Software installation and commissioning manual

Product House

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Table of contents

Page #

Figures

Tables

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References

[A] Sensorlist Manual

[B] IMO Res.A.694(17), MSC.128(75), MSC.191(79), IEC 60945 (2002) inc. corr.1 (2008), IEC 61162 Series, IEC 62288 Ed.1.0 (2008), IEC 62616 (2010) , IEC 61696-1 IEC FDIS Ed.2 TC80-690 FDIS VDR, IEC 61924-2 NEN-EN-IEC Ed.1 2012-12

Introduction

The software installation manual provides instructions for adjusting, setting and configuring NavVision. The chapters and sections are organized in chronological order in which the relevant component must be installed and configured (where applicable).

About the installation and commissioning manual

The software installation manual contains the following chapters:

- Chapter “The Operators Manual” handles about the standard Operators Manual.
- Chapter “Duty Alarm System” explains how to work with the AM(C)S system and how the different parts are integrated in NavVision.
- Chapter “Personal Alarm” Explains the work and feel of the different Deadman-systems provided within NavVision.
- Chapter “Annex 1 Mimic control” contains extra information about mimics within the system.
- Chapter “Part 2: Extra settings for (Commissioning) Engineer” Gives extra information on settings within the system that are for all kind of engineers.
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- Chapter “BNWAS Settings” is an extra explanation of the configuration settings for the BNWAS.
- Chapter “Performance” shows a tool for checking performance of the system on a deeper level.
- Chapter “Commissioning” contains a description of procedures to realize the acceptance test on-board the vessel.

for specific information on interfaces, but also in depth information on here mentioned features, as well as here not mentioned features, we refer you to the specific manuals from NavVision that can be obtained through Free Technics.

Abbreviations list

AC	Alternating Current
AI	Analog IN
AO	Analog Out
CAN	Controller Area Network
COM	Communication
CPU	Central Processing Unit
DAP	Duty Alarm panel
DC	Direct Current
DI	Digital In
DIN	Deutsches Institut für Normung
DO	Digital Out
DM	Dead Man's
ECR	Engine Control Room
FT	Free Technics
GEA	General Engineers Alarm
GND	Ground
GPS	Global Positioning System
GRP	Group
ID	Identification
I/O	Input/Output
LAN	Local Area Network
LED	Light Emitting Diode
LPU	Local Processing Unit
MAC	Media Access Control
Mbps	Megabit per second
NC	Normally Closed
NMEA	National Marine Electronics Association
NO	Normally Open
OWS	Operator Work Station
PIN	Personal Identification Number
PLC	Programmable Logic Controller
Rx	Receive
SMS	Short Message Service
SRAM	Static Random Access Memory
TCP/IP	Transmission Control Protocol/ Internet Protocol
TFT	Thin Film Transistor
Tx	Transmit
UDP	User Datagram Protocol
USB	Universal Serial Bus

Safety instructions

This section provides only a summary of the safety requirements and notes in the following sections. To protect your health and prevent damage to the AM(C)S equipment or vessel, it is essential to read and carefully follow the safety instructions.

The indications NOTE, CAUTION and WARNING have the following significance:

NOTE:
An operating procedure, practice or condition etc., which it is important to emphasize.

CAUTION:
An operating procedure, practise or condition etc., which, if not strictly observed, may damage AM(C)S equipment or crash NavVision software.

WARNING:
An operating procedure, practise or condition etc., which, if not carefully observed may result in personal injury or damage to the vessel.

Revision history

Revisions issued since publication.

Issue	Date	Revision	Reason
1.0	August 26, 2010		initial release
1.1	July 19, 2012	Update	Adjustments
1.2	September 14, 2012	Update	Adjustments
1.3	September 20, 2012	Extra information	Tank Tables
1.4	November 1, 2012	Alterations	Edited
1.5	January 22, 2013	Extra information	Tank tables calculations
1.6	February 26, 2013	Update	Trending
1.7	March 03, 2013	Update	Divers
1.8	April 14, 2013	Update	Divers
1.9	June 13, 2013	Update	Divers
1.11.15	November 21 2013	Update	Divers
1.12.16	November 22, 2013	Update	System Layout
2.1.1	November 30, 2014	Decimus Update	New version
2.1.2	July 16, 2015	Updates	Development

1. Part 1: The operators Manual

1.1 Human Machine Interface

The FT NavVision *Human Machine Interface* (HMI) displays the current state of any physical device (I/O) on one or more monitor screen(s) by color, animation or values.
Moreover, when an undesirable state of a device is detected the operator will be notified by means of an audible and/or visible alarm signal. Messages concerning the alarm are added to the FT NavVision list of active or unacknowledged alarms (*Alarm Page*). This list can be displayed by clicking the Imtech logo in the center of the taskbar.
The HMI also supports remote platform control. Operators can control the platform (vessel) via the HMI.

1.2 Taskbar

NavVision's main User Interface (UI) element is the taskbar, positioned on top of each screen. The taskbar is home to the shortcuts to various settings, modules and mimics.
In addition, when an alarm is registered, the middle portion of the taskbar turns a bright red and shows the most recent unacknowledged alarm, the number of active alarms, and the total number of unacknowledged alarms. A single mouse click on this portion of the taskbar links to the extensive alarm viewer, showing the data for each active alarm such as time, alarm group, status and duration.

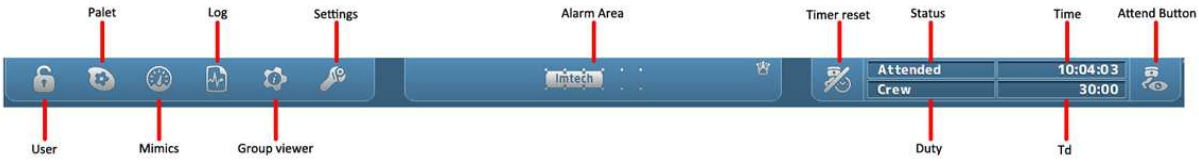


Figure 1-1: NavVision taskbar

Takbar Icon	Explanation
User	Setting of user and user rights
Palette	Setting of colors and day, dusk or night mode
Mimics	Selecting the mimics
Log	Show the log files
Group viewer	Show information on all I/O
Settings	Entry to all settings
Alarm Area	Click to show/hide alarm mimic
Timer Reset	Reset deadman timer, show active/inactive state
Status	Show status of attendance of the ER
Duty	Show person on duty
Time	Time
Td	Time dormant (for deadman timer)
Attend Button	Attend/unattended button for ER or Bridge

Table 1-1: NavVision taskbar

1.2.1 User rights

FT NavVision handles control rights by using log-in credentials (username and password), and assigning rights to these credentials. These rights limit access to the system's configuration, therefore ruling out any edits that may harm the system made by unauthorised crewmembers.

Users can be added, edited or removed. Adding, editing and removing users, together with assigning their rights, can only be done by an administrator, i.e. a top-level user.
For every profile made, permissions can be set. The system is delivered with three pre-configured user-profiles, namely:

1. *Administrator*: has all rights;
2. *Guest*: can only use the available viewers;
3. *Operator*: can only alter display mode and/or units.

Login is required upon system start-up. After start-up, users can log off and log in using the dedicated button on the taskbar. By clicking the button, the following window will appear:

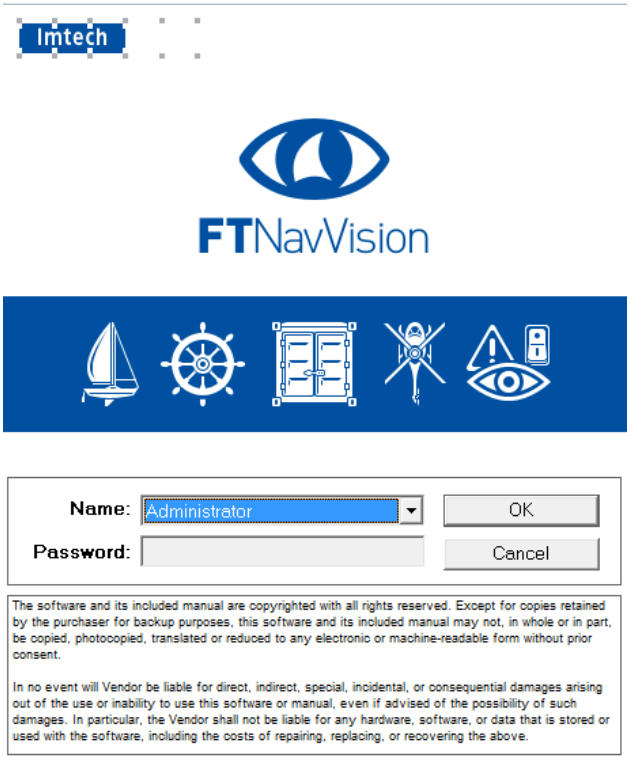


Figure 1-2: User selection

By clicking the drop-down menu “Name”, you can choose which user you want to start. Provide the password if necessary and click “OK”.

1.2.2 Palette

The palette is meant to give a quick selection to change the color settings of the screen. When you click the button, you'll be presented with 4 choices (see Figure 1-3).

Figure 1-3: Palette options

From left to right (beginning top left), there are three predefined buttons: Day, Dusk and Night. These choices give you the right colors and brightness for these specific periods of time. The last one is the palette selection tool. Using this, you can change the colors of the three presets to your liking.

When you change the colors of a preset, be aware that there is no "Default" setting. It might be hard to get the colors back to their old state. This is the reason that this button is disabled in operator mode.

1.2.3 Mimics

When you click the mimic button, you're presented with a grid of mimics available to you. It's possible that you have all the mimics as numbers so you have to choose the right number (see Figure 1-4).
If you know the right number for the mimic you want to see, simply click on the corresponding icon.
Quite often, the only mimic icon that is presented is number one. This is the home mimic. From the home-mimic you can then navigate to other mimics.

If in scope the numbered icons can be changed to a more appropriate setting. Visual representations of the mimic's behaviour can be shown as an icon to make it more intuitive.

Figure 1-4: Mimic menu

1.2.3.1 Mimics

The FT NavVision mimic presentation function provides schematic and graphical overviews of the vessel's systems like navigation lights, electrical, piping and hydraulic overview.
The screens and mimics presentations are automatically updated with live data of the platform components illustrating components and/or system status.
Via these screens and mimic pages, the operator is able to monitor and control the vessel by using the trackball or touch-screen as a pointing device by selecting elements and their associated commands.

1.2.3.2 General

In general, we say that every page that represents a set of values, switches or any other representation of data is a mimic. The mimics within the system are all freely adjustable within the design stage. After the system is delivered, changes can be made by the NavVision engineers, on appointment. Small changes to the mimic can be made by a trained and skilled operator, who is granted some extra rights in the system. This trained crewmember will have the documentation, so we won't discuss the changing of mimics in this manual.

1.2.3.3 Mimic examples

Although the mimics are freely adjustable, the main setup will be greatly alike on your screen. Imtech has defined some rules that the mimics have to live up to. This results in an overall recognizable style of mimics that gives it the modern and stylish look and feel.

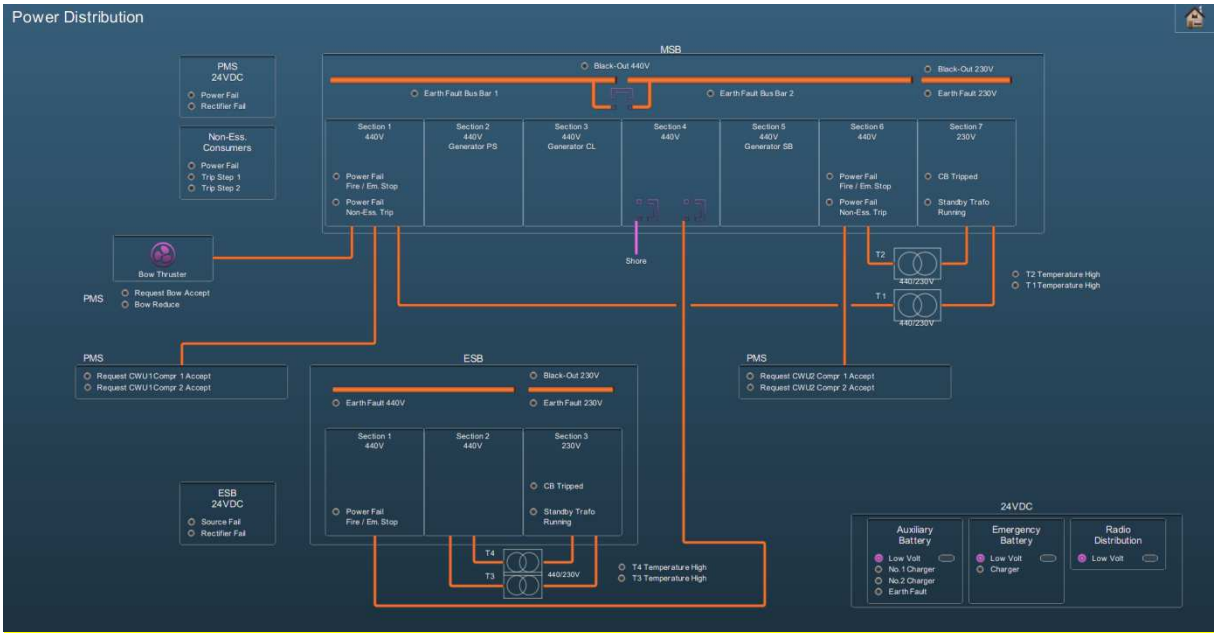


Figure 1-5: Mimic example 1

1.2.3.4 Reading the mimic

Some installations contain a special *legend* mimic. This mimic explains the symbols, variations, colors etc. that you can find in your system's mimics (see Figure 1-6). If there is ever a doubt in what you observe on the mimic you are watching, please refer to this mimic.

Figure 1-6: Legend mimic

Other mimics can show a variety of information. There can be mimics for power distribution, tank volumes (see Figure 1-7), fire alarms and many more. It is also possible that you have a combination of subjects on one mimic. Mimics are perfectly capable of displaying camera feeds or trend graphs.

As a special feature you can show the alarm list or the logbook on (part of) the mimic (see Figure 1-8).

Figure 1-7: Tank mimic

Figure 1-8: Alarm list and logbook in mimic

More extensive explanation on control in a mimic can be found in Annex 1 (See Chapter 6, page 53).

1.2.4 Logbook

During normal operation, all system events are registered chronologically. By clicking the *Logbook* button (see Figure 1-1), these registered system events are displayed in a dedicated screen. It is also possible to show the logbook in any mimic (see Figure 1-8).

1.2.4.1 Logbook groups

In order to separate various categories of information from each other, log entries are stored in various logging-groups. You can select them all or just a few of them, or even one if you need to focus on these entries. Just by selecting the category label at the top of the list, you filter the information you need (see Figure 1-9).

Figure 1-9: logging groups, all selected

Logging group	Explanation
All Alarms	Alarms from all stations (even alarms you might not see on this station will be logged)
Alarms	All alarms from this station (all alarms that are visible on this station will be logged)
Serial	All serial information available on this station will be logged (initializing, finalizing and errors)
Network	All network information available on this station will be logged (Connecting, conn. Failed and errors)
Switching	All system, network and program switching
System	All process information and errors

Table 1-2: Logging groups

1.2.4.2 Logbook appearance

All identical log entries that appear at the same time will be interconnected as shown in the following figure (see Figure 1-10).

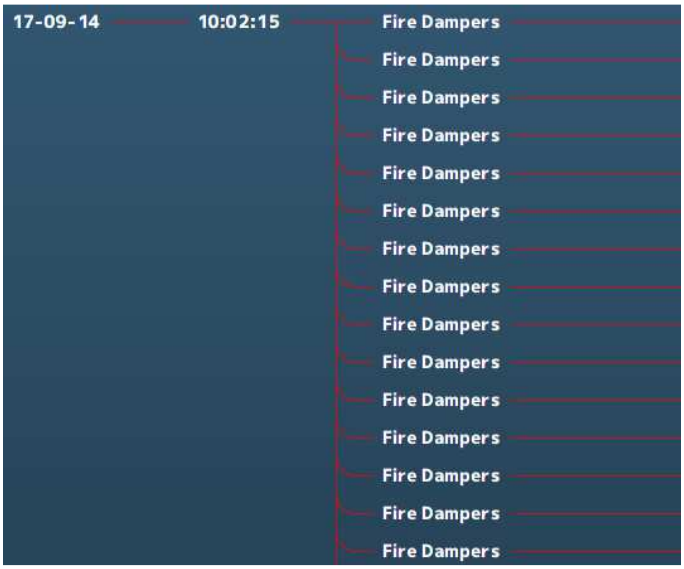


Figure 1-10: interconnecting log appearance

1.2.4.3 Logbook status indication

All entries will have an explanatory status indication at the end of the entry line. This will give an indication about the reason that the indication is in the logbook (see Figure 1-11).

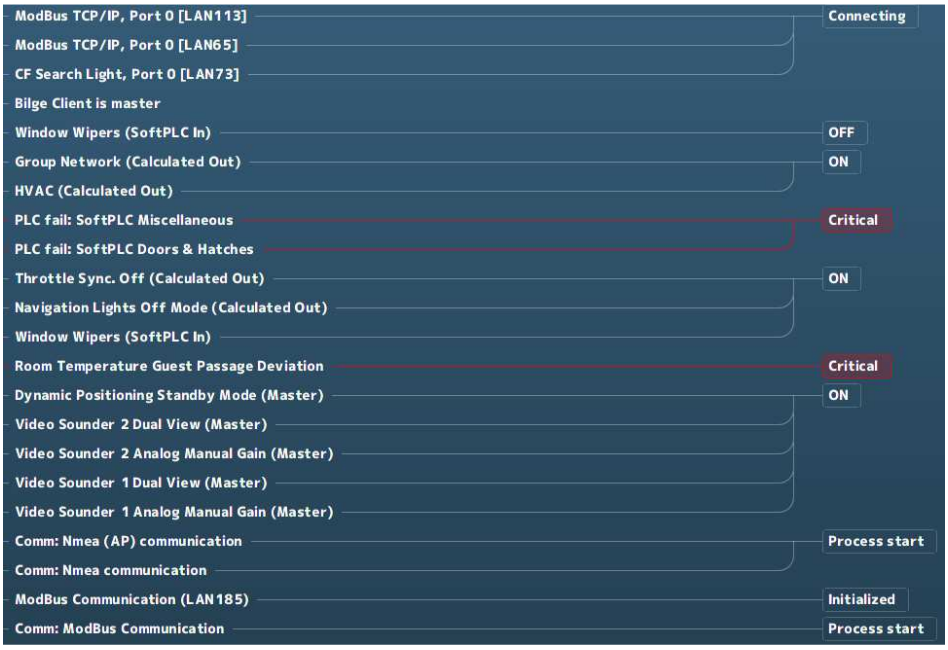


Figure 1-11: Status indication log-entries

When logging alarms, this status indication will also be colored.

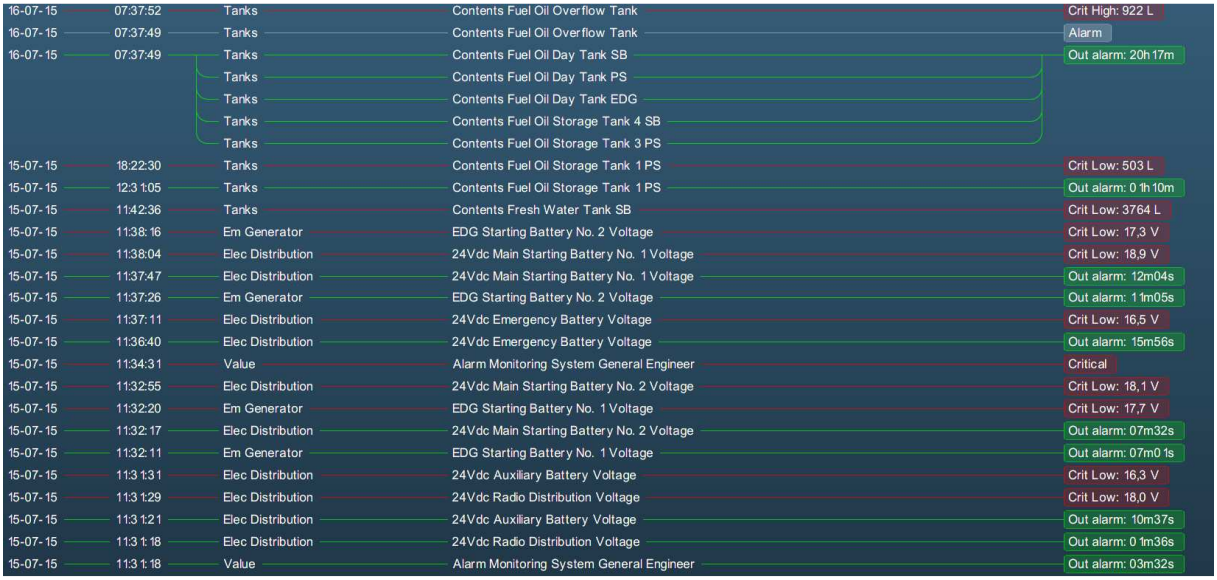


Figure 1-12: Logging colors

Logging colors	Explanation
Grey	Acknowledged
Green	Out of alarm or OK
Yellow	Caution
Orange	Warning
Red	Critical, Slowdown and Shutdown

Table 1-3: Logbook colors

1.2.4.4 Logbook search bar and buttons

At the bottom of the logbook, you will find a search bar and a few buttons (see Figure 1-13). In the search bar, you can click and type the name of the listing you are looking for. After hitting *Enter* the listing is shown, if available.

Figure 1-13: Logbook search bar and buttons

If you click on the “From:” or “To:” on the search bar, a new window will appear (see Figure 1-14). This window is a fully working calendar from which you can choose a “From” or “To”

date. After you have entered the date and pressed the checkmark, the entries that occurred in the entered timeframe are shown.

Figure 1-14: Search calendar

Figure 1-15: Print button

Figure 1-16: Up- down buttons

If you click the *Print* button, you can print the logbook (if a printer is available). With the *Up* & *Down* buttons you can scroll to the top, up or down.

