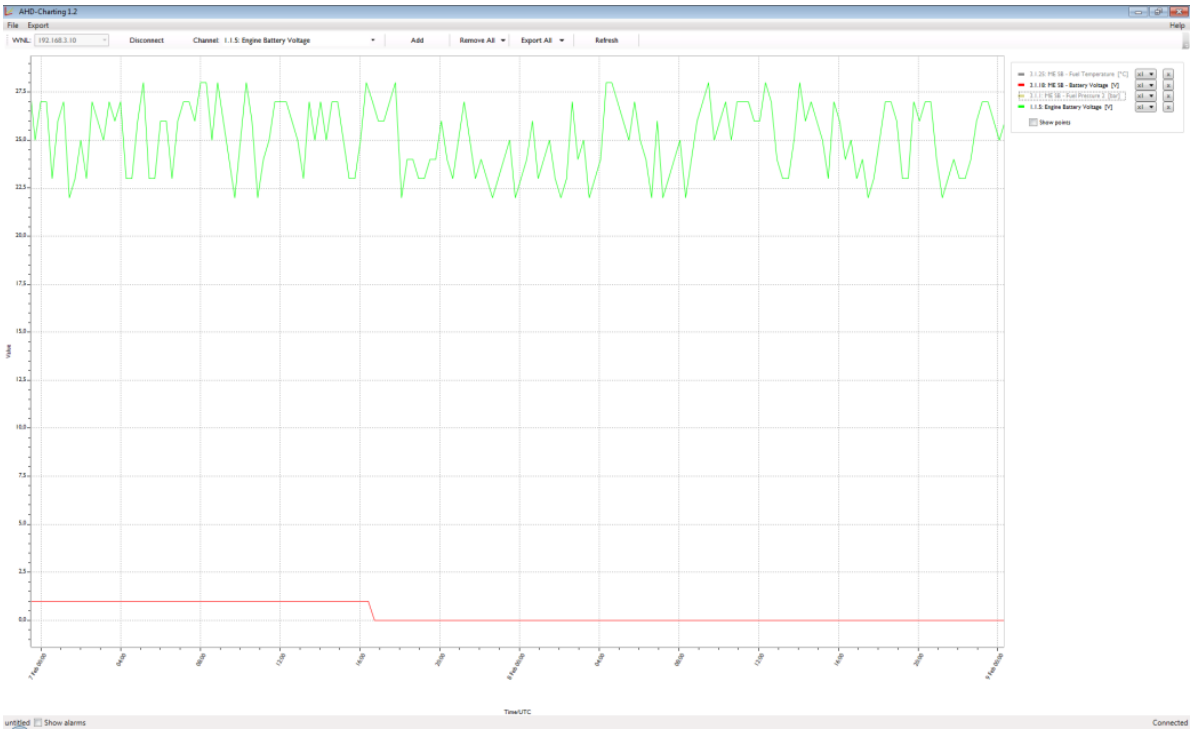

Figure 15: Zoomed-in timeline

To display all values again, double-click in the chart area.

3.1.3.9 Zooming the value axis

To zoom the value axis, scroll the mouse wheel.

Scrolling the mouse wheel up enlarges the time axis; scrolling down reduces it.

The time axis is adjusted automatically.

To display all values again, double-click in the chart area.

3.1.3.10 Scale channel values

To make the chart clearer, the values can be scaled using specified factors.

To scale the values of a loaded channel, click the button for selecting scaling factors in the list of loaded channels x1 (17).

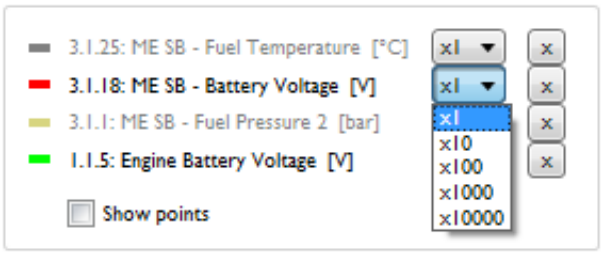

Figure 16: Scaling factors for channels

The channel's values are divided by the selected factor.

3.1.3.11 Moving in the chart

To move the displayed curve in the graph, right-click and drag the mouse while holding down the mouse button.

To display the original view, double-click with the left mouse button in the chart area.

3.1.3.12 Display individual values

To display individual values for a channel, press the CTRL key and simultaneously drag the crosshairs displayed by the mouse pointer to the desired point on the curve.