1.2.5 Group viewer

The *Group Viewer* is the place within FT NavVision that holds the necessary information about all connected I/O. In this window, you can find a descriptive line for all the sensors with their connections and dependencies (see Figure 1-17).

Group	Field	Value	Unity	Alarm	Status	I/O Source	Mimic	I/O Location
Engine	Engine Auxillar Switch 01	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 02	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 03	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 04	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 05	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 06	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 07	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 08	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 09	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 10	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 11	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 12	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 13	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 14	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 15	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 16	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 17	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 18	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 19	Off	Switch	---	Manual	Simulated		
Engine	Engine Auxillar Switch 20	Off	Switch	---	Manual	Simulated		
Engine	Engine Battery Discharge	Off	Switch	---	Manual	Simulated		
Engine	Engine Block Heater	Off	Switch	---	Manual	Simulated		
Engine	Engine Coolant Level Switch	Off	Switch	---	Manual	Simulated		
Engine	Engine Coolant Pump	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 1	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 2	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 3	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 4	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 5	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 6	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 7	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 8	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 9	Off	Switch	---	Manual	Simulated		
Engine	Engine Cylinder Knock 10	Off	Switch	---	Manual	Simulated		
Engine	Engine DP Mode	Off	Switch	---	Manual	Simulated		
Engine	Engine ECU Active	Off	Switch	---	Manual	Simulated		

Figure 1-17: Group viewer

There are various columns that each list a specific piece of metadata of an I/O point in clear language or digits and colors.

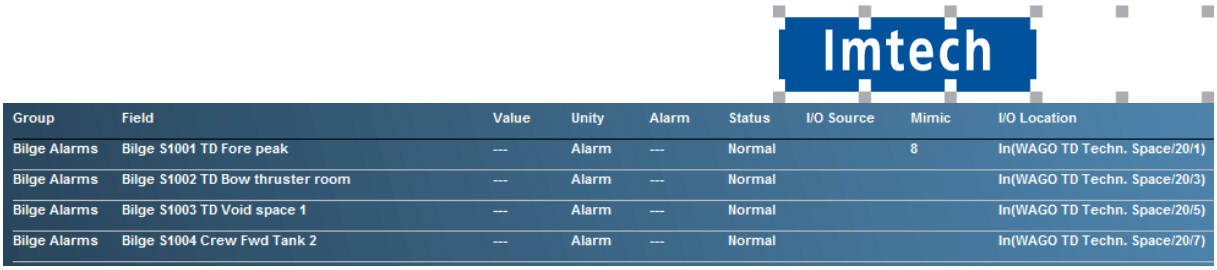


Figure 1-18: Group Viewer columns

Column	Explanation
Group	The alarm group the I/O point belongs to
Field	The item name of the I/O point (FT NavVision ID-tag)
Value	Actual value of the I/O point
Unity	The Unity of the I/O point
Alarm	Shows if the I/O point is in alarm and the value of the alarm
Status	Status of the I/O point
I/O Source	The source (interface) the I/O point comes from
Mimic	The mimic(s) the I/O point value is present
I/O Location	The location where you can find the I/O point physically

Table 1-4: Group Viewer columns

1.2.5.1 The search bar

Using the search bar, you can reduce the amount of searchable data to a specified group. This way it is easier to pinpoint the faulty I/O point you are looking for (see Figure 1-19).

Figure 1-19: Search bar

In the first drop-down menu, you can choose between *Categories* and *Alarm Groups* in which you change between the standard arrangement of categories as set in FT NavVision or the division in alarm groups.

When choosing for *Alarm Groups,* you have the choice to narrow the selection down even further to the specific alarm group that you are looking for (see Figure 1-20).

When you choose for the *Categories*, you can narrow it down to the group and even subgroup for that particular I/O point (see Figure 1-21 and Figure 1-22).

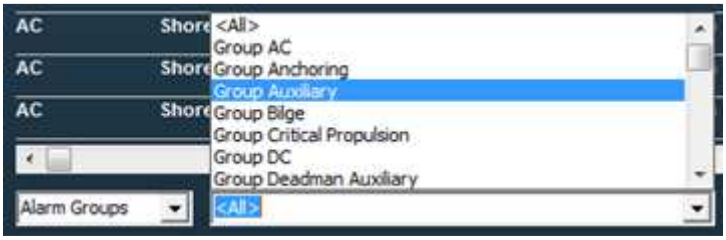


Figure 1-20: Alarm groups

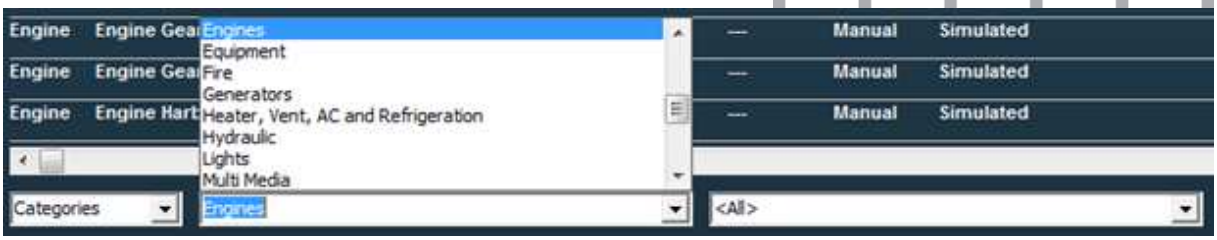


Figure 1-21: Categories group

Figure 1-22: Categories subgroup

If there is an I/O point currently in alarm status, it will give information on the fact that it is in alarm (red) and what its status is (see Figure 1-23). Also the mimic it is presented on and the I/O location can be read from the group viewer (see Figure 1-24).

Figure 1-23: Group viewer in alarm

Figure 1-24: Group viewer mimic and I/O location

1.2.6 Settings

The settings Icon is not applicable to the operator. There is nothing in this submenu that may be adjusted by an operator.

1.2.7 Alarm Mimic

The *alarm mimic* is the central place where all relevant alarms are shown in clear and unambiguous language and coloring. The smaller *Alarm area* in the taskbar will always be available and visible. Here, each alarm will be shown immediately. When you click the area, the larger Alarm mimic is shown (see Figure 1-25).

The Alarm mimic will always be on top of all the other windows, so if you want to look at other mimics, you will need to close the alarm mimic first.

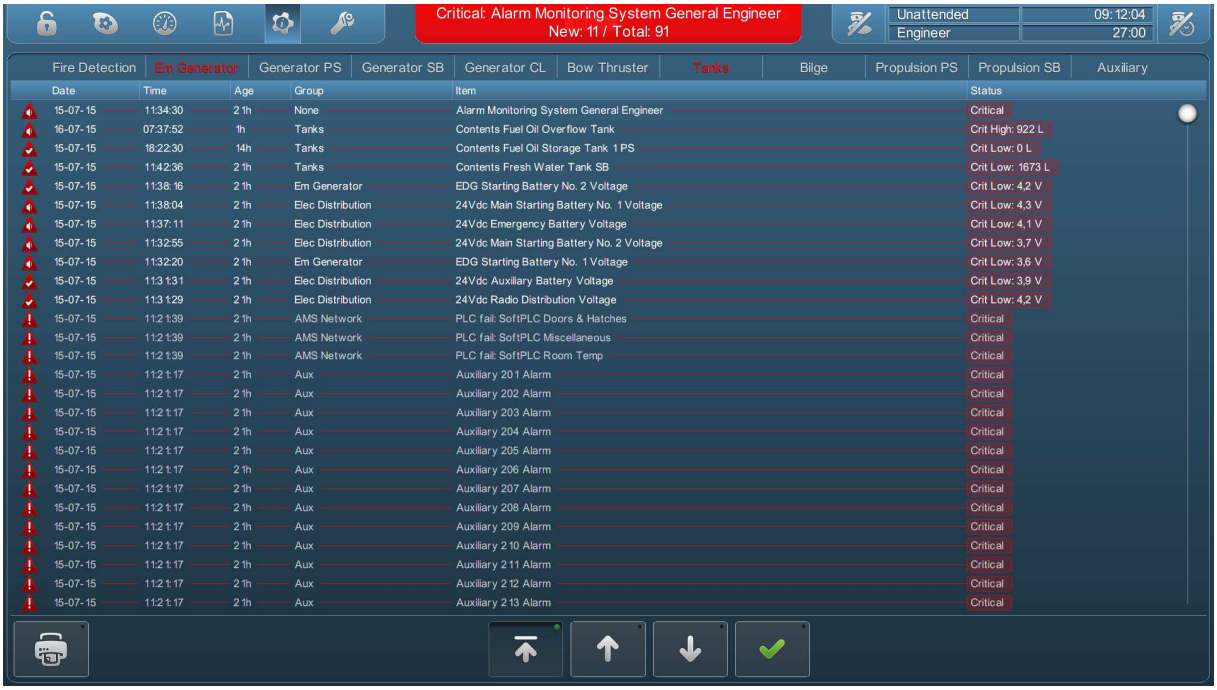


Figure 1-25: Alarm mimic

Depending on which rights your station has, more or less buttons and/or alarm-information are shown.

The order will always be as follows:

- Critical alarms
- Warnings
- Cautions
- Time of appearance

So the latest *critical alarm* will always be on top. The latest *warning* will always be on top, after all *critical alarms.* Similarly, the latest *caution* will always be on top after all *critical alarms* and/or *warnings*.

In the engineering phase it is possible to set the alarm sequence to chronological.

When clicking once on an alarm line a pop-up will appear (see Figure 1-26). This pop-up will give you direct the most relevant information on that particular alarm such as ID, CableNumber, Device etc. This way it is easier for the operator to pinpoint the location of the alarm. Another click will make the pop-up disappear.

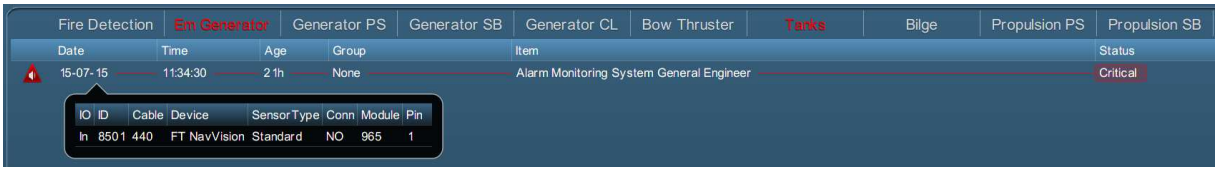


Figure 1-26: Alarm list pop-up

1.2.7.1 Alarm icons

The alarm icons have distinctive colors and symbols, so you can see exactly what is going on with each alarm. A brief explanation of each icon is shown in the following table.

Icon	Explanation
	Critical alarm: Unacknowledged
	Critical alarm: Silenced
	Critical alarm: Acknowledge not allowed
	Critical alarm: Acknowledged
	Critical alarm: Rectified
	Critical alarm: Transferred
	Warning: Unacknowledged
	Warning: Silenced

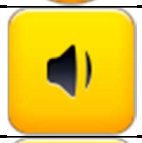
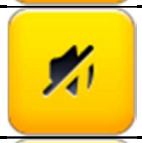
	Warning: Acknowledge not allowed
	Warning: Acknowledged
	Warning: Rectified
	Warning: Transferred
	Caution: Unacknowledged
	Caution: Silenced
	Caution: Acknowledge not allowed
	Caution: Acknowledged
	Caution: Rectified
	Caution: Transferred

Table 1-5: Alarm Icons

The bottom of the alarm mimic houses buttons for printing and scrolling.

Figure 1-27: Print button

Figure 1-28: Up- down buttons

Upon clicking the *Print* button, you can print the alarm list (if a printer is available). With the *Up/Down* buttons you can scroll up, down or jump to the top of the list.

The rest of the Alarm mimic will be explained in Chapter 2 (Duty Alarm System) and in chapter 3 (Personnel Alarm).

2. Alarm System

2.1 Introduction

The alarm system provides clear and unambiguous representation of all the alarms that take place at a certain time and present that on any screen that has the rights to show that alarm. There is a difference between the alarm system and the Duty alarm system. The alarm system shows all the alarms to all the stations with the specific rights. The Duty alarm system divides the (machinery) alarms to a station “on duty” in case of an unmanned machinery space.

2.2 Alarm handling

Alarm handling is determined in a set of international rules by standardization organisations. These rules are visualized in Figure 2-1.

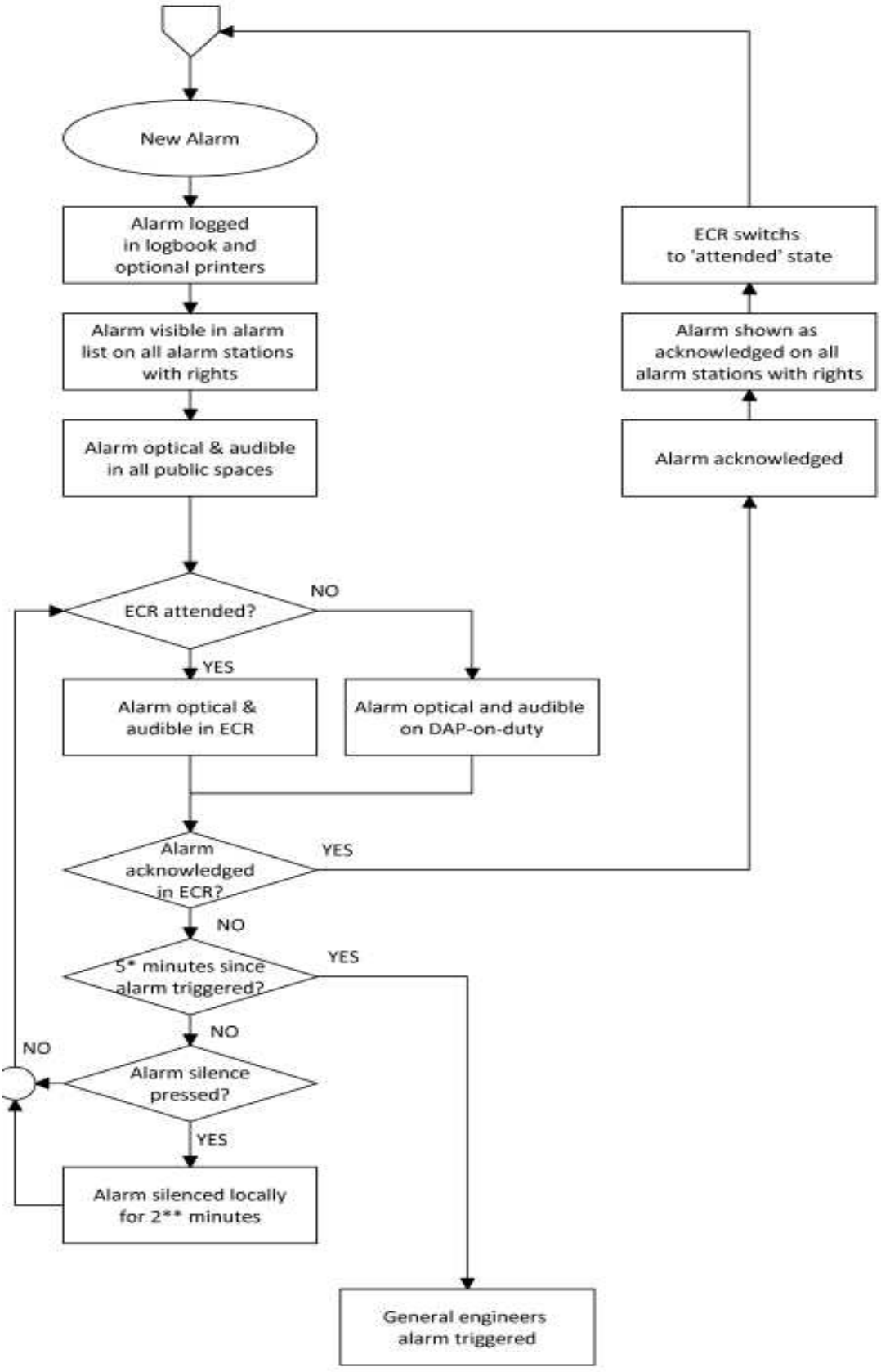


Figure 2-1: typical alarm sequence

2.3 Alarm handling in the alarm mimic

As shown in Figure 1-25, all cautions, warnings and critical alarms will be shown in the taskbar and, more extensively, in the main window of the Alarm mimic. In *Table 1-5: Alarm Icons,* you will find the explanation of the various alarm icons and their meaning.

When you look further at the alarm mimic, you'll notice more values and buttons. The row just above the alarm window (see Figure 2-2), is the *alarm group row*. Depending on the alarm groups set here at initialisation of the system, you can see in which groups the alarms on the alarm page reside.

Figure 2-2: Alarm group row

When even a single alarm within a group is active, the group label will turn red. This way you can see quickly in which group there are alarms.

When you click on this specific group label, the alarm mimic will be filtered to show only the specific alarms in that group. This will come in handy when you have a lot of alarms on the screen. After 10 seconds it will revert to the complete alarm list.

When you want to silence or acknowledge an alarm, you can double click on the alarm entry. Depending on the rights your station has, double-clicking will either silence, acknowledge or do nothing with the entry. Alternatively, you can click the silence/acknowledge-button (see Figure 2-3) to silence/acknowledge all visible alarms in the alarm mimic. Depending on how many alarms you have, you will need to click one or more times to do this for all the alarms as this action only applies to the alarms currently visible on the screen.

Figure 2-3: silence/acknowledge-button

2.3.1 Explanation of alarm rights

During commissioning of the system, all stations will be set to their respective alarm station names with the distinctive rights set accordingly. Class demands that the only place where an alarm may be acknowledged is the space where you can act upon the alarm directly. This usually means that 99 percent of the alarms can only be acknowledged in either the engine room (ER) or the engine control room (ECR). For the other stations, the rules state that the alarms (if shown) can only be silenced. This means that the alarm stays unrectified and unacknowledged and only the buzzer will be silenced (at most for 3 minutes).

If you are unable to acknowledge or silence alarms, you probably don't have the rights.

2.4 Duty alarm system

The *Duty Alarm System* provides (machinery) alarms to bridge, cabins and public areas for an unattended (unmanned) machinery space. The duty alarm system is configured upfront.

Duty Alarm Panels (DAP's, see Figure 2-5) at specific locations are connected with the automation system via the LAN-network. They display the information for machinery alarms and settings such as alarm group status, operation status, and on-duty selection.

The duty alarm system provides for signaling of Engine Control Room (ECR) to the cabins and bridge by a *Duty Alarm Panel* (DAP) or on a *Local Operator Panel* (LOP).

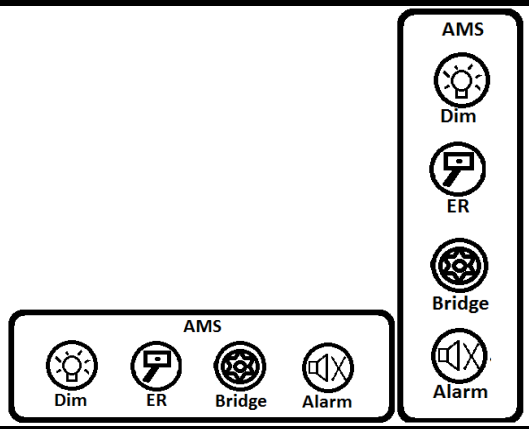
An engineer on duty can be selected from the *Operator Workstation* (OWS). He will be warned when an critical alarm is present in the unmanned engine room.

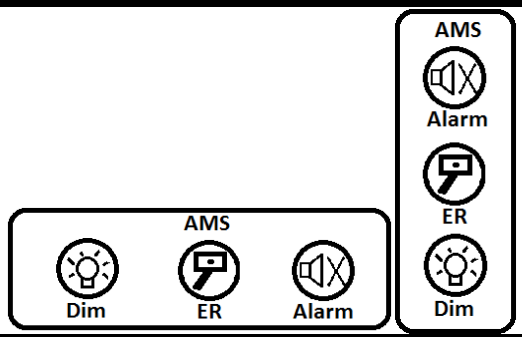
An engineer can be called on duty from the ECR on the OWS. Each station has its own caller identification.

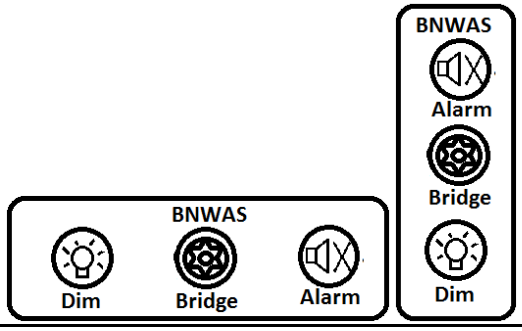
When no DAP is used, the duty alarm system can be implemented with small or larger hardware panels as shown in the following figures:

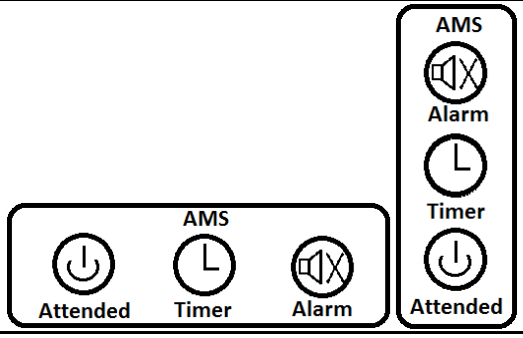
Figure 2-4: typical Alarm panels

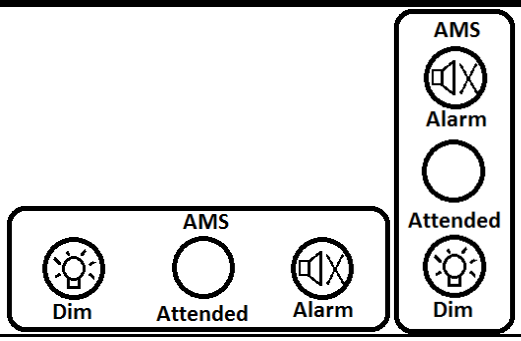
These panels come in the following editions, with their own respective operation.

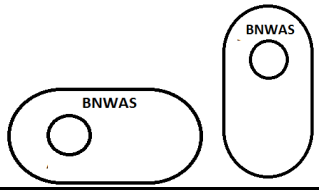
Panel horizontal-vertical	
	
Location of use:	Crew cabins that can be selected for Bridge duty as well as for ER duty

Panel horizontal-vertical	
	
Location of use:	Crew cabins that can be selected for ER duty

Panel horizontal-vertical	
	
Location of use:	Crew cabins that can be selected for bridge duty

Panel horizontal-vertical	
	
Location of use:	At each entrance door of the ER, or in the ECR

Panel horizontal-vertical	
	
Location of use:	Main or secondary bridge

Panel horizontal-vertical	
	
Location of use:	All spaces where Bridge duty crew can be available (no duty select)

Button	Explanation
	Dim the button LED's of that panel Illuminates when panel is active
	Silence the alarm Illuminates when an alarm is active
	No push activity Illuminates when ER duty
	No push activity Illuminates when Bridge duty
	Press for attended/unattended mode Illuminates when attended
	No push activity Illuminates when timer is active

Table 2-1: Alarm panel buttons

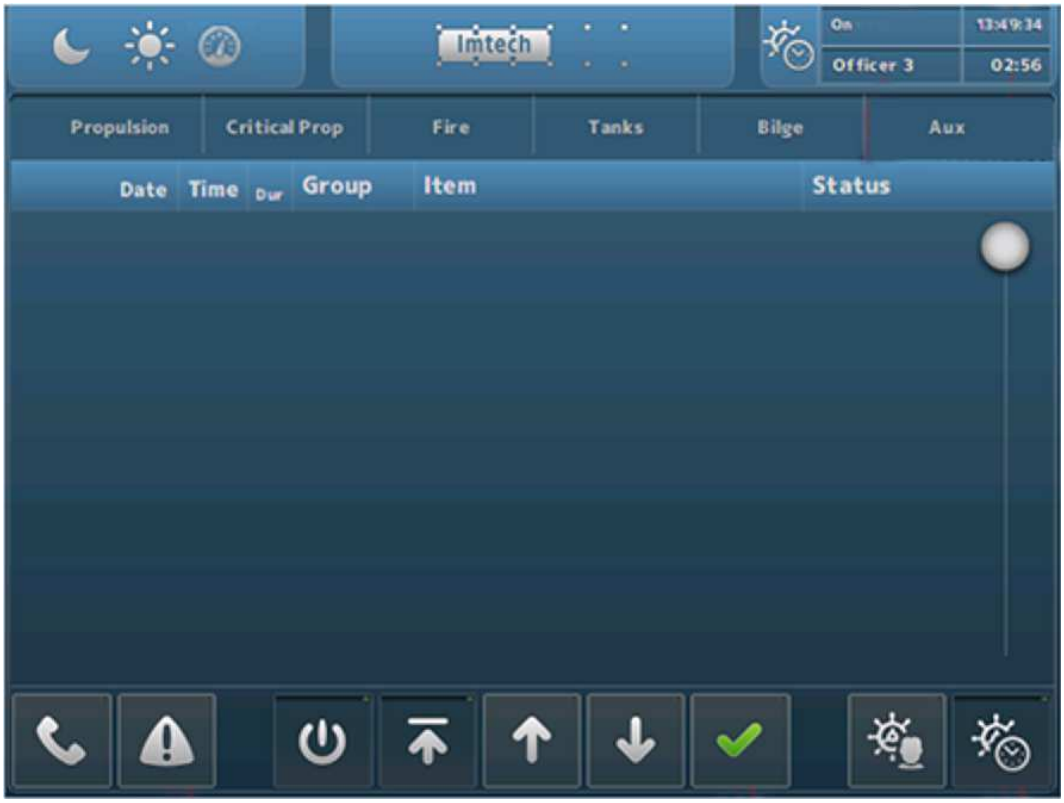


Figure 2-5: Typical DAP screen

2.4.1 Extra buttons alarm mimic

Depending if the station is set as a specific alarm station, some extra buttons will appear at the bottom of the alarm mimic. When the OWS is set-up as a bridge station, the icons as shown in Figure 2-6 will appear. When the OWS is set-up as an ER station, the icons as shown in Figure 2-7 will appear.

Figure 2-6: Bridge set-up icons

Figure 2-7: ER set-up icons

The meaning and handling of these icons are explained in the following table.

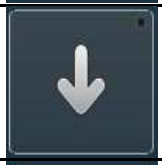
Button	Explanation
	Press to print (part of) the alarm list
	Press and select space or crewmember to call
	Switch station On/Off (when applicable)
	Scroll to top
	Scroll up
	Scroll down
	Acknowledge or silence alarms
	Select crew for Bridge duty
	Switch BNWAS On/Off
	Select crew for ER duty
	Switch personnel alarm On/Off

Table 2-2: Alarm mimic set-up icons

The *Call* and *Duty Select* buttons have some additional choices, depending on who you can call or who you can select for duty. This will be configured upfront and will look as in Figure 2-8 and Figure 2-9. First select the *Call* or *Duty Select* button and then choose from the following menu.

Figure 2-8: Call function

Figure 2-9: Duty select function

Additionally, you can see the station that is calling you on the main screen (while hearing a buzzer tone if available). You can click on the message to make it disappear (see Figure 2-10).

The person that is on duty will be visible on all stations in the right upper corner of the screen.

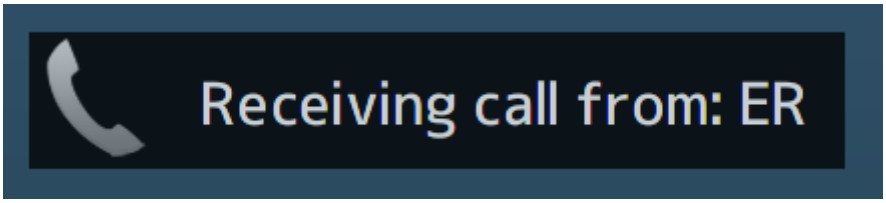


Figure 2-10: receiving call message

Finally in the upper right corner of the alarm mimic some crew and time information will be shown (see Figure 2-11). Here you can see if the ER is attended or unattended, who is on duty, the time and the timer (remaining time) from either the ER Personnel alarm or the BNWAS alarm.

The left button is the reset button for the timer. The right button is the same as the button *Switch station On/Off*.

Figure 2-11: Crew information

2.4.2 Duty alarm principal

The duty alarm system is used for the transfer of alarms to the technical crew in case of an unattended machinery space. The duty alarm system will be configured from a particular OWS. The duty alarm system provides unambiguous audio visual annunciation of alarms and warnings via a dedicated banner located at the top of the alarm panel screen.
A watch and call system extends the central alarm system to engineers' cabins and public areas when machinery spaces/control rooms are unattended.

2.4.3 Alarm types

2.4.3.1 Alarm detection for analogue signals

The following functions are included:

- Instrument failure alarms
- Low-low process alarms with or without action (slow-down)
- Low process alarms
- High process alarms
- High-high process alarms with or without action (slow-down)
- Return to normal detection with dead-band to avoid alarm fluctuations
- Adjustable filter factors to filter fluctuations in the incoming signals
- Time delay of alarm triggering and return to normal messages.

2.4.3.2 Alarm detection for on/off (two state) signals

The following functions are included:

- High process alarms
- Return to normal detection
- Time delay of alarm triggering and return to normal messages.

2.4.3.3 Alarm detection for on/off signals with line check

The following functions are included:

- High process alarms (open or closed)
- Line broken alarm
- Line short alarm
- Return to normal detection
- Time delay of alarm triggering and return to normal messages.

2.4.4 Attended alarm mode

NavVision will transfer the alarm to the activated location.
In case of an attended or manned machinery space this location will be the:

- Engine Control Room (ECR)
- Accommodations (e.g. mess room and public areas).

2.4.5 Unattended alarm mode

In case the machinery space is left “unmanned”, alarms that will come in will be redirected immediately to the selected Duty Alarm Panel.

The “Unattended” mode can be activated on the workstation in de ER or the ECR.

NavVision will direct the alarm to the activated location.
In case of an unattended or unmanned machinery space this will be:

- The engineer on-duty
- Engine Control Room (ECR)
- Accommodations (e.g. mess room and public areas).

New alarms are indicated respectively on the DAP of the engineer on duty in the ER and in public spaces such as the mess room. On the panels, the alarm sounding (horn/buzzer) can be silenced (only local), but the alarms still need to be acknowledged on the OWS within the relevant technical area.

If alarms are not acknowledged within a specific period of time, the *General Engineers Alarm* (GEA) is invoked, independent from the *Attended/Unattended* mode. Once the GEA goes off, the alarm will sound on all alarm stations

2.4.6 How to acknowledge an alarm

The alarms must be acknowledged on the OWS in the Engine (Control) Room by means of:

- Double clicking the corresponding alarm line (alarm viewer)
- Click the Silence/Acknowledge button

2.4.7 How to silence an alarm (not at ECR)

You can silence an alarm on all other locations (except GEA and Fire alarms).
This will silence the local alarm buzzer for 3 minutes, but will not acknowledge the alarm.
The engineer is required to go to the Engine (Control) Room to acknowledge the alarm.

2.4.8 When will an alarm disappear

An alarm will disappear only when rectified AND acknowledged. Acknowledged alarms will show in the normal instrument colour.

3. Personnel alarm

3.1 Engineer Deadman

3.1.1 Scope

The purpose of an Engineer Deadman System is to monitor engine room activity and detect engineer disability which could lead to marine accidents. The system monitors the awareness of the *engineer on duty* and automatically alerts another qualified engineer if for any reason the engineer on duty becomes incapable of performing his duties. This purpose is achieved by a series of indications and alarms to alert first the engineer on duty and, if he does not respond, then to alert another qualified engineer by means of a general alarm.

Additionally, the Engineer Deadman System may provide the engineer on duty with a means of calling for immediate assistance if required. The Engineer Deadman System should be operational whenever the engine room is attended and/or manned, unless inhibited by the Chief Engineer.

3.1.2 The Engineer Deadman System incorporates the following operational modes:

- Manual ON (In operation when engine room is attended)
- Manual OFF (Does not operate under any circumstances)

The Deadman timer can only be switched on or off by inserting a password. This to prevent illicit usage of the Deadman timer (see Figure 3-1). Fill in the password and press enter, or the green checkmark to engage. The red "X" is to return.

Figure 3-1: Password entrance panel

3.1.3 Operational State

Once operational, the alarm system remains dormant for a period of 30 minutes. At the end of this dormant period, the alarm system initiates a visual and audible indication on the AMS.

3.1.4 Reset function

It is not possible to initiate the reset function or cancel any audible alarm from any device, equipment or system not physically located in areas of the engine room or ECR (local silence is allowed).

The reset function is only available in positions in the engine room and ECR. The reset function is easily accessible from the anywhere in the engine room.

The reset function cancels the visual indication and all audible alarms and initiates a further dormant period. If the reset function is activated before the end of the dormant period, the period should be re-initiated to run for its full duration from the time of the reset.

A continuous activation of any reset device triggers the emergency call facility within 3 seconds.

3.1.5 Emergency call facility

Means are provided in the engine room to immediately activate the visual and audible alarm by means of an Emergency Call push button or similar. Holding any reset button for at least 3 seconds also triggers the emergency call facility.

3.2 BNWAS

The BNWAS (Bridge Navigational Watch Alarm System) is a similar personal safety system, designed for use on the bridge.

3.2.1 Introduction

It is possible that you use the BNWAS as a standalone version, but it can also be used in conjunction with the UniMACS bridge. It can even be used with other bridge systems as long as these systems give the standard EVE-messages.

In this manual, we will address both ways in the same explanation since their differences are mainly HMI-related and do not affect functionality.
When we discuss the interface of the BNWAS system, it can be the interface on the standalone BNWAS or on the integrated BNWAS. It can be the interface on the bridge-panel, but also the interface on the panel in the captain's cabin. What follows is an integral explanation of the BNWAS functionality.

3.2.2 The HMI overview

The HMI consists of a main screen that holds all functionality for the BNWAS and a setup-screen that can be used to enter the necessary settings. In the following figures, we will explain the functionality and functions on the HMI.

Figure 3-2: Main BNWAS HMI

3.2.3 The HMI explained

The functions of the HMI are described in the following figures. These are mostly self-explanatory. Where not explicitly clear, an additional explanation is given.

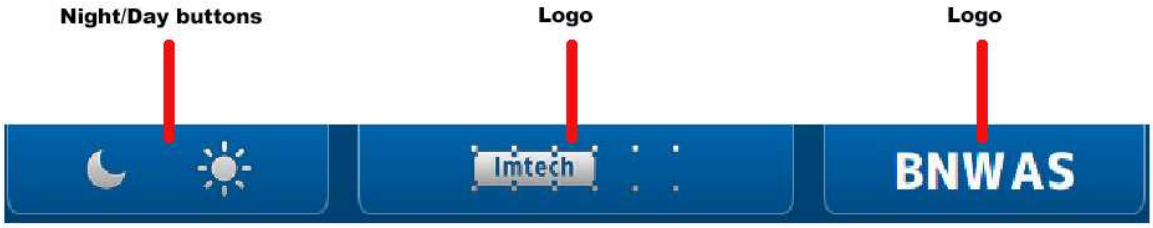


Figure 3-3: HMI top bar

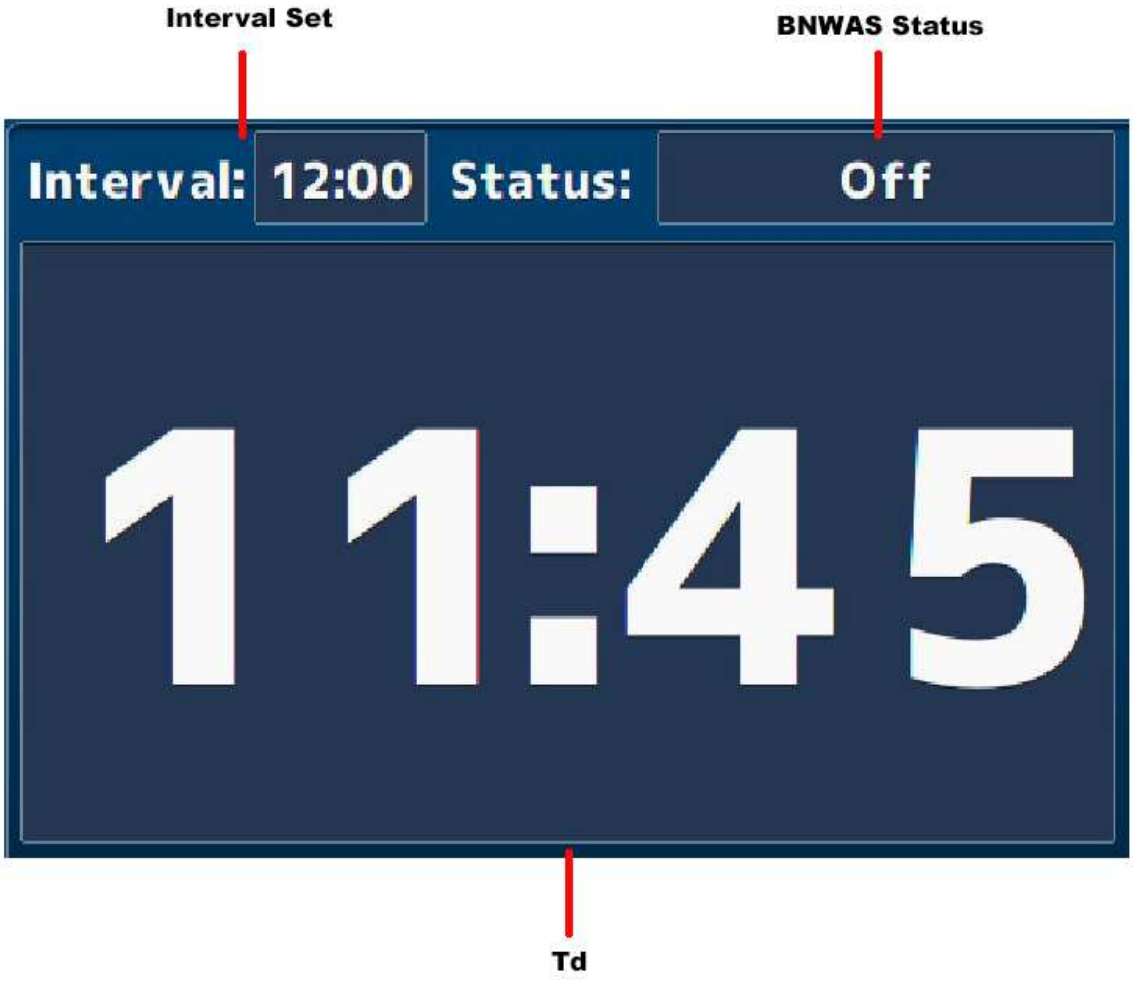


Figure 3-4: HMI main screen

Figure 3-5: HMI bottom bar

The reset timer and emergency call buttons are only available when the panel is placed on the bridge. Any other location will show these buttons, but they will not be operational.

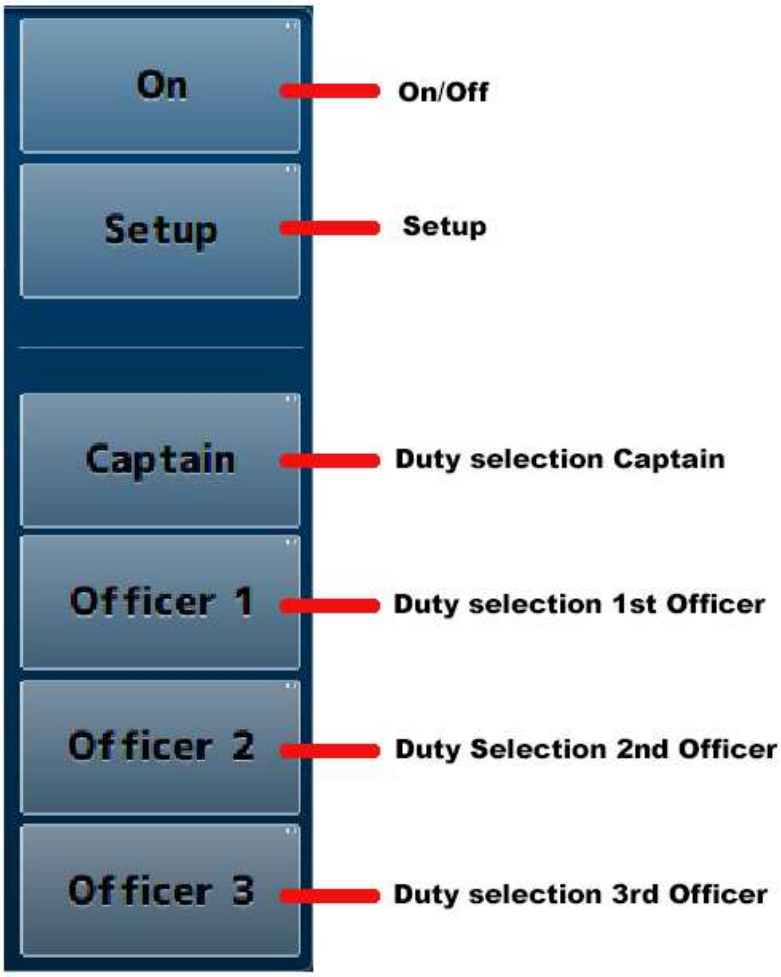


Figure 3-6: HMI Panel

When you operate the On/Off *or* Setup *button a keypad will appear where you have to type a passcode. (See* Figure 3-8*).*

3.2.4 The setup page

By clicking on the setup button a new screen will appear. This is the setup screen. It looks quite the same as the main window as it has only a few settings in the main panel (see Figure 3-9).

Figure 3-7: Setup screen

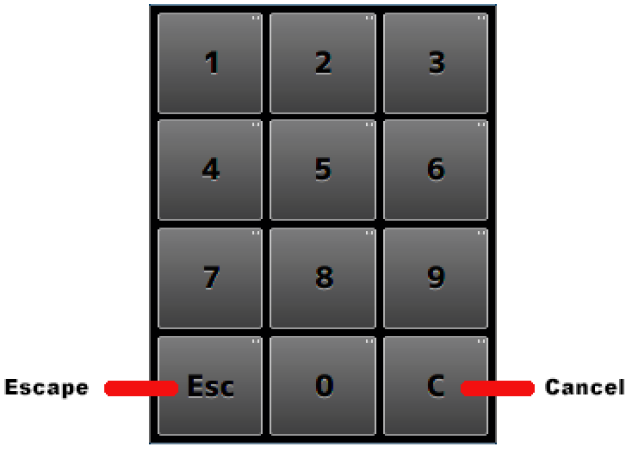


Figure 3-8: Keypad

The functions, with their respective explanation, are shown in the following figure.

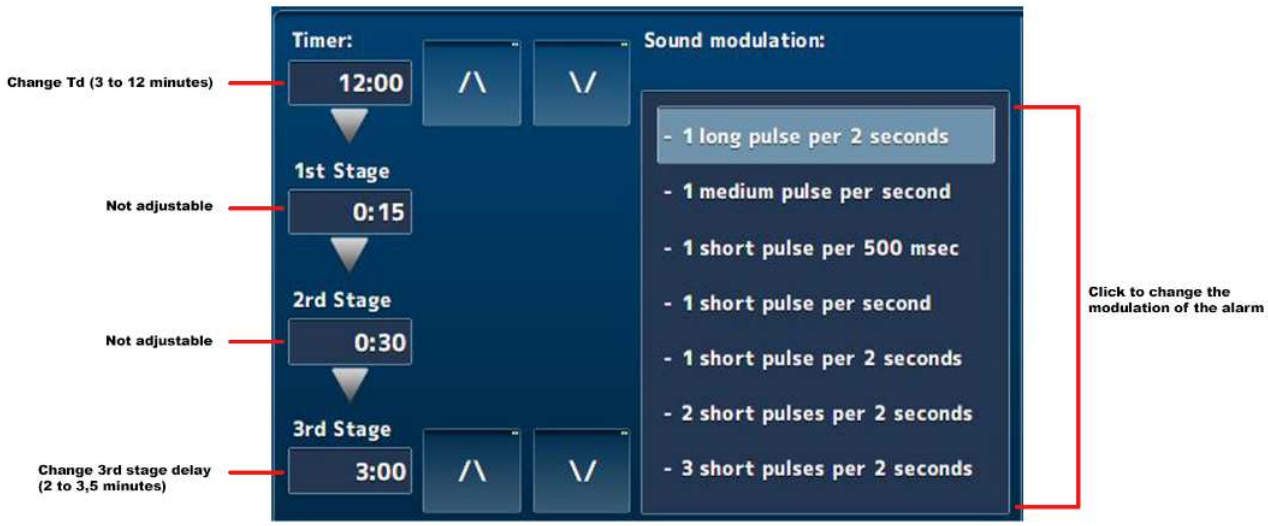


Figure 3-9: Setup main screen

With the arrow buttons in the setup page, you can increase or decrease the Td and/or 3rd stage delay time.