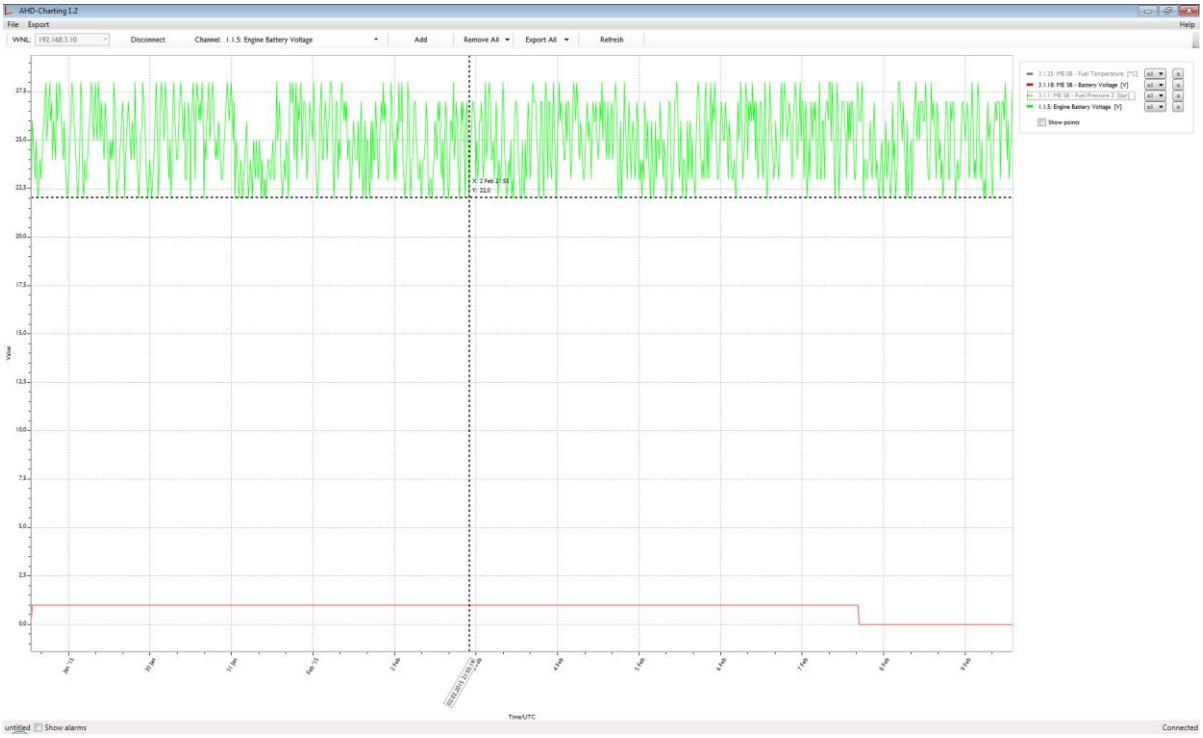

Figure 17: Displaying individual values

The crosshairs display the date and time of the value as the X-value and the channel value as the Y-value.

3.1.4 Exporting data

The data for all loaded channels or individual channels can be exported in xls format to Microsoft Excel®.

To export only a section of the data, zoom in on the desired area.

3.1.4.1 Data from a single channel

To export data from a single channel, click “Export All” (9), open the “Export one” menu, and select the desired channel.

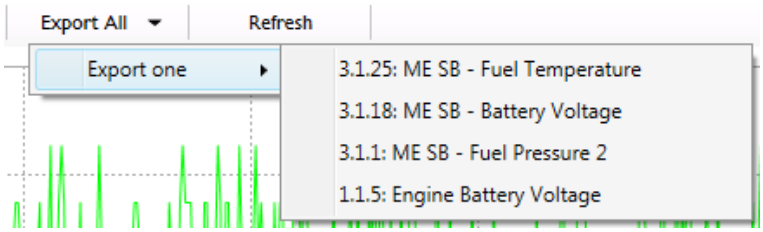

Figure 18: Selecting individual channels for export

The same function is also available in the "Export" menu. Click on "Export," open the "Export one channel" menu, and select the channel.