Once a working NavVision server is connected to the same system, the HMI of NavVision will be overwritten on the DAP's. It is just the HMI. The BNWAS will still be the one that handles all the BNWAS features.

It will look as in the following figure:

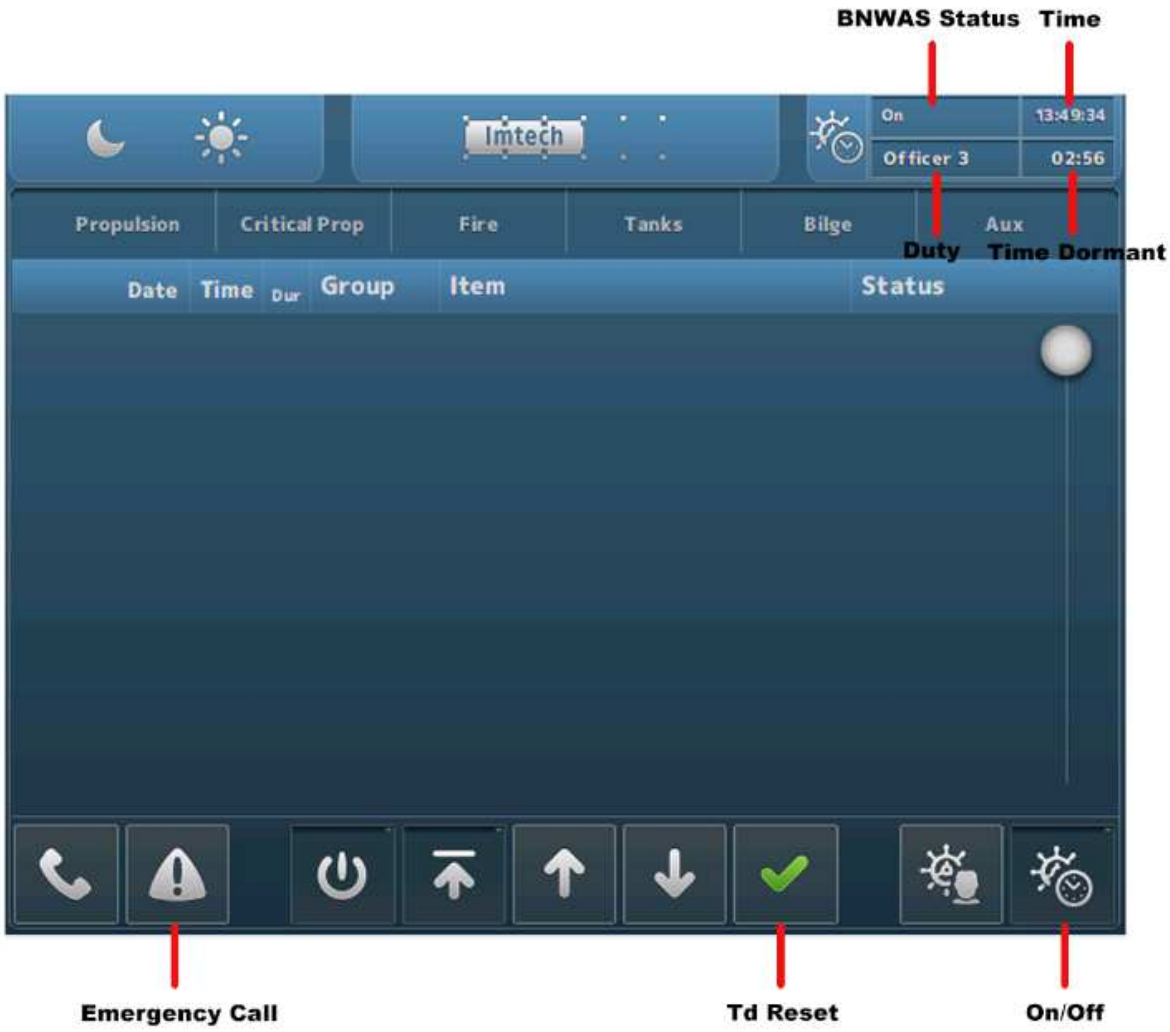


Figure 3-10: NavVision HMI on DAP

On the NavVision server, you will have an equal kind of display as shown in the following figure.

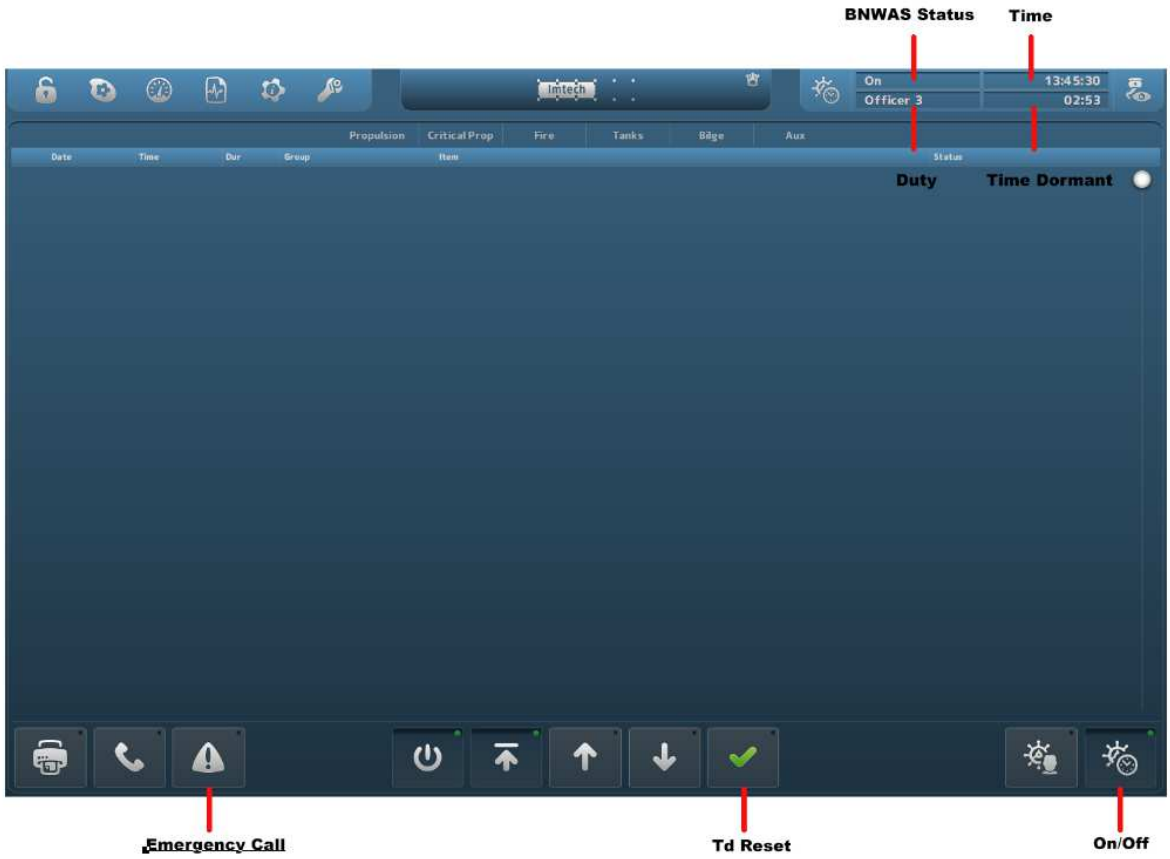


Figure 3-11: NavVision Native screen

4. Annex 1 Mimic control

Control elements are used to interface a wide range of *Control* devices like pumps, fans, valves, generators, etc. via their relevant starter unit. Since these element types are suitable to process a wide range of components, several symbols are defined to represent each type. Color animation is used to show the actual element status.
Chevrons, a single filled chevron (arrow) for low - and a double filled chevron (arrow) for high speed, show the difference between a control element running at high speed and a control element running at low speed. Chevrons without filling indicate an off condition.

4.1 Mimic components

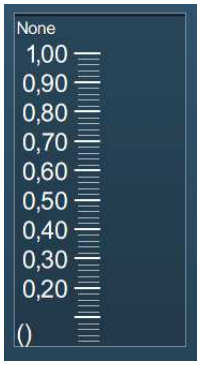
The mimic contains a lot of components which, together, make up for the representation of the ship or a specific system on the ship. Components can be some of the following different forms:

Label

Icon

Value

Button



Horizontal Level

Vertical Level

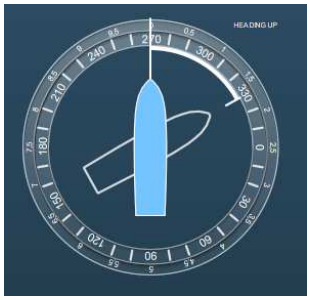
Small Graph

Slider Control

Instrument

Indicator

Propulsion



DP View

Joystick

Propulsion

All values shown in a value box, A graph or a bar will alter in color depending on the state they are in. So with warnings it will turn amber and with critical alarms it will turn red.

4.2 Component behaviour

Each component can have its own behaviour. Sometimes it is just representing a value and sometimes there is some extra functionality available. The following examples will give you an idea of some of the possibilities.

Figure 4-1: Pop-up balloon

When you double-click on a value, a balloon will pop up with some additional information (see Figure 4-1).

Figure 4-2: control doughnut

When you click on items that you can control, a radial menu will appear. Depending on the element and its settings, you can control different aspects of the item (see Figure 4-2). For the control elements, see Table 4-1, Table 4-3, Table 4-4 and Table 4-5.

Figure 4-3: Vertical bar with alarm lines

In the vertical bars (often used for tanks) you can see the warning and critical alarm levels. The critical alarm levels (red) are not changeable since these are mandated by class. The warnings (orange) can be changed by dragging the lines with your mouse on the little dot at the end of the line. This way, you can use it for example when filling a tank. You get a warning (visual and audible) when the warning line is crossed.

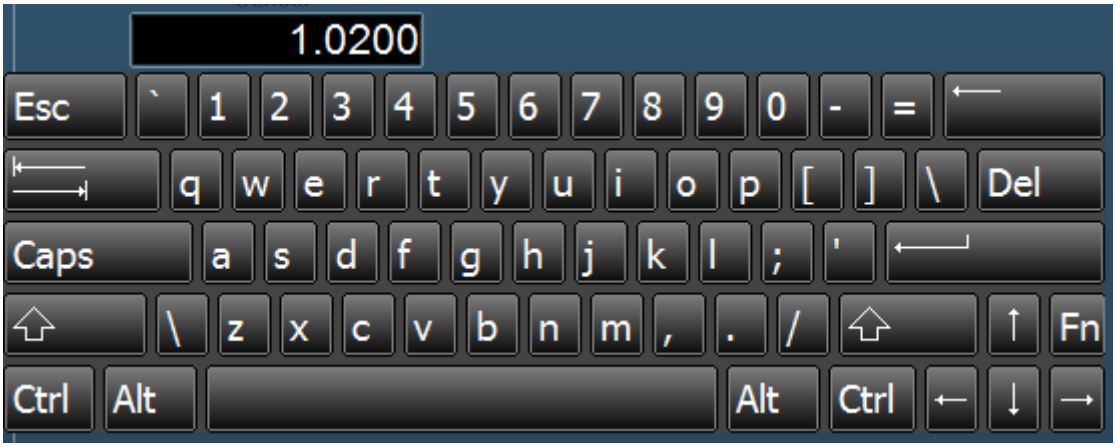


Figure 4-4: Edit keyboard

When you have an *edit-enabled* value, you can click on it and a keyboard will appear (see Figure 4-4). You can fill in an amount and press enter to change the desired value. It will not be possible to change it beyond the min/max values.

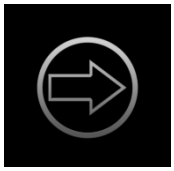
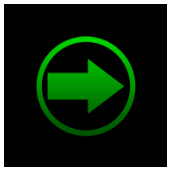
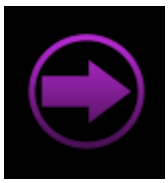
Status	Control element	Symbol
Operable in two speeds, system off	Double chevron (no fill)	
Operable in two speeds, system running at low speed	Double chevron (single chevron filled)	
Operable in two speeds, system running at high speed	Double chevron (double chevron filled)	
Operation is disabled (local control only or controlled by other OPC)	Padlock	
Manual operation (controlled remotely)	Hand	

Automatic operation (controlled by ACS)	Chip	

Table 4-1: Control element status

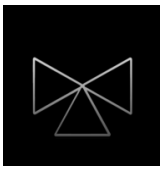
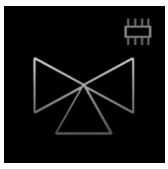
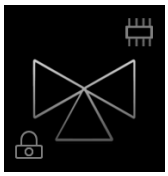
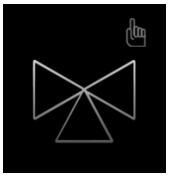
Colour	Description
Grey	Control element off (stopped), device is ok
Green	Control element on (running), device is ok
Orange	Control element in warning condition
Purple	Control element defective
Red	Control element in alarm condition

Pump and generator control elements

Centrifugal pump	Piston pump	Generator	Status description
			Off
			On (condition ok)
			On, warning condition
			On, defective condition

			On, critical condition

Table 4-2: Control elements and color animation

3-way valve OFF	Status description	3-way valve ON	Status description
	3-Way valve off (status indication only)		3-Way valve on (status indication only)
	3-Way valve off, auto (control by AMCS)		3-Way valve on, auto (control by AMCS)
	3-Way valve off, auto (local control)		3-Way valve on, auto (local control)
	3-Way valve off (local control)		3-Way valve on (local control)
	3-Way valve off, manual (controlled by AMCS)		3-Way valve on, manual (controlled by AMCS)

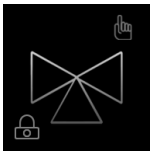
	3-Way valve off, manual (local control)		3-Way valve on, manual (local control)

Table 4-3: Control elements with status indication

	Centrifugal pump on, operable in two speeds, system off
	Centrifugal pump on, operable in two speeds, pump running at low speed
	Centrifugal pump on, operable in two speeds, pump running at high speed

Table 4-4: Control elements with speed indication

		Fan off & on
		2-way valve off & on

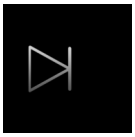
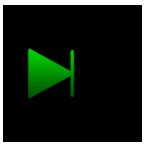
		Check valve off & on

Table 4-5: Other control elements

5. Part 2: Extra settings for (Commissioning) Engineer

5.1 General

Under Settings you will find all the tabs that you can use to configure and fine-tune the NavVision system. These settings need to be done by the engineering department. Also commissioning engineers need to know how to work with these settings.

5.2 Users

The tab “Users” features all the adjustments to set up different access control for different users. The main reason for user access control is protecting the system. By limiting the user changing the configuration settings etc. the chance of disturbing system operation is limited as well.
Basically only three users are available. Administrator is the user status for Engineers of Imtech and its representatives. This login has all the rights available. This is logical because at commissioning and installation you need to be able to alter all the settings.

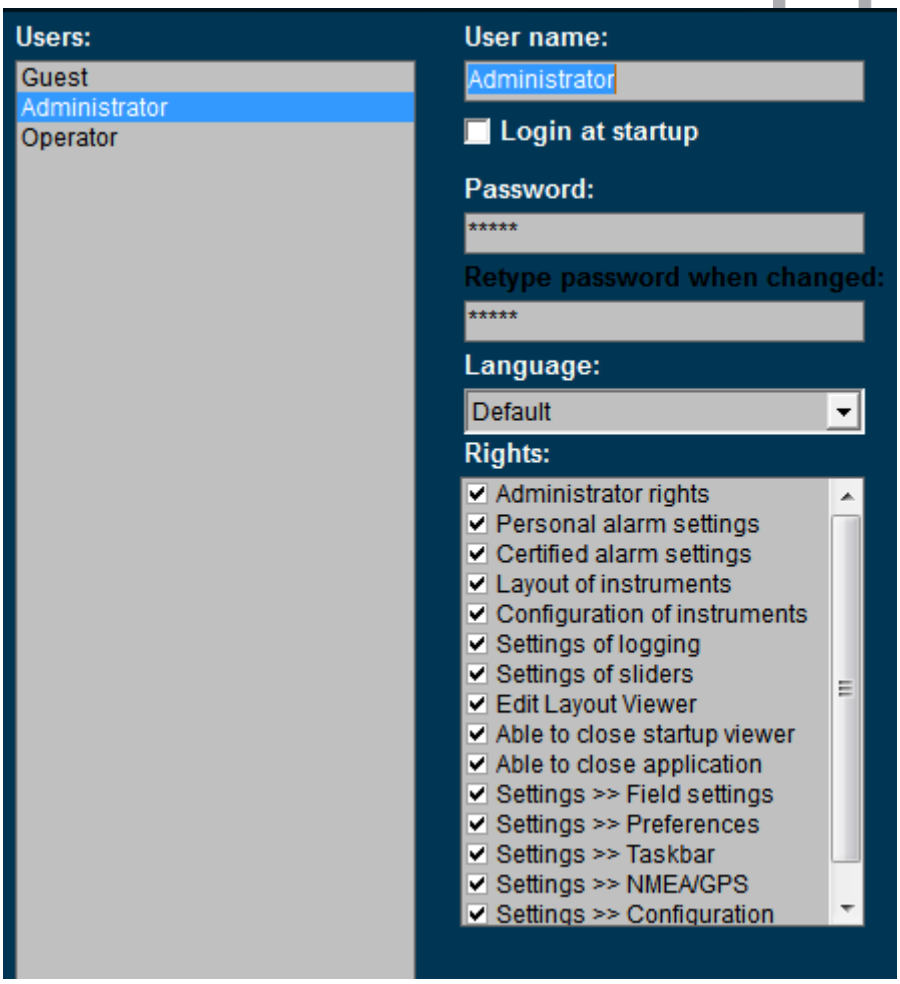


Figure 5-1: Users

5.2.1 User name

This is a box that shows the active user name. You can also alter the name here..

5.2.2 Login at startup

Tick this box to set the default user at startup (default operator).

5.2.3 Password

The user name "Administrator" is always password protected (standard this is "admin").

If a password is required please type password here. When changing the password or typing the password for the first time, retype password at next field "retype password when changed".

5.2.4 Language

In the box "Language" you can choose for "default" or "local". If you choose "default" the main language will be English.
By choosing "local" you can set any kind of language for the comments section. So the GroupLabel, Item and label can be changed under fieldsettings/comments and it will be shown in the operators mode where you have chosen for "local" as language. If you change

the default language to local, you will have to define the English language as well for that user in case you want to put it back again at a certain time. Default language always will be English.

In the Sensorlist it is possible to change these Local values as well. See the “sensorlist manual” for further details.

5.2.5 Rights

Rights can be set (by check mark) for each user. Rights are divided in several subgroups. Each user can have one or more rights. By putting a check mark you can set the rights.

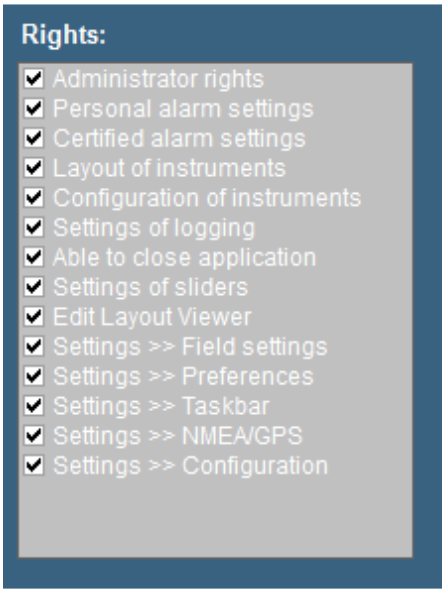


Figure 5-2: Rights

Rights	Explanation
Administrator rights	The right to change settings and user settings
Personal alarm setting	Set personal alarms directly in the instruments
Certified alarm setting	Set certified alarms in Field settings > Alarms
Layout of instruments	Change layout of instruments (i.e. unit, analogue-digital etc.)
Configuration of instruments	Change fields that instruments are representing
Settings of logging	Make logs of incoming data (see “Configuration > Field settings > log”)
Able to close application	Decides if the button to close FT is available
Settings of sliders	Allow setting of sliders in layout viewer
Edit layout viewer	Makes it possible to change the layout viewer
Settings > Field settings	Allows changing the field settings (see “Tools > Field Settings”)
Settings > Preferences	Allows changing the preferences (see “Tools > Preferences”)
Settings > Taskbar	Allows changing the taskbar (see “Tools > Taskbar”)
Settings > NMEA/GPS	Allows using “Tools > NMEA/GPS” tab
Settings > Configuration	Allows changing of configuration settings

- **Administrator rights**
  All rights.
- **Operator rights**
  Limited rights to prevent accidental alterations

Under “Operator rights” you will NEVER get the rights as mentioned below.

- Administrator rights
- Certified alarm setting
- Configuration of instruments
- Settings of logging
- Settings of sliders
- Edit layout viewer
- Settings > Field settings
- Settings > Configuration

5.2.6 Add / Remove

Via the “Add / Remove” buttons a user can be added or removed.
For example you need to add a user for the shipyard or the installation company. Click “Add” and fill in a new user name. For the removal of a user, click the user then click “Remove” and acknowledge.

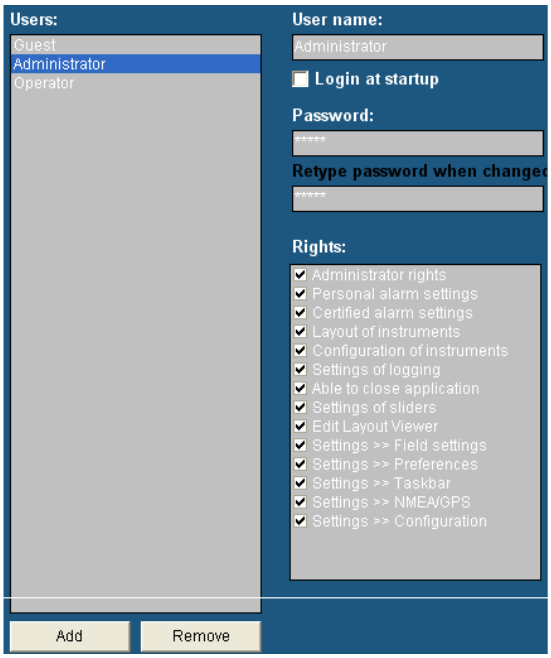


Figure 5-3: Add / Remove

Setup the new user direct at the beginning of the setup. In this way the user will get access to all settings and adjustments. If you set a new user after you've finished installing and adjusting the system, this will result in an empty user. All adjustments you've made are not visible. You can get the adjustments you made to appear in the new user by copying the content of the "administrator.ini" to the new user ini-file (i.e. shipyard.ini). For more information please refer to section "Adjusting ini-files".

5.3 Field settings

Under "Tools > Configuration > Field Settings" you'll find the tools to adjust and fine-tune on field label basis. For every I/O you attach a label onto you will find different ways of tuning in each tab of field settings.

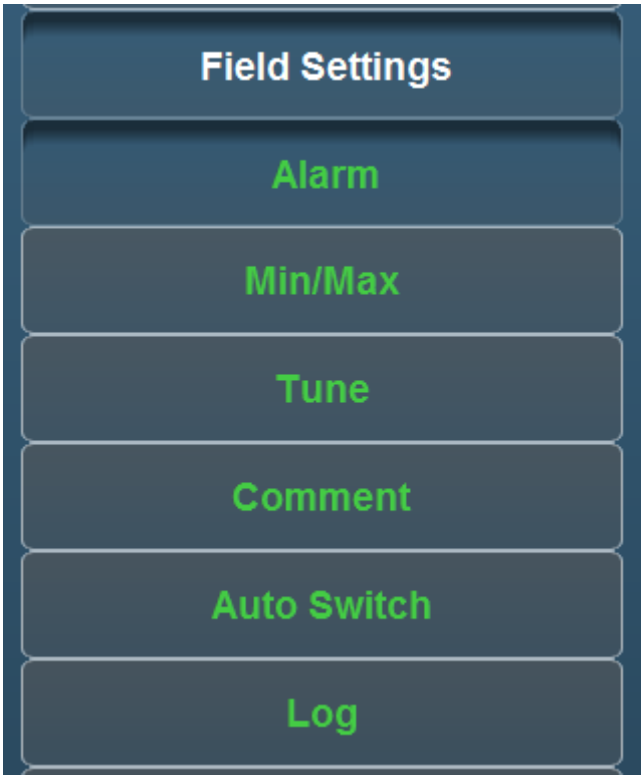


Figure 5-4: Field settings

The following settings are available:

- **Alarm**
  Settings of user alarms, warning alarms, critical alarms, Alarm group settings, SMS settings, inhibit settings
- **Min/Max**
  Setting of instrument range, zone marking, default unit and filter
- **Tune**
  Setting of tuning table, see results and sender
- **Comment**
  Check and change group label, group label logbook, field label and field label instrument
- **Auto Switch**
  Make various in-and outputs react on each other.
- **Log**
  Setting and enabling/disabling logging for each field label.

5.3.1 Alarm

Choose the field you would like to change the alarm settings for (e.g. “Steering and Propulsion >Rudder > Angle”).
Depending on the field selection, a number of field settings are available. In this example the following settings are allowed:

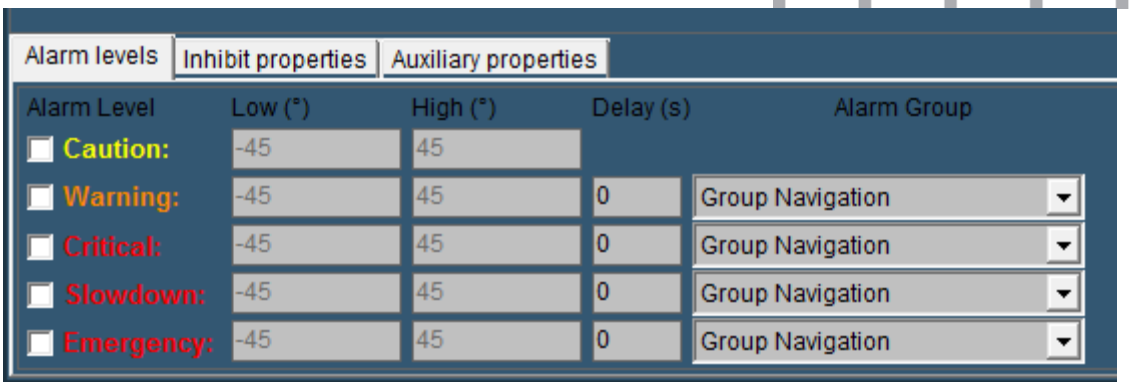


Figure 5-5: Alarm settings

A field like this “rudder alarm” is not set as alarm by default. It gives an analogue value, in this case within the range -45 degree and +45 degree. Now within this range you can set a few alarms. The settings that can be altered are the following:

5.3.1.1 Alarm levels

- **Caution**
  Via this check box the user alarm settings are set. In this example you can set the alarm threshold (low and high). Usually you will not set them here but in the instrument itself (it is a user alarm) but you can check and/or change them here. This alarm will only give a visual alarm.
- **Warning**
  The warning alarm is a dedicated alarm to warn the user when certain thresholds are exceeded. This alarm can have a dedicated delay and a dedicated alarm group (i.e. a high or low alarm).
  Choose these thresholds widely within the boundaries of the capabilities of the attached device (check specific manual for the values)
- **Critical**
  To set the critical alarm thresholds (i.e. too high or too low) (check specific manual for these values).Critical alarms are typically TooToo Low and Too Too High.
- **Slowdown**
  This is a grade higher alarm than the Critical. It means that immediate action is required without further ado.
- **Emergency**
  When there is an emanate threat, like Watertight Doors that aren’t closed during sailing, an emergency alarm is in place. Everything has to stop to prevent this alarm from going any further.

When the field represents an Engine or a Generator. The Emergency Alarm Level will be changed by the Shutdown Alarm Level. In this case it will take further actions (when implied) to shut down the engine to prevent further damage.

- **Delay(s)**
  The time (in seconds) the system will wait before it will show the specific

alarm that is triggered. This is necessary if a hysteresis is needed (i.e. a bilge alarm that is on the edge of the alarm by the rocking of the ship, will not go of all the time if you put in a delay)

- **Alarm Group**
  Here you can put the alarm in a specific group. By putting it in a group you can manage the rights of different users on whether they can silence or acknowledge these alarms.

5.3.1.2 Inhibit Properties

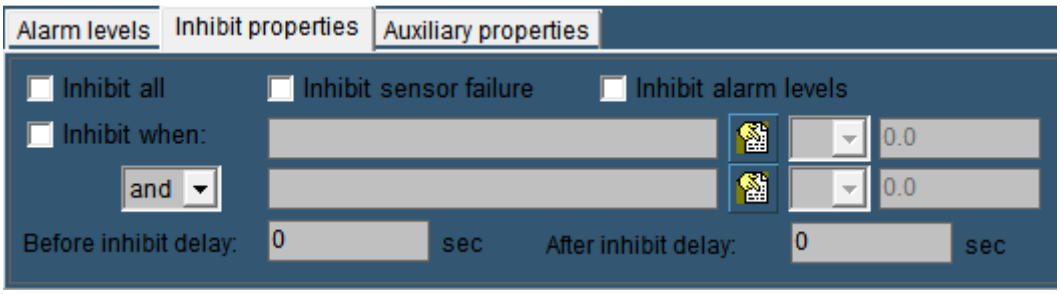


Figure 5-6: Inhibit Properties

There will be certain occasions where you do not want the alarm to go off. For example an oil pressure alarm from an engine will normally also be in alarm when the engine is shut down. This is not wanted as an alarm. Or when a sensor is broken and there is no time to repair it for a while, it will be easier to inhibit the “Defect Alarm” of this sensor until you have time to repair it.

- **Inhibit All**
  This checkbox is used to inhibit all the alarms from this particular sensor. Especially when the sensor is defect, it will come in handy. In the alarm page you will constantly see that the sensor is inhibited, so you won’t forget.
- **Inhibit Sensor Failure**
  Some sensors (i.e. 4-20 mA) tends to go a little bit out of range. Normally this will be no problem. However if a 4-20 mA sensor drops below 4 mA or goes higher than 20 mA, NavVision will see this as a sensor failure and will give an alarm. If you think it is just the range of the sensor that is giving the problem, you can check this box to stop these alarms.
- **Inhibit Alarm Levels**
  If you have set alarm levels as mentioned in “Alarm Levels” And you need them to be shut off for a while, check this box.
- **Inhibit When**
  In the earlier mentioned oil pressure alarm, you don’t want that alarm to go off when the engine is not running. This is where “Inhibit When” will help. In the inhibit properties of that particular sensor you mark the checkbox. Now you search the belonging engine running field in the box next to that, by clicking the tab besides that.

  While you want the alarm to be inhibited when the engine is not running, in the next field you choose “<” from the dropdown menu. Finally you set an amount (in this case 0.5) in the adjacent field. Now, when the engine is not running, the alarm will not sound (see Figure 5-7). Finally you can choose an additional field (And/Or) to specify even further. For example you can use the Shaft Speed RPM as backup (see Figure 5-8).

“Before Inhibit Delay” and “After Inhibit Delay” are delays to catch up for irregularities in the sensors behavior.

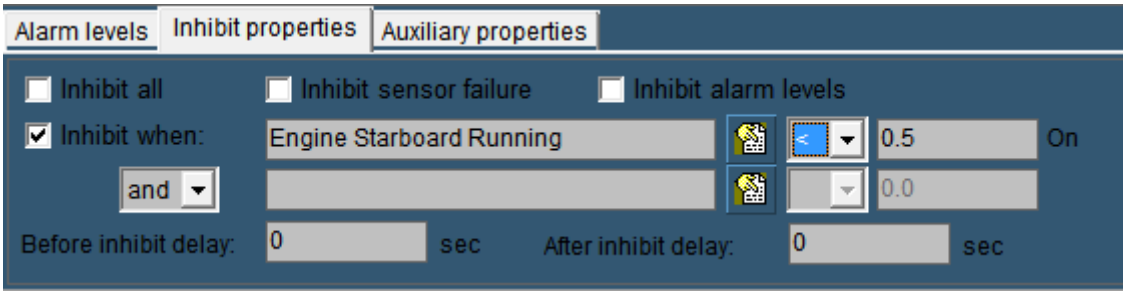


Figure 5-7: Inhibit When

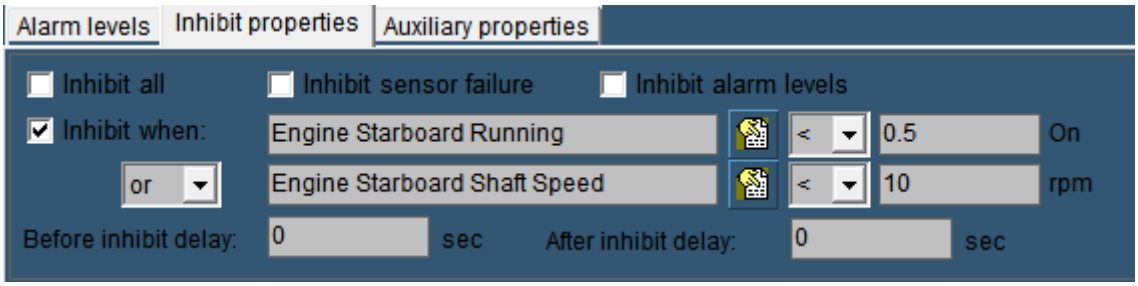


Figure 5-8: Inhibit When 2

If you specify just one inhibit field, make sure the “and/or” box is set to “and”. Otherwise the alarm field will not work.

5.3.1.3 Auxiliary Properties

- **Alarm Sound:**
  Obsolete
- **Send SMS When Alarm Active**
  If you have the SMS Alert License you can tick this checkbox to send a text message to your phone, every time the alarm is triggered.
- **Alarm on Request Timeout**
  especially valves will have a long time to open or close. You can set a timeout on the time to get an alarm if the conditions aren’t met in the given time.
- **Alarm When Not Ready**
  If the sensor is equipped whit an output to state that it is not ready, tick this checkbox to get an alarm.

5.3.2 Min/Max

Under “Tools > Field Settings > Min/Max” (see Figure 5-9) the instrument boundaries can be set. For example the “Engine 1 Oil Pressure” instrument can be set as follows:

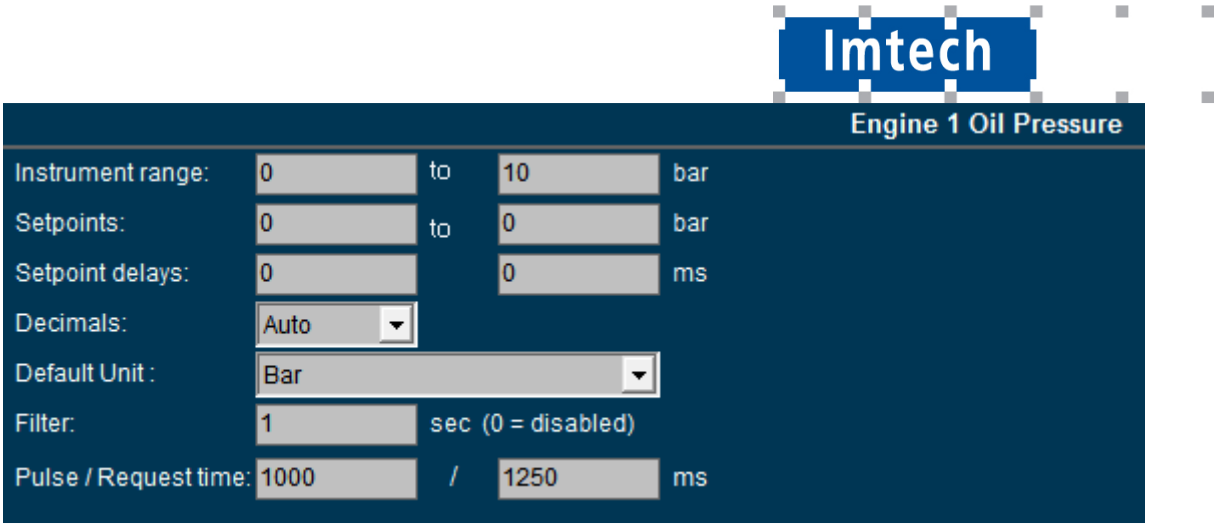


Figure 5-9: Min/Max settings

5.3.2.1 Instrument range

The instrument range field is used to define the measuring range (scale) of the instrument. For example: the indicator below is scaled from 0 to 10 bar.

Figure 5-10: Engine 1 oil pressure indicator (0 - 10 bar)

5.3.2.2 Setpoints

If the sensor values and their working ranges are known, you can set a zone marking. It puts a grid over the desired values on the instrument, to verify if the readings are correct.

Figure 5-11: Zone marking on older versions

For now this is only working in older versions of NavVision. It is not yet implemented in the new Mimic instruments, but it will be in the future.

5.3.2.3 Setpoint delay

Whit the delay you can set a time in milliseconds before an alarm will be triggered. This prevents recurring alarms if the sensor is working on the edge of the setpoint

5.3.2.4 Decimals

To make sure that in a mimic all the decimals in a value are of the same length, you can choose the number of decimals here. This will make it easier to get the same decimals for different values as FT NavVision© will calculate its own decimals. Standard is “Auto”.

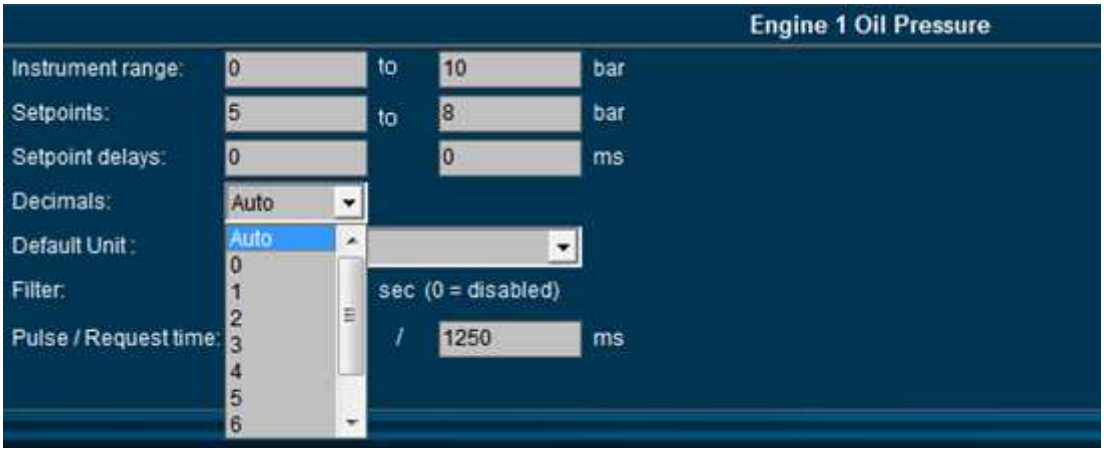


Figure 5-12: Decimals

5.3.2.5 Default unit

At startup each instrument will show the unity in which it will display the data. Depending on the sensor type select the desired unity (see Figure 5-13).

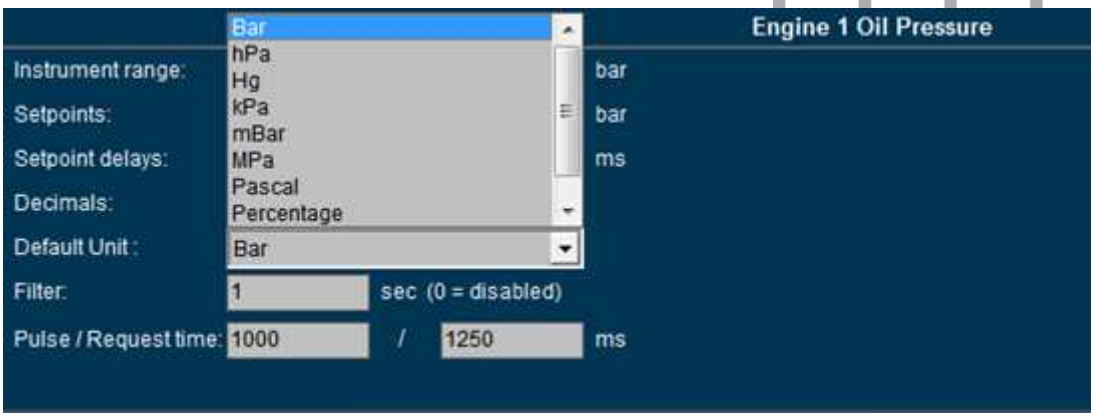


Figure 5-13: Default unit

In a mimic you can choose a secondary value to show in the mimic itself. See chapter about mimics.

5.3.2.6 Filter

If an instrument reading seems to be a little erratic, you can select a higher number (see Figure 5-13) to dampen the movement of the instrument pointer.

5.3.2.7 Pulse/Request time

The pulse time is the time a pulse will last after pressing the button in milliseconds. If you need a longer pulse (i.e. for starting or stopping a generator) you can change it here.

The request time is how long a request stays active. For example: some valves will take up to 30 seconds to open or close. If the time is set to 1250 ms and the valve didn't get a feedback that it was opened or closed, it will stop or give an alarm. If you increase the amount of time here, NavVision will wait for that longer time to give an alarm.

This also goes for requests that are send over Modbus etc. sometimes you need to let it wait for a longer time.

5.3.3 Tune

Tune is used to finetune the sensors outcome to make a more accurate readout.

5.3.3.1 Tune Table

The “Tune table” settings allows the user to fine-tune the output of a sender.

Example 1: Sensor value too low.
In such a case you must change the “Input value”. You can change the input value as follows: Input value = 0.8 → Real value = 1.
The statement above implies that for every input of 0.8 bar the output (actual reading) is 1 bar. In other words, any sensor input value of 4 bar corresponds with an instrument reading of 5 bar. You can make at most 29 correction points.

Example 2: Sensor value too high.
Change the input value as follows: Input value = 1.2 → Real value = 1.
The statement above implies that for every input of 1.2 bar the output (actual reading) is 1 bar. In other words, any sensor input value of 5 bar corresponds with an instrument reading of around 4 bar. You can make at most 29 correction points.
.

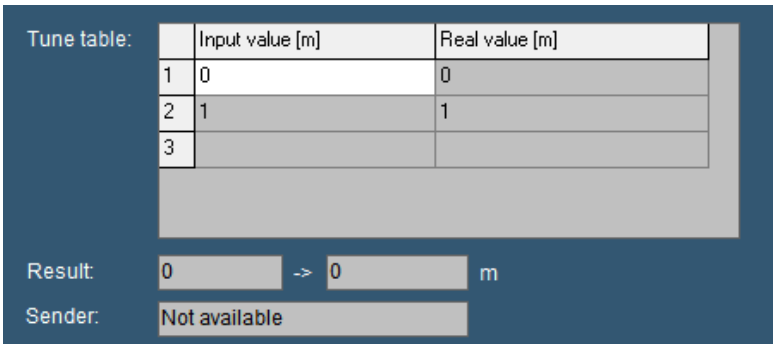


Figure 5-14: Tune table

If you need an offset you can do that by using the Tune-table as well.