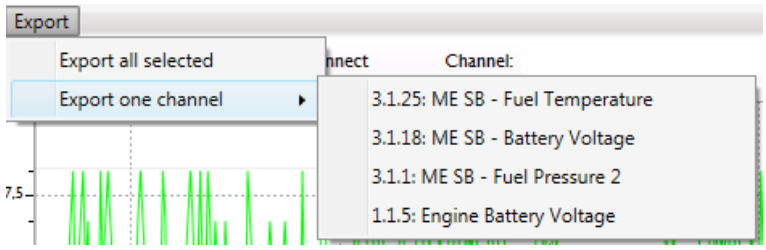

Figure 19: Exporting individual channels using the "Export" menu

In the window that opens, specify the save location and file name.

3.1.4.2 Data for all channels

To export data from all loaded channels, click “Export All” (9) or select “Export all selected” from the “Export” menu. Channels hidden in the graph are also exported.

In the window that opens, specify the save location and file name. The exported data is saved in Microsoft Excel® XLS format.

3.1.4.3 The data in Microsoft Excel

A separate worksheet is created in the Excel file for each channel.

	A	B	C	D	E
1	Date	Time	Value	Alarm	Valid
2	2015-01-28	13:00:52.890	1	Main Alarm Max	
3	2015-02-07	16:26:22.513	1	Main Alarm Max	
4	2015-02-07	16:26:50.702	1	Main Alarm Max	invalid
5	2015-02-07	16:28:58.865	0		
6	2015-02-07	16:31:19.889	0		
7	2015-02-07	16:31:30.045	1	Main Alarm Max	
8	2015-02-07	17:51:13.684	1	Main Alarm Max	
9	2015-02-07	17:51:22.903	1	Main Alarm Max	
10	2015-02-07	17:51:25.602	1	Main Alarm Max	
11	2015-02-09	13:35:37.113	1	Main Alarm Max	
12	2015-02-09	13:36:14.678	1	Main Alarm Max	invalid
13	2015-02-09	14:01:27.133	1	Main Alarm Max	
14	2015-02-09	14:01:59.597	1	Main Alarm Max	
15					
16					

1.7.142 AC System Power Supply 1.7.190 Generator Batter

Figure 20: Exported data in Excel

Each worksheet contains the following columns:

- Date: Date
- Time: Time
- Value: Channel value
- Alarm: Type of triggered alarm
- Valid: Validity status

3.1.5 Profiles

To quickly load frequently used channels from an AHD-WNL into AHD-Charting, you can create profiles.

The following data is stored in profiles:

- The IP address of AHD-WNL
- The first date displayed
- The last date displayed
- The channels and the set scaling factors

Currently, when loading a saved profile, the IP address of AHD-WNL, the channels, and their scaling factors are taken into account.

3.1.5.1 Create Profiles

Load the desired channels of an AHD-WNL into AHD-Charting and, if necessary, configure additional settings that can be saved in the profile.

Press the keyboard shortcut CTRL+S or open the "File" menu and select "Save profile…".

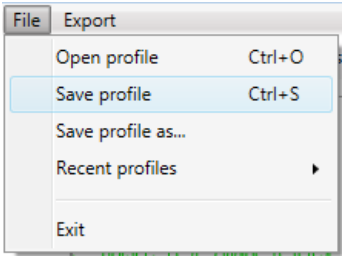

Figure 21: Profile entries in the "File" menu

In the window that opens, specify a save location and file name for the profile.

To save a loaded profile under a different name, select "Save profile as..." from the "File" menu and specify the save location and file name.

3.1.5.2 Loading Profiles

To load a saved profile, press the keyboard shortcut CTRL+O or open the "File" menu and select the "Open profile" option.

Select the desired profile in the window that opens.

To load one of the most recently used profiles, open the "File" menu, select "Recent profiles," and choose one of the displayed profiles.

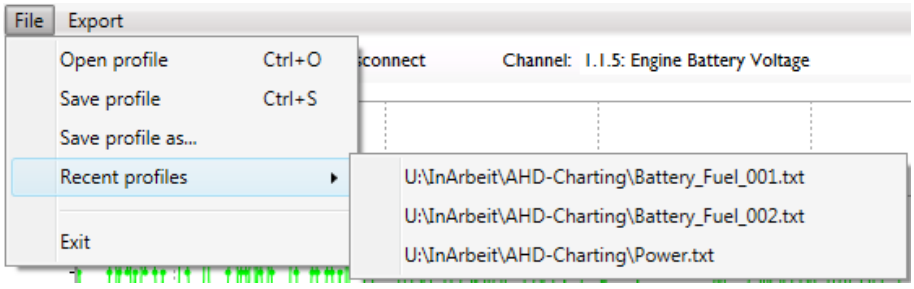

Figure 22: Selecting recently used profiles

Channels that have already been loaded continue to be displayed with their current scales. The name of the most recently loaded profile is shown in the lower-left corner of AHD-Charting (14).