As shown in the x/y-matrix (see Figure 5-73), it gives a linear line that is 0-output at 0-input and 1-output at 1-input.

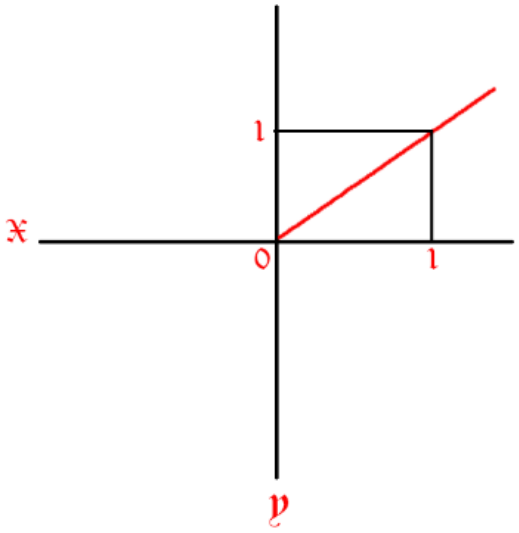


Figure 5-15: Tune Example 1

When you want to set an offset, you have to change at least 2 set-points to make the whole line go up and stay linear (see Figure 5-74). If you change just 1 point it will skew in another direction. As soon as you set 2 new set-points in the tune-table, the line will move up- or downwards and will be linear adjusted (see Figure 5-75).

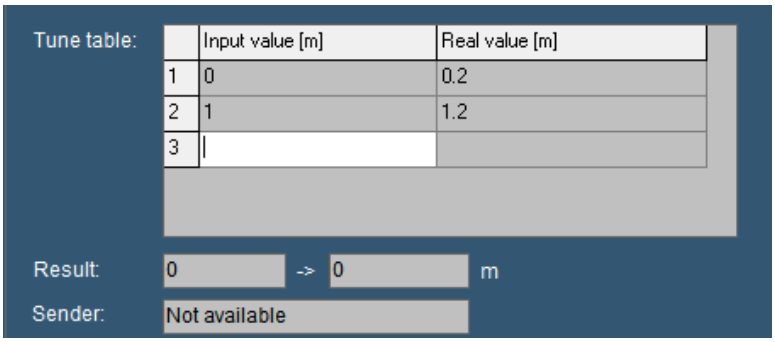


Figure 5-16: adjusted tune table

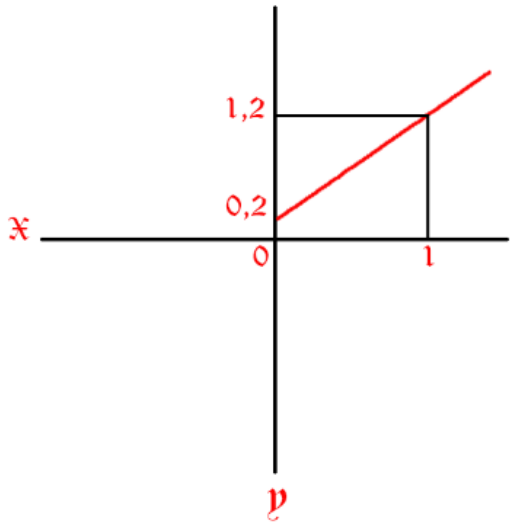


Figure 5-17: Tune Example 2

5.3.3.2 Result

The “Result” box displays the exact incoming measuring data. The second box displays this data as translated by NavVision.
If for example the sensor gives a pressure (bar) output for every 20 mV, the real time result may read “100 → 5 bar”. As a result the sensor reads “100 mV” and indicated as “5 bar” on the instrument.

Values may differ per sensor type.

5.3.3.3 Sender

The “Sender” box (see Figure 5-18) displays the interface where the data is coming from. If the sender field shows “Not available” the sensor isn’t giving any data (for a reason why it is not giving data, check the troubleshooting section).
Items you can see in the box “sender” are: NMEA, Wago, Serial, Modbus, Calculated in, etc. this gives you an indication where the signal is coming from.

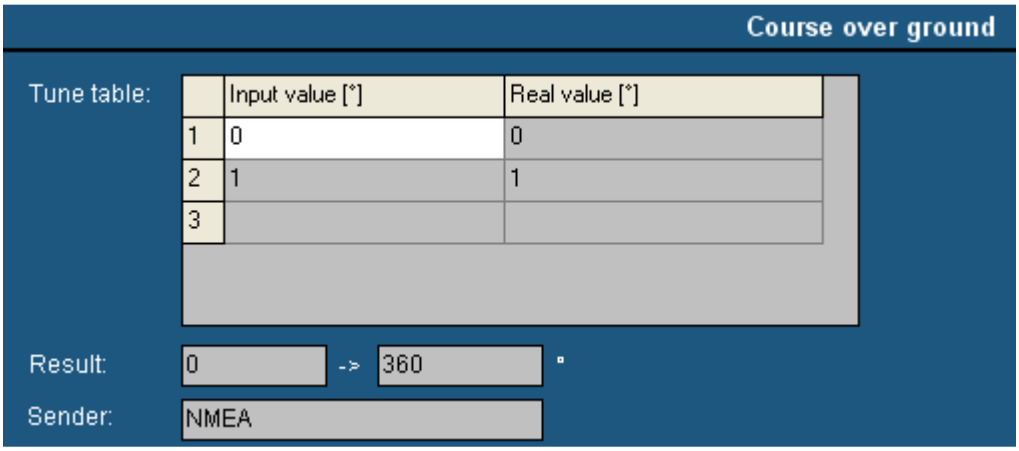


Figure 5-18: Sender box

5.3.4 Comment

In the “Comment” section you can change the names of different fields to get an overall clarity. These names can be changed for the clarity in an instrument or a logbook if the sensor has an explicit name. Sometimes you have to use an auxiliary field when the name for that sensor is not available.

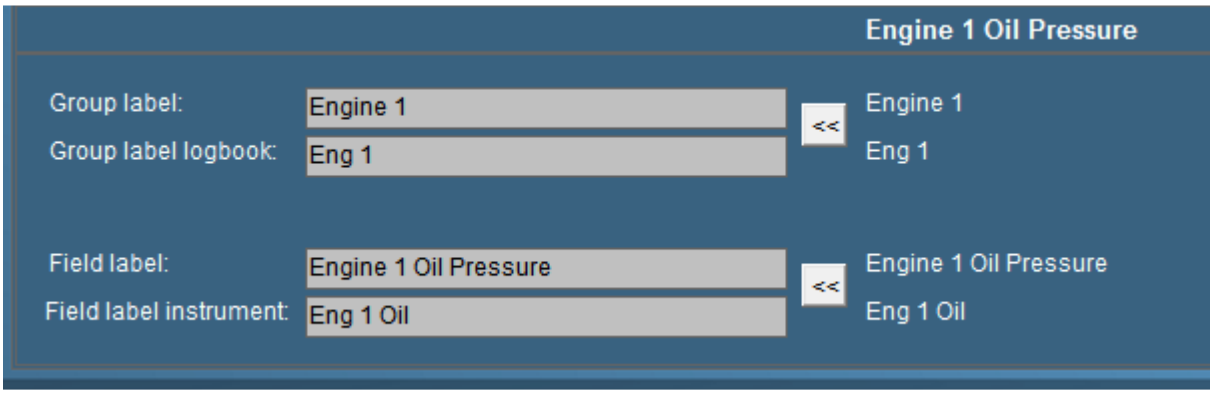


Figure 5-19: Comment

5.3.4.1 Group label

Via “Group label” you can assigns a field to a specific “Alarm” group. The name is written in full so there will be no misunderstanding. It is especially handy if you have different sensors, which are arranged in different groups. Once grouped, you change them in “Group label”.

5.3.4.2 Group label logbook

This is the label that is shown in the logbook (see chapter logbook). To save space you type an abbreviation of the group label. This is helpful to check in the logbook. All the alarms in the Logbook will have a group available so it is distinct where to place the alarm.

5.3.4.3 Field label

The field label is the exact indication of the sensor. For every sensor in NavVision you need a unique ID. That ID is the field label. Whether it is already preprogrammed or you rename an auxiliary field, that field label represents from then on the sensor. Knowing this, NavVision can connect this sensor to an instrument, calculate with it etc. mostly you will see the representation of this field label in the Wago, but it is possible you find it in other, programming or calibration files.

5.3.4.4 Field label instrument

The name of the sensor showed in the instrument is set in the field label instrument. While there isn't always that much space in an instrument, we use an abbreviation of the "Field label". If you have to make up a name yourself be sure to choose a name that is representing the sensor and is clear, even in the abbreviation.

To switch back to the old settings, just click on the arrow-button on the right side

5.3.5 Auto Switch

5.3.5.1 General

Under auto switch you can automate some of the actions of I/O in a decent easy manner, without knowledge of PLC programming. It is used to make small automations within the program.

5.3.5.2 Autoswitch Method

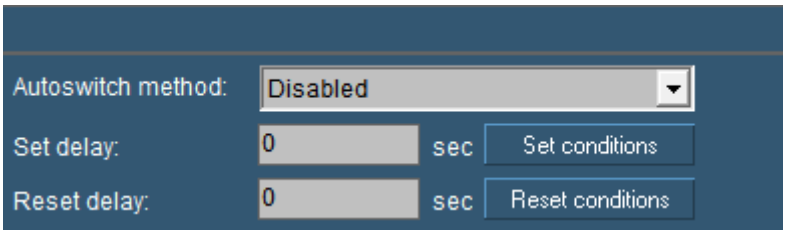


Figure 5-20: Autoswitch

Figure 5-21: Autoswitch choices

Autoswitch option	Explanation
Autoswitch Method	Here you choose how the switch works Disabled: not working Set over Reset: Set is standard position Reset over Set: Reset is standard position Mimic Switch: for use in a mimic without attached sensor
Set Delay	Delay time for Set condition
Reset Delay	Delay time for Reset condition
Set conditions	Set conditions on how to react (see Figure 5-22)
Reset conditions	Set conditions on how to react (see Figure 5-22)

The mimic Switch function is important if you want to use a button in a mimic that isn't attached to any field in NavVision. Here you can use it as a freely programmable button to trigger other events like "Harbor Mode" or others.

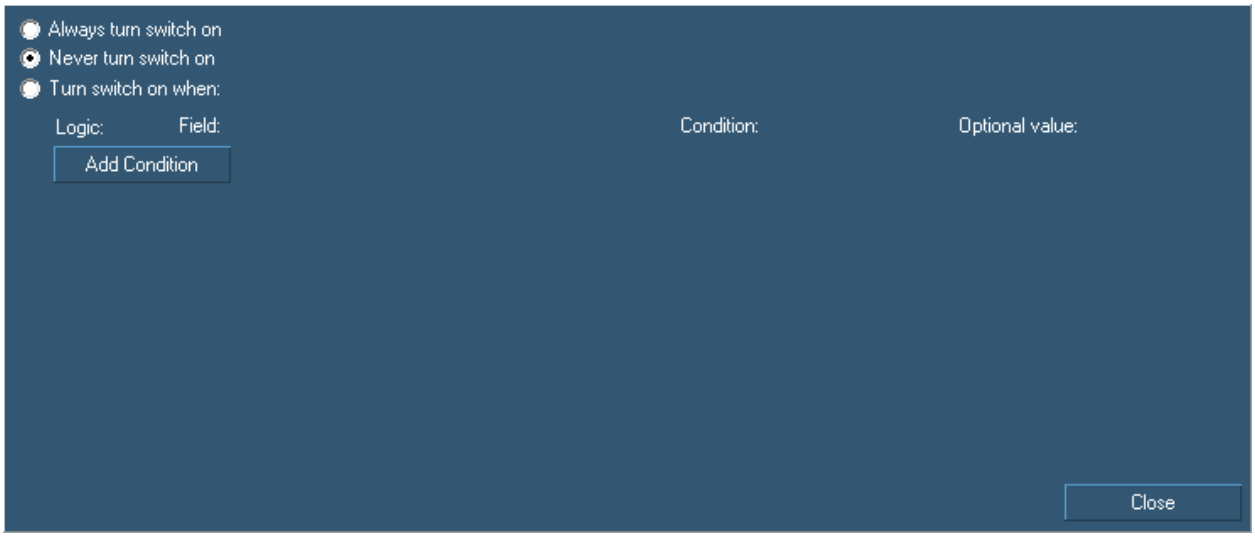


Figure 5-22: Auto Switch Conditions

Autoswitch conditions	Explanation
Always turn switch on	Switch is always on/visible
Never turn switch on	Switch is always off/unvisible
Turn switch on when	Let you add logic to turn a switch on
Add Condition	Alter the conditions that you need to make the switch work

For example if you have a switch that turns on the bilge pump, you can also let it switch on when a certain event occur. So if you have a high alarm from that bilge, you can make the switch go on by saying so in the conditions field (see Figure 5-23)

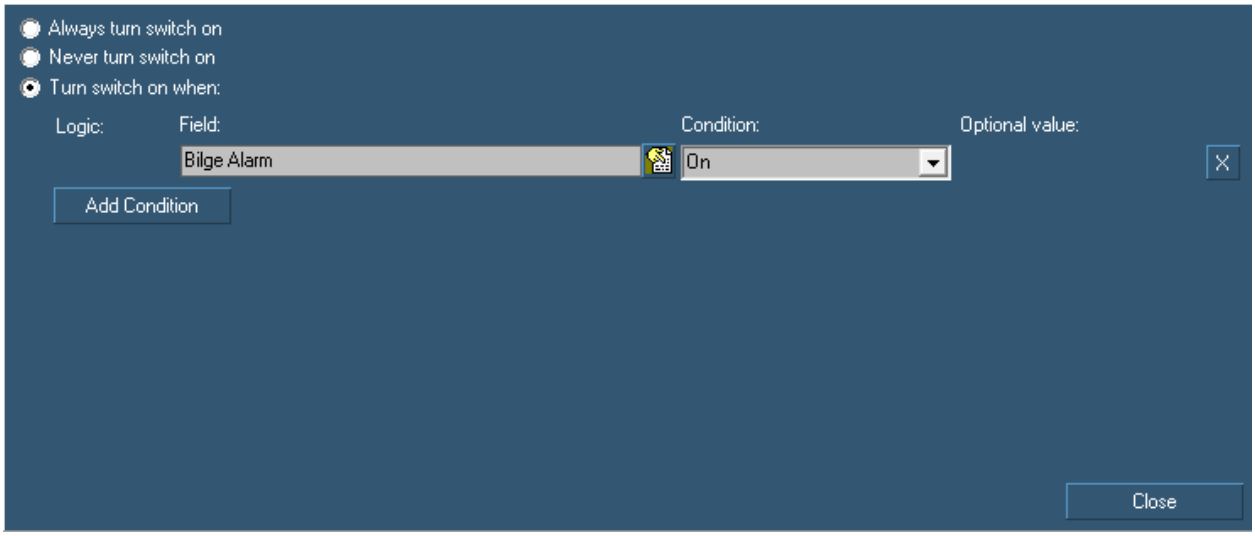


Figure 5-23: Auto Switch condition

Under conditions you find a lot of settings tah you can use in different situations. You can experiment to get the right adjustments you need.

5.3.6 Log

For troubleshooting and examination purposes you can log all the fields. All the data coming in on each specific field can be saved to a log file.
Go to “Tools > Field Settings > Log” and choose the right field (e.g. Engine 1 Oil Pressure).

Figure 5-24: Logging

5.3.6.1 Logging

Choose whether to enable or disable the logging on this field.

5.3.6.2 Interval

Depending on the data on the field you can choose an interval her form 1 second to 2 hours. Useless to say that the log file is getting a lot bigger at an interval of 1 second. Be very precautious when using this.

5.3.6.3 Filename

Here you can chose the name and place where you save the log file.

5.3.7 Logging with trending

When you have mimics available, you automatically have the possibility to make a trending mimic. Trending is very useful for troubleshooting and you can also use it to log activities.

In an empty mimic make a trending instrument. You will get the following instrument (see Figure 5-25). At the right side you can choose the field that you want to see in your trend-instrument.

Click with your mouse on the box at the right side of the trending window. A dialog box will appear (see Figure 5-26). Here now you can chose the field that you want to track.

Once you have chosen a field a new box will appear. Clicking on the colored line will take you to the color adjustment window, so you can give every trend a distinct color.

Moving your mouse over the trend-lines give you an exact date and time for every event on that line (see Figure 5-27).

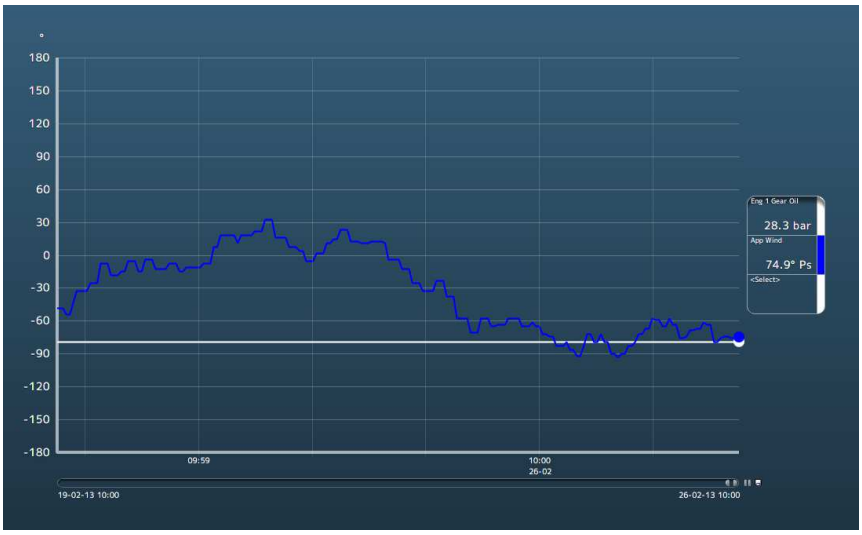


Figure 5-25: Trending instrument

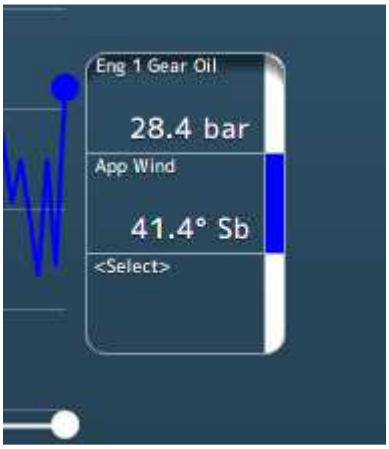


Figure 5-26: Selection boxes

Figure 5-27: time line

The line underneath the trending page is adjustable. You can take one of the corners to adjust the length of the trend to the interval time that you like to use (see Figure 5-28).

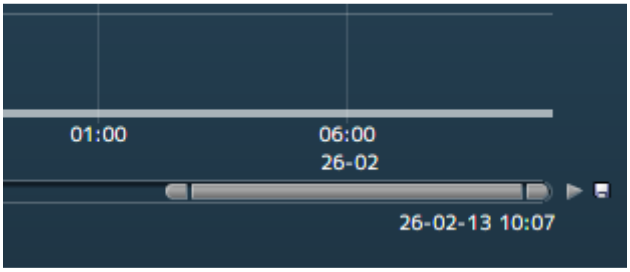


Figure 5-28: Trending adjustments

Next to that line you can see a play button to make it interactive. You can play or pause the trending. Next to the play button is a save-icon. If you want to save the trending, click on the icon, find a place to save and give the file a name NavVision will save it to a .csv file that you can open with Excel (see Figure 5-29).

	A	B	C	D
1	Date	Time	Engine 1 Gear Oil Pressure (bar)	Apparent Wind Angle (°)
2	26-2-2013	9:58:09	28.4	91.8 Ps
3	26-2-2013	9:58:10	28.4	91.8 Ps
4	26-2-2013	9:58:11	28.4	90.0 Ps
5	26-2-2013	9:58:12	28.4	90.0 Ps
6	26-2-2013	9:58:13	28.4	93.6 Ps
7	26-2-2013	9:58:14	28.4	99.0 Ps
8	26-2-2013	9:58:15	28.4	99.0 Ps
9	26-2-2013	9:58:16	28.4	93.6 Ps
10	26-2-2013	9:58:17	28.4	93.6 Ps
11	26-2-2013	9:58:18	28.4	75.6 Ps
12	26-2-2013	9:58:19	28.4	75.6 Ps
13	26-2-2013	9:58:20	28.4	81.0 Ps
14	26-2-2013	9:58:21	28.4	81.0 Ps

Figure 5-29: Saved trending file

5.4 Alarm stations

The installation on board can be divided into different parts (alarm stations) which all can have different rights concerning the completion of alarms. Besides that it is proficient to have different rights for different groups onboard it is also prescribed by organizations such as Lloyds Register etc. there are preset names to choose from.
These groups can be setup with specific alarm-rights. You can understand that the crewmess has other rights on alarms as the Engine Room or the Wheelhouse. Also the same goes for many other stations around the ship as there are the captain's cabin, Flybridge, etc.

5.4.1 Alarm Matrix

The alarm matrix defines which alarms get to which workstation or panel, what a workstation or panel is allowed to do and which rights workstations or panels have. This all in sequential order and within range of class rules.

If you start up the system the first time, the matrix will be set to standard. If this is not the case you can remove the "AlarmPanels.uc.ini" out of the network folder and restart. NavVision will start a new default matrix.

Although an engineer or administrator can alter these settings, we at NavVision will deliver the system within class rules. Any alteration is solely the responsibility of the administrator.

5.4.2 The matrix

The matrix can be found in NavVision under Tools/Alarm Stations (see Figure 5-30).

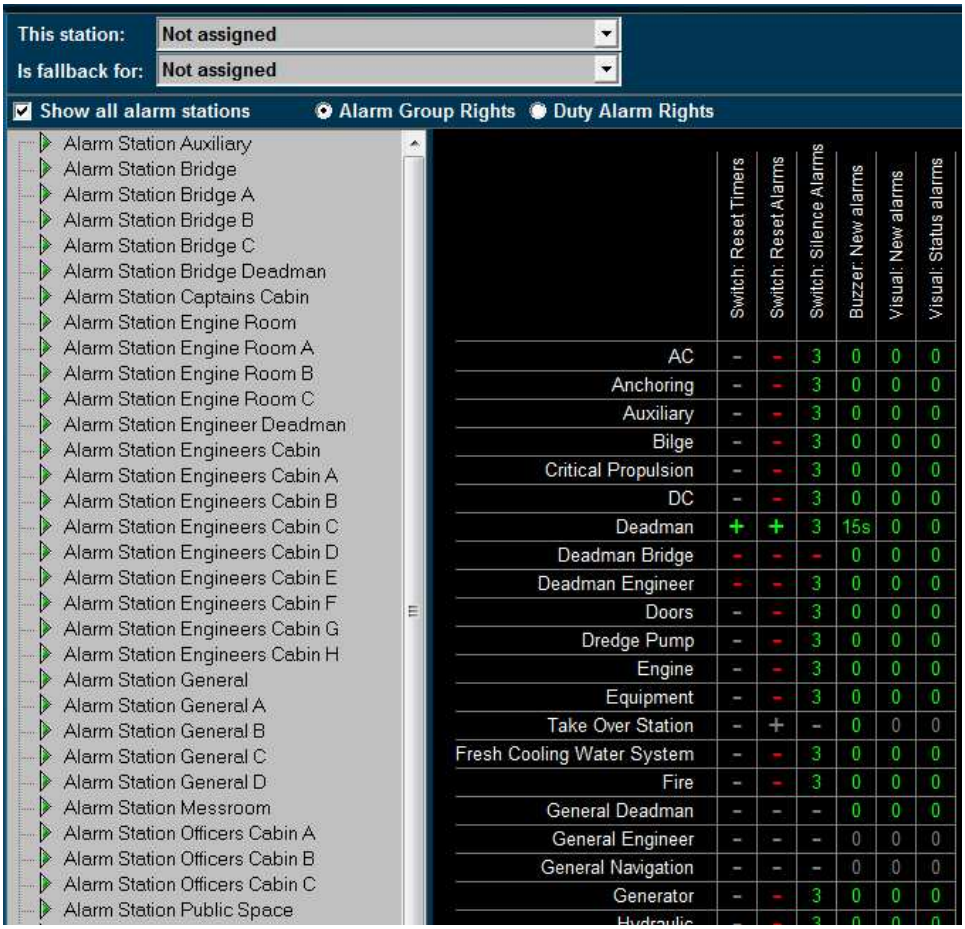


Figure 5-30: Station Matrix

As you can see the default settings are already in place. Things you cannot do are protected and will show a grey line. Additional settings that are allowed are shown with a red line.

5.4.2.1 This station

Defines the station this computer is set on. All the alarm settings of that station are also valid for the PC screen you are working on. If set to “Not Assigned” no specific alarm restriction is set. All alarms will be visible and can be silenced or acknowledged.

5.4.2.2 Is fallback for

This defines which rights this computer will get once the station set in this box is not working. If this would be the wheelhouse pc it could be a fallback station for the engine room. When the engine room pc should be out for whatever reason, the wheelhouse station will take over the tasks and rights of the engine room pc. This way all the important tasks can still be handled.

5.4.2.3 Show all alarm stations

Ticking this box switches between showing all, or all available alarmstations.

5.4.2.4 Alarm group rights/Duty alarm rights

Choose either of these two to switch between changing alarm group rights or duty alarm rights.

5.4.2.5 Adjustments

On the left pane you can choose the alarm station to be adjusted. The adjustments will only be valid for that particular station. When you choose to set this station (i.e. Alarm station bridge) on an alarm panel or another Server or client, these will have the same settings automatically.

All the settings in the diverse alarm stations will automatically be set in all the other pc's (servers and clients) which are connected. You won't have to change all PC's separately. On the left panel you will find all the groups that are available in the system. Groups that are in use by the system are shown in the right pane. Other groups will not be available. You can set the alarm options for each separate group.
When finished, all alarm options of each alarm group will be set within the specific alarm stations.

The following options are available for Alarm Group Rights:

Alarm group option	Explanation
Visual: status alarms	Shows any alarm even if it is acknowledged
Visual: new alarms	Shows new alarms for this group
Buzzer: new alarms	Sounds buzzer on new alarms for this group
Switch: silence alarms	Allows to silence the alarms for this group
Switch: reset alarms	Allows to acknowledge the alarms for this group
Switch: reset timers	Allows resetting of timers (i.e. dead man's timer)

Table 5-1: Alarm Group Rights

5.4.2.6 How to set Alarm Group Rights

Fields are set separately by pointing the mouse onto that field and right click it. The "Reset" fields will turn to "+" and the other fields will turn to "0" which simultaneously means that the delay is set to "0" minutes.

Figure 5-31: Settings example

If you want to set a field to a higher delay (i.e. you want to silence an alarm for 3 minutes) you must left click the field. A menu will appear where you can change the settings including the delay time. Check “Enable the selected cells” and choose a delay time. You can choose the delay time in minutes or seconds by checking the appropriate box (see Figure 5-32).

Figure 5-32: Alarm station settings

In addition, you can do this for different cells at the same time, by clicking and dragging the mouse over the preferred cells (see Figure 5-33).

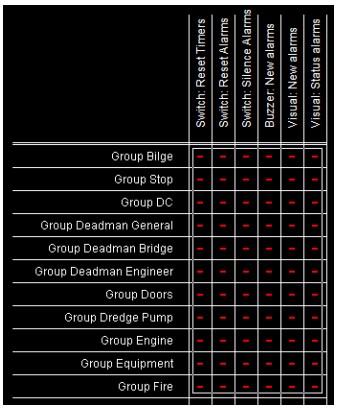


Figure 5-33: Select by dragging

If you want to disable the alarm settings, deselect the checkbox “Enable the selected cells”.

The following options are available for Duty Alarm Rights:

Alarm group option	Explanation
Call Allowed	Marks if other stations are allowed to call this station
Bridge Duty	Marks if station can be selected for Bridge Duty
Bridge Duty Select	Marks if station can select bridge duty
ER Duty	Marks if station can be selected for ER Duty
ER Duty Select	Marks if station can select ER duty
Activate station	Marks if station is allowed to switch on or off

Table 5-2: Duty Alarm Rights

The “Call Allowed” and “Duty” is shown in the alarm mimic on the main workstations (see Figure 5-34 and Figure 5-35).

Figure 5-34: Duty Select function

Figure 5-35: Call Select function

The NavVision fields for call and duty select can be found under Field Settings/Alarm/Crew/Crew Alarms.

5.4.3 Background

To elaborate a little bit further we will explain a bit more about the use of alarm stations. Each station will be in a particular part of the ship (i.e. wheelhouse, engine room, crewmess, chief engineer cabin etc.) All these stations have their own rights on which alarms they can hear or see and how they can act upon such an alarm. For example, the engine room is the place where all the alarms normally will be visible and almost always the only place where alarms can be acknowledged. This is because regulations require that alarms can only be acknowledged on that part of the ship where you can act upon the alarm and take precaution action on that alarm. Now in the crewmess (a public space) all kind of people have access to the workstation. It is not advisable that these people have rights to acknowledge the alarm. So in this space you can set the Alarmstations rights for the crewmess, so that they don't have the rights to acknowledge.

You can imagine that in the wheelhouse they do not want to see all the alarms concerning propulsion etc. merely navigational alarms are mostly enough on the bridge. Here you can set the alarm stations to only show navigational alarms and not propulsion alarms.

5.4.4 Alarm Panels

Often we use smaller panels as a workstation in diverse rooms (especially the smaller cabins and messroom) these panels are called DAP (Duty Alarm Panel). These DAP's have to be pointed out to the system. Under Alarm Stations>Alarm Panels you can set these DAP's (see Figure 5-36).

Figure 5-36: Alarm Panels

Alarm group option	Explanation
Checkbox	Switch the particular DAP on or off
MAC	Type the MAC-address of the DAP here
IP	IP address in range 172.xx.0.81 and so on
Alarm Station	Choose which station it will represent (for alarm settings)

After changing these settings choose "accept and restart communication" to activate the changes.

There are a few items, shown as icons behind the lines, which give extra functionality to the station (see Figure 5-37).

Figure 5-37: Alarmpanel icons (Settings)

5.4.4.1 Mimics

When switched on you can choose which mimics can be shown on the alarmpanel. By clicking on the mimic-icon behind the alarmpanel, you can choose which mimic will be available on that panel (see Figure 5-38).

Figure 5-38: Select the mimics

5.4.4.2 VPN

When you have an alarmpanel like a tablet which is connected to the ships network through VPN, you need to check the icon “VPN”. This prevents NavVision from pinging the station constantly.

5.4.4.3 BNWAS

When the panel needs to function as a BNWAS panel besides the other functions, you need to check this Icon. Upload button will appear with which you can set it.

5.4.4.4 Wheelmark

When the wheelmark needs to be shown on the alarmpanel, you need to check this icon to enable the show wheelmark for the particular panel.

5.4.5 Alarm groups

In Alarm Groups you can define the looks of the DAP's and the workstation it is running on (see Figure 5-39).

Under "duty alarm panels" you can set the rows and columns that you want to see if they are in alarm. You can choose up to 2 rows and up to 5 columns. Under "assigned alarm groups" you can define which alarm group you will see. Just click on a field and choose the specific alarm Group.

"This Station" defines the look and feel of the OWS. In default mode you have the same layout as a standard alarm page. You can also choose to only see a list of alarms or a list of alarms with the controls for silencing etc.

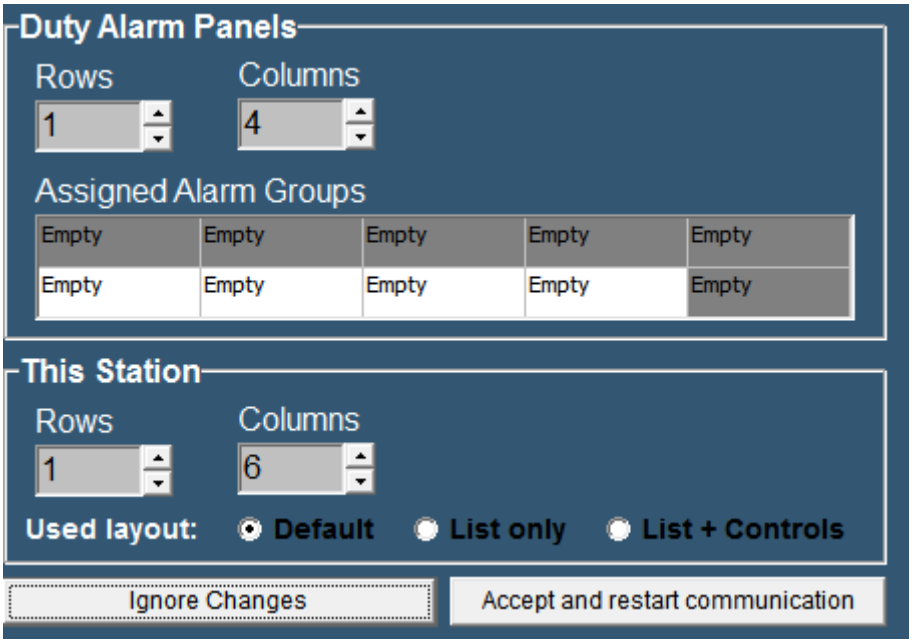


Figure 5-39: Alarm Groups

After changing these settings choose "accept changes" to activate the changes.

5.4.6 Alarm Settings

Here you can specify different alarm settings.
Under “Duty Alarm System” you can choose the following:

Automatic deactivate of public space When ER attended: if you do not want the alarms to sound in all the public spaces when there is someone at watch in the ER

Alert duty Cabin When ER turns unattended: To notify the person on duty that there is nobody in the ER anymore and his watch begins.

Alert Bridge when ER turns unattended: Just for convenience.

Under **“Personal Alarm System”** you can choose if the Deadman timer starts again with every new alarm and if a mouse-movement will rest the timer of the BNWAS.

Under **“BNWAS”** you can choose whether to use the standard NavVision BNWAS or the dedicated external BNWAS which is the new standard for NavVision. If you choose the external BNWAS you can click the BNWAS Configuration button to configure the BNWAS. This will be explained in a separate topic and in the BNWAS Manual.

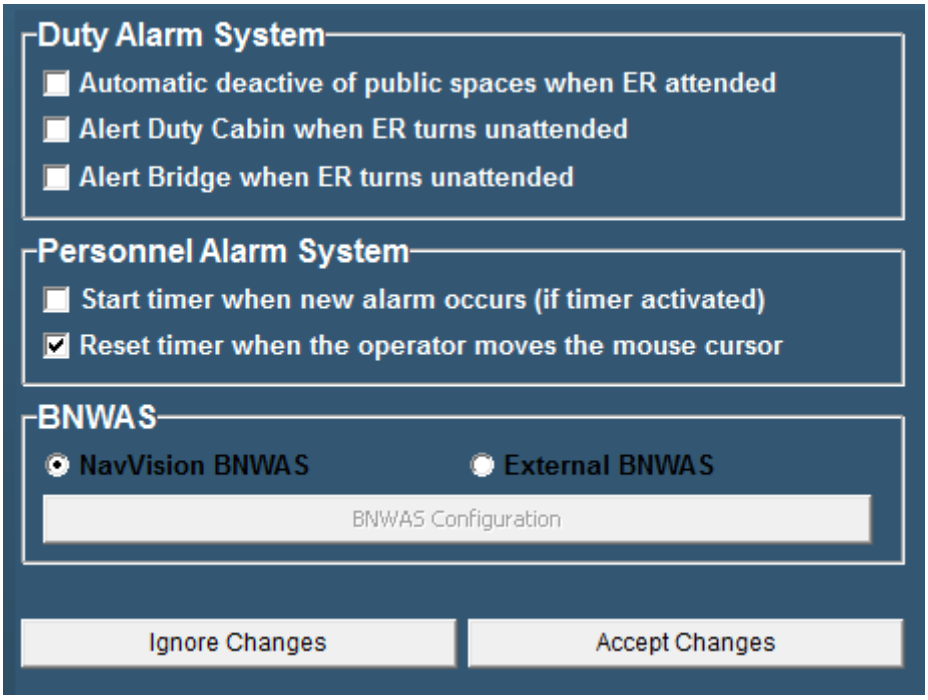


Figure 5-40: Alarm Settings

After changing these settings choose “accept changes” to activate the changes.

5.4.7 Preferences

This function is obsolete. It will be deleted in a future release.

5.4.8 Taskbar

To open the NavVision taskbar menu, select “Tools > Taskbar”.
The taskbar menu is used to configure the taskbar.

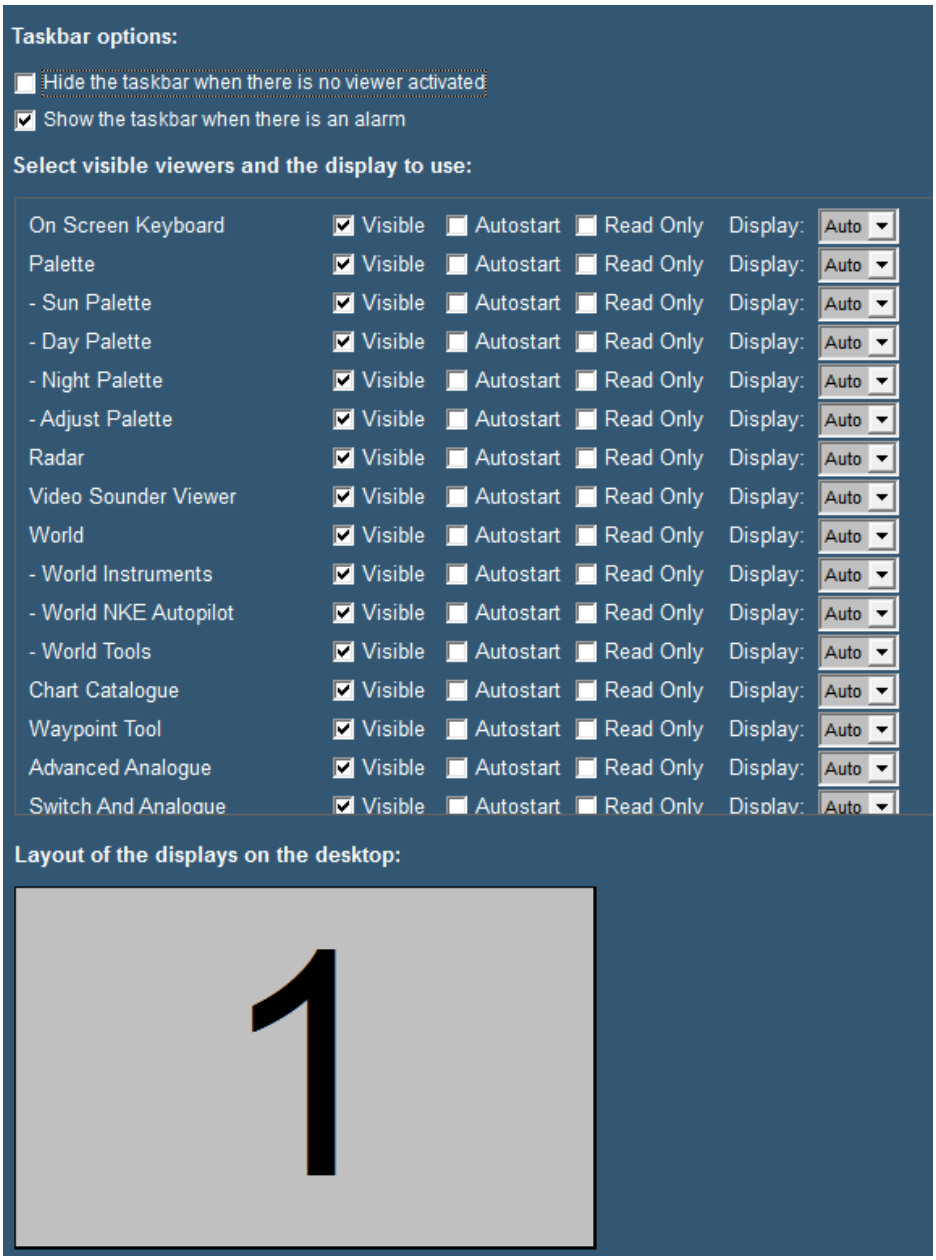


Figure 5-41: Taskbar menu

The following taskbar settings are available:

Setting	Description
Hide the taskbar when there is no viewer activated	This option allows you to hide the taskbar, in case all viewers are inactive. This function can be disabled, by moving the mouse cursor to the top of the screen.
Show the taskbar when there is an alarm	This option allows the taskbar to appear whenever an alarm occurs. This overrides the previous setting of the hidden taskbar.
Visible	This option allows you to select the availability of viewers. You can select the viewer that must be displayed and be accessible through the taskbar or not.
Autostart	The second option enables you to determine the viewers that automatically open at startup of the software.
Read Only	This option prevents people to alter settings in the viewer or mimic
Display	The display box defines the screen used for each viewer. The number shown symbolizes the displays as shown at the bottom of the screen. “Auto” means that it will appear at the first free screen. If there is a number, the viewer will appear on that screen. Only available if you have more screens attached.
Layout of the displays on the desktop	This setting allows you to show the placement of the different screens connected to your system. The display order, size and the number available for display of viewers are shown.

As of release 9.18.03.3522 it is possible to hide the “close” button to make sure people do not shutdown the program accidently. Just uncheck the checkmark box for the close button

5.4.9 GPS/NMEA

The GPS/NMEA page is merely a reference to check data. You can use it to see if data from GPS or NMEA devices is coming into the system and if the data is right.

5.4.10 GPS calculates the position in/The position is shown in

These two fields can be used to change the calculating method of the GPS sets. In almost any case you can leave them as they are.

5.4.11 Trace of received NMEA data

In the window below the text you will find all the NMEA data that is coming in. With the eraser you can clear the data from the window. By checking/unchecking the box from “Rx” or “Tx” you get respectively only received, only transmitted or all data.

If the string you see in the window is green, the data is recognized by NavVision and can be processed. This doesn’t directly mean that the data is correct, but only that the string is sent in the right style. If the string is grey, it is no longer available or not in the correct style and won’t be processed by NavVision.

While NavVision repeats a lot of NMEA data for multiple purposes, it is wise to uncheck the “Tx” box when you are checking the incoming data.

5.5 Configuration

5.5.1 General

Under configuration you will find all the tabs that you can use to configure and fine-tune the NavVision system. These settings need to be done by the engineering department. Also commissioning engineers need to know how to work with these settings.

5.6 License

To give rights to use a specific part of the software, NavVision uses licenses to open up these parts of the software. Depending on which licenses are bought, viewers will be visible and strings will be processed (see Figure 5-42).

Under “License” you can see which viewers, communication etc. are opened in your version. If you see a license and it is green, this means that the license is valid. If the license is red it is not valid. If there is no license and the stripes in the box are green or red it means the same, only than the license is freed up by another license (i.e. Navigation Pro license will also open up NMEA, so the stripes under NMEA will be green).

Normally you won’t have to alter anything here. Free Technics will provide you with a “Key.uc.ini” with all the necessary licenses available. The program will read the licenses from the ini-file and put them in place at startup. Sometimes however you can check here if you miss a certain viewer or if a communication protocol doesn’t seem to work. If you are missing a single license, you can fill it in here and it will be set in the ini-file as well.

Missing licenses are also mentioned in the logbook. Please refer to the chapter “Logbook” for more information.

Figure 5-42: License

5.7 Serial

5.7.1 General

Under “Tools > Configuration > Serial” the following menus are available;

- COM ports
- Serial LAN ports
- CAN ports
- MasterBus Devices
- Overview connected devices.

5.7.2 COM ports

Under “Tools > Configuration > Serial > COM ports” (see Figure 5-43) all COM ports as found by NavVision ® become visible. At the first startup they are no COM port yet assigned (i.e. COM port menu does not show any COM port data).