3.1.6 Disconnect from AHD-WNL

To disconnect from the AHD-WNL selected in “WNL” (1), click “Disconnect” (2).

You can now select a different AHD-WNL in “WNL” (1) and connect AHD-Charting to it.

3.1.7 Exit AHD-Charting

To close AHD-Charting, click the cross in the upper-right corner of its window, or open the “File” menu and select “Exit.”

3.2 AHD Exporter Tool

With the "WNL Exporter" client tool, the values logged in the AHD-WNL can be exported directly to an Excel file.

To ensure a common time base, timestamps can be defined within a specified range. This allows for better value comparison during subsequent analysis. Furthermore, data export can be automated on a cyclical basis using a batch file or a task scheduler. Frequently used settings can be saved as profiles and loaded into AHD-Charting.

3.2.1 Command-Line Query

Data retrieval using the "WNL Exporter" client tool is performed via command lines using predefined parameters, as follows:

Parameter

Short	Long	Example	Description
-o	--output	-o **export.xlsx**	**Required:** Output XLSX filename (the .xlsx extension is automatically added if not specified)
-w	--wnl	-w **192.168.11.200**	**Required:** IP address/hostname of the WNL to connect to
-c	--channels	-c **1.2.3 1.2.4**	**Required:** Space-separated list of channels to export
-s	--start	-s **"2020-10-23 22:33:00"**	(Default: today 00:00:00) Start date and time in UTC: "yyyy-MM-dd HH:mm:ss"
-e	--end	-e **"2020-10-24 22:33:00"**	(Default: now) End date and time in UTC: "yyyy-MM-dd HH:mm:ss"
-i	--interval	-i **30**	(Default: 10) Interval between values in seconds
-n	--no-status		Remove the status column (GOOD/BAD)
	--help		Display help
	--version		Display version information

Please note

- The date and time must be entered exactly in the format "yyyy-MM-dd HH:mm:ss", as follows:
  - yyyy: Year: 4 digits (e.g., 2020)
  - MM: Month: 2 digits (e.g., 03)
  - dd: Day: 2 digits (e.g., 18)
  - Space to separate the date and time
  - HH: Hours: 2-digit 24-hour format with a leading 0 (e.g., 22 or 08)
  - mm: Minutes: 2 digits (e.g., 44)
  - ss: Seconds: 2 digits (e.g., 00)
  - Don't forget the quotation marks (""")

- Whenever possible, an output file is always created; an existing file with the same name will be overwritten without notice! The .xlsx extension is added if no file name extension was specified.
- The channels specified in the list must be separated by spaces.
- The specified interval must be an integer and greater than 0.
- The command line length may be limited depending on the Windows version.
- If the maximum number of rows allowed by Excel (.xlsx export file) is exceeded, an error message will be displayed. In this case, the interval must be increased or a shorter time period selected.

Query examples

Command line	Action
wnlexporter-cli.exe -w 192.168.11.200 -c 1.2.3 1.2.4 -o export.xlsx	Export channels 1.2.3 and 1.2.4 from WNL, IP address 192.168.11.200, from 00:00 today until now to the file export.xlsx
wnlexporter-cli.exe -w 192.168.11.200 -c 1.2.3 1.2.4 -n -i30 -o export.xlsx	Export channels 1.2.3 and 1.2.4 from WNL, IP address 192.168.11.200, from 12:00 AM today until now to the file export.xlsx
wnlexporter-cli.exe -w 192.168.11.200 -c 1.2.3 1.2.4 -o export.xlsx -s "2020-10-23 22:33:00"	Export without status column, interval = 30s
wnlexporter-cli.exe -w 192.168.11.200 -c 1.2.3 1.2.4 -o export.xlsx -s "2020-10-23 22:33:00" -e "2020-10-24 22:33:00"	Export channels 1.2.3 and 1.2.4 from WNL, IP address 192.168.11.200, from 2020-10-23 22:33:00 to the present, to the file export.xlsx

Return Values

The following return values can be evaluated by the calling tool as needed.

Code	Description	Comment
0	Success	Query successful
1	Invalid parameters	Check parameter list
2	Cannot connect to WNL	Check connection to WNL
3	Cannot write to file	Check path and file status
100	Unknown error	e.g., maximum number of Excel rows exceeded (see notes)

4 List of Figures

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