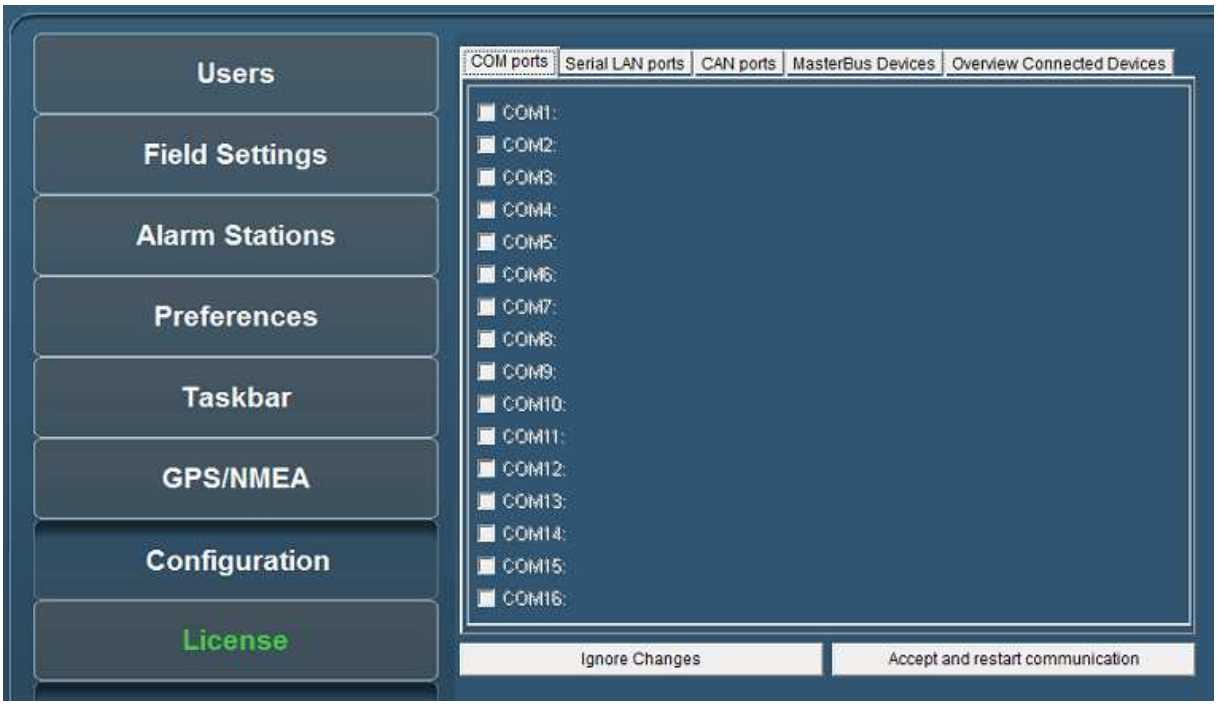


Figure 5-43: COM ports

5.7.2.1 COM port assignment

Use the right device interface (protocol) and verify the baudrate etc.

Check the respective wiring schematics to determine the COM port arrangement and assignment. Tick off the relevant COM port (1, 2, 3, etc.) and select the required device interface (protocol) by means of the drop-down menu (see Figure 5-44 and Figure 5-45).

Figure 5-44: Drop-down menu (device interfaces)

At completion, confirm the settings by clicking “Accept and restart communication” (see Figure 5-44).

Check the appropriate NavVision viewer to verify if the COM-port is correct and if there is any data communication.

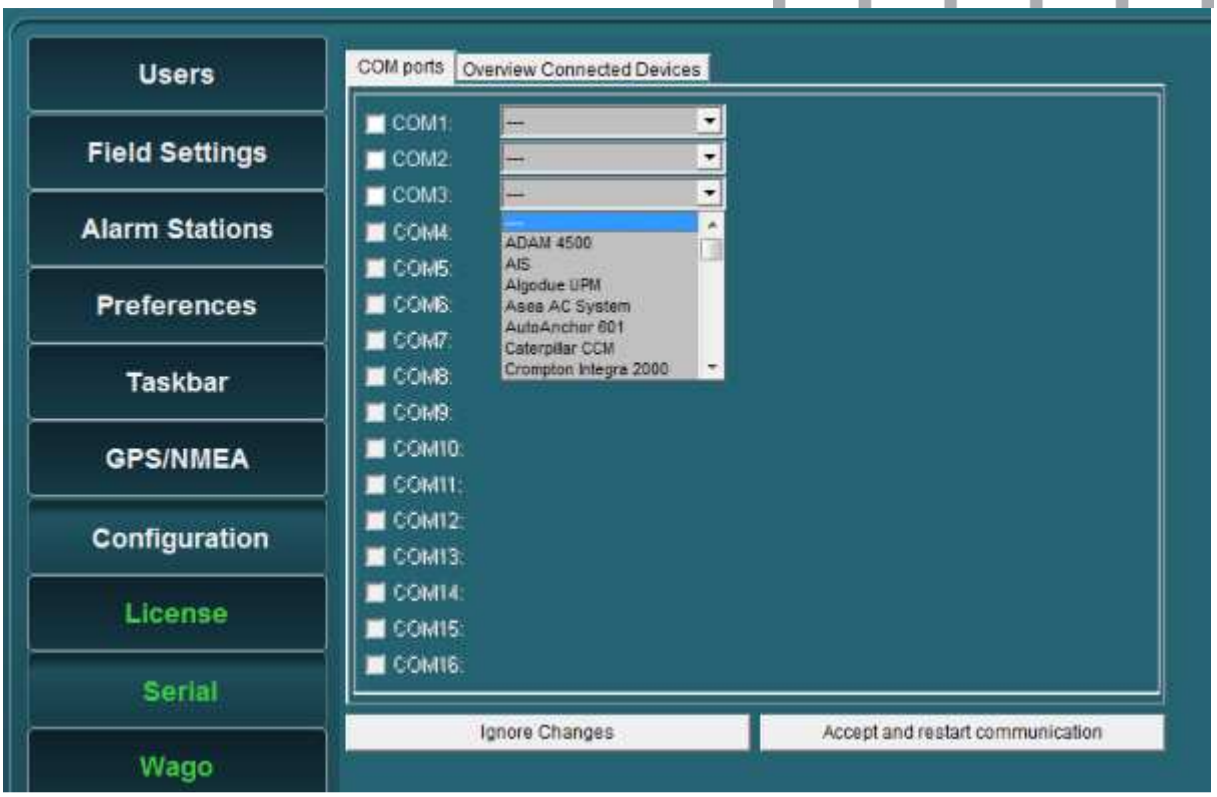


Figure 5-45: COM port assignment

Additional information on the selected port can be configured by clicking on the sign behind the drop-down menu (see Figure 5-46). A new box will open.

Figure 5-46: additional configuration

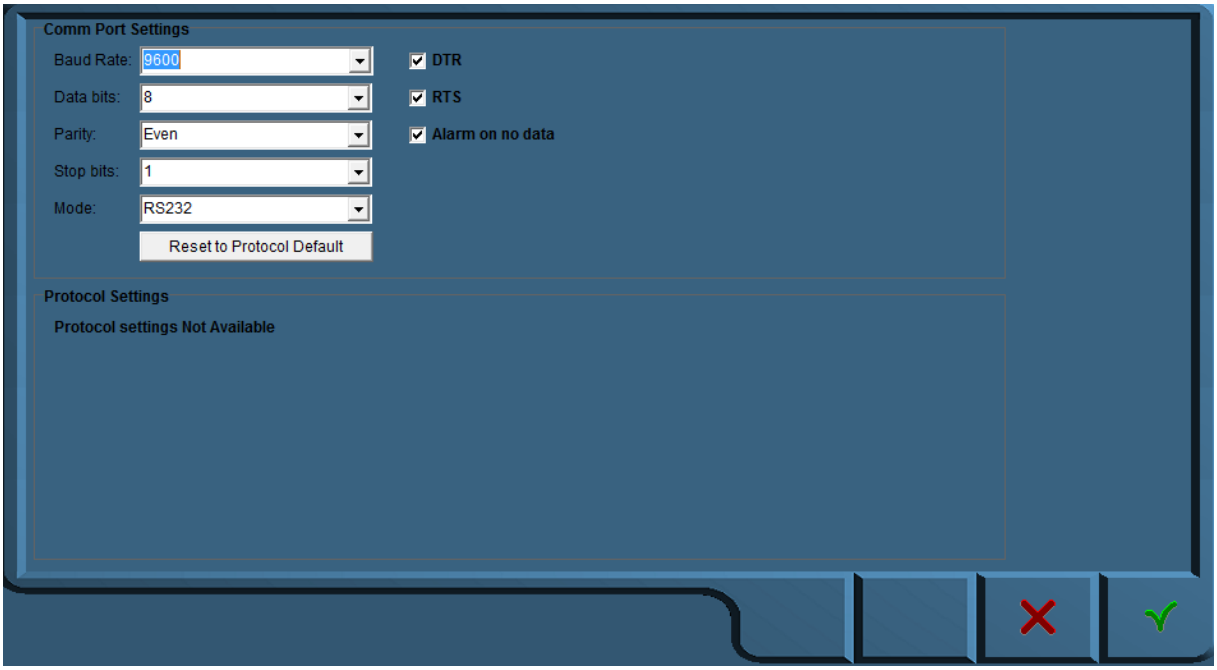


Figure 5-47: Comm Port Settings

In this additional configuration menu (see Figure 5-47) you can force all the settings for the regarding Communication port. The following fields apply:

- **Baud Rate:** Set the appropriate baudrate (see manual attached device)
- **Data Bits:** The number of data bits in each character can be 5 (for Baudot code), 6 (rarely used), 7 (for true ASCII), 8 (for any kind of data, as this matches the size of a byte), or 9 (rarely used). 8 data bits are almost universally used in newer applications. 5 or 7 bits generally only make sense with older equipment such as teleprinters.
- **Parity:** The parity bit in each character can be set to none (N), odd (O), even (E), mark (M), or space (S). None means that no parity bit is sent at all. Mark parity means that the parity bit is always set to the mark signal condition (logical 1) and likewise space parity always sends the parity bit in the space signal condition. Aside from uncommon applications that use the 9th (parity) bit for some form of addressing or special signalling, mark or space parity is uncommon, as it adds no error detection information. Odd parity is more common than even, since it ensures that at least one state transition occurs in each character, which makes it more reliable. The most common parity setting, however, is "none", with error detection handled by a communication protocol.
- **Stop Bits:** Stop bits sent at the end of every character allow the receiving signal hardware to detect the end of a character and to resynchronise with the character stream. Electronic devices usually use one stop bit.

- **Mode:** In mode you can set the protocol that the serial port is using to communicate. Refer to your device for the proper protocol. You can choose between RS232, RS422 and RS485. In some occasions you can't choose Mode because the interface protocol can only work in a predefined Mode (i.e. NMEA is always RS232).
- **DTR:** Data Terminal Ready, indicates presence of DTE to DCE (set high or low)
- **RTS:** Request to send, DTE requests the DCE prepare to receive data (set high or low)
- **Alarm on no data:** Gives an alarm when there is no data on the Comm port
- **Reset to protocol default:** Resets standard configuration for chosen protocol

5.7.2.2 Special note on printers

Under the Com port assignment, if you choose "printer" there will be an additional configuration part. You can set which data you want to be printed by checking the appropriate checkmark (see Figure 5-48). While NavVision supports two printers, you can add different data to the separate printers.

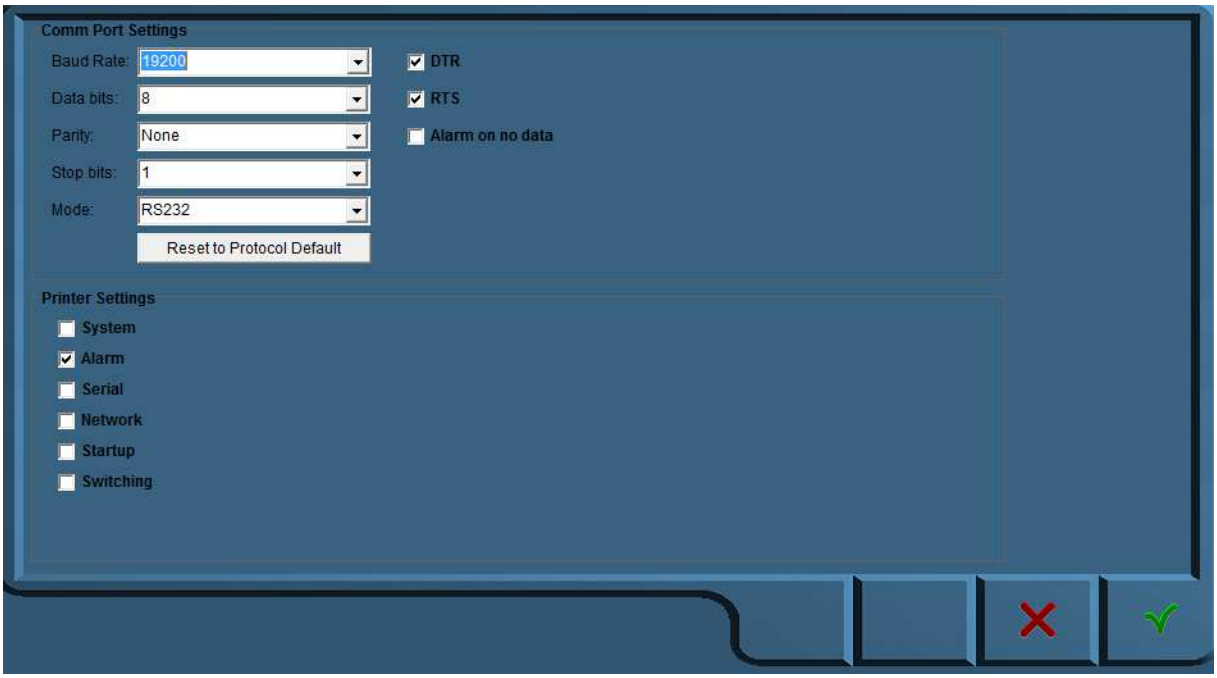


Figure 5-48: Printer settings

5.7.3 Serial LAN ports

Under “Serial LAN ports” (see Figure 5-49) the attached serial LAN device can be addressed and when necessary be calibrated.
The following fields are available;

- Serial LAN server
- Type (serial LAN server)
- IP address
- MAC address
- Data/control port
- LAN1 and LAN2

After installation a calibration procedure must follow, to ensure that the LAN device will function properly.

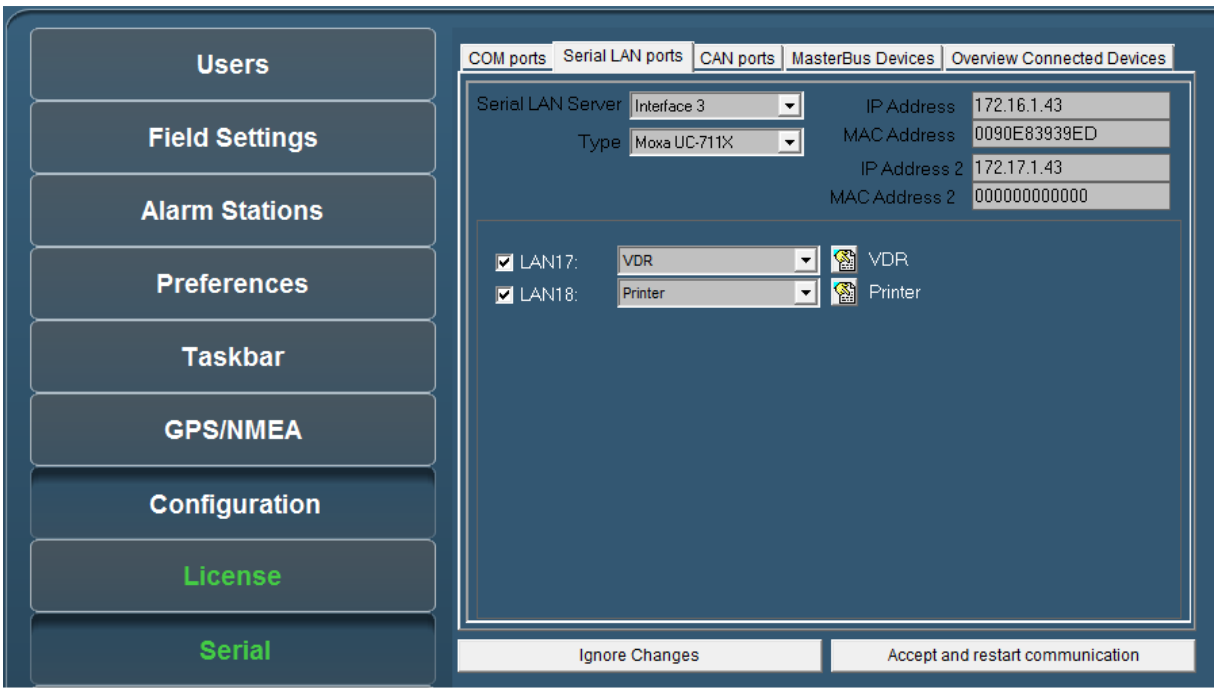


Figure 5-49: Serial LAN ports

5.7.3.1 Serial LAN server

Under “Serial LAN ports > Serial LAN server” (see Figure 5-50) the server to be assigned can be selected. In addition under “Type” the LAN server type can be selected.

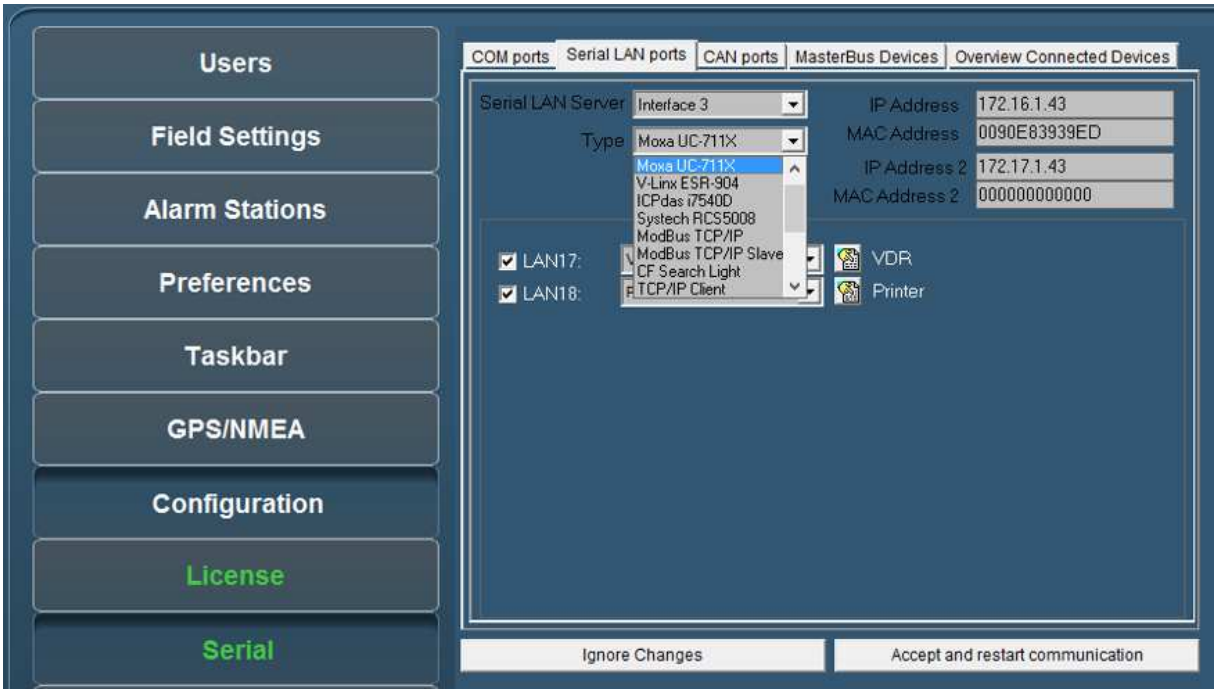


Figure 5-50: Type (Moxa)

5.7.3.2 Type (Moxa UC-711X)

The Moxa is found under “Type” > “Moxa UC-711X” (see Figure 5-50).
Fill in the IP address of the Moxa unit under “IP Address” (use same range as the PC i.e. 172.16.x.x, for Moxa the last digits are in the 40 range).
The very first connected Moxa unit is set to IP address 172.16.1.41 and the next available to 172.16.1.42 etc.

The MAC address can be found on the sticker underneath the unit.

For the Moxa unit it is necessary to use a MAC address specified under “MAC Address”.
If necessary, verify the LAN1 and/or LAN2 settings and choose the appropriate device interface / protocol.
To confirm the settings, click “Accept and restart communication” and verify if the serial data is working within NavVision.

Other possibilities can be chosen in the port-assignment drop-down. These refer to the different protocols that can be set here. You can find these protocols as catalogue in Table 5-3.

Protocols			
Adam	Frigomar_626C	MTU	Soft PLC
AIS	FSI_2DACM	MVECP	Sounder
Algodue	Generic	Nke	Switch
Asea	Gensys	Nmea	SygoDraft
AutoAnchor601	J1708	Nmea Mecmar	TMA4S
BMV501	J1939	Nmea Nacos	Vaisala_CL31
BMV602	KiloPakIguard	Nmea Quantum	Vaisala_LT31
BTM1	Littau Anchor	Nmea2000	Vaisala_PTB330
Camera	Lutron	OPC Client	Vaisala_PW
Can	MalinDraught	PC	VDR
Cat	Masterbus Modbus	PPM3	Victron
CF Smartview	Mastervolt	Printer	VictronVEBus
Crompton	Mitsubishi_DMS_II	Remote Monitoring	VisiplexPaging
DssKeypad	ModBus	Sae	Wago
EM4000	ModBus Slave	SD41	WatchIO
EmpirBus	MPC30	SMS	

Table 5-3: Port assignments

5.7.4 CAN ports

Under “Serial > CAN ports” the following menus are available:

- Interface
- Standard
- IP
- Group.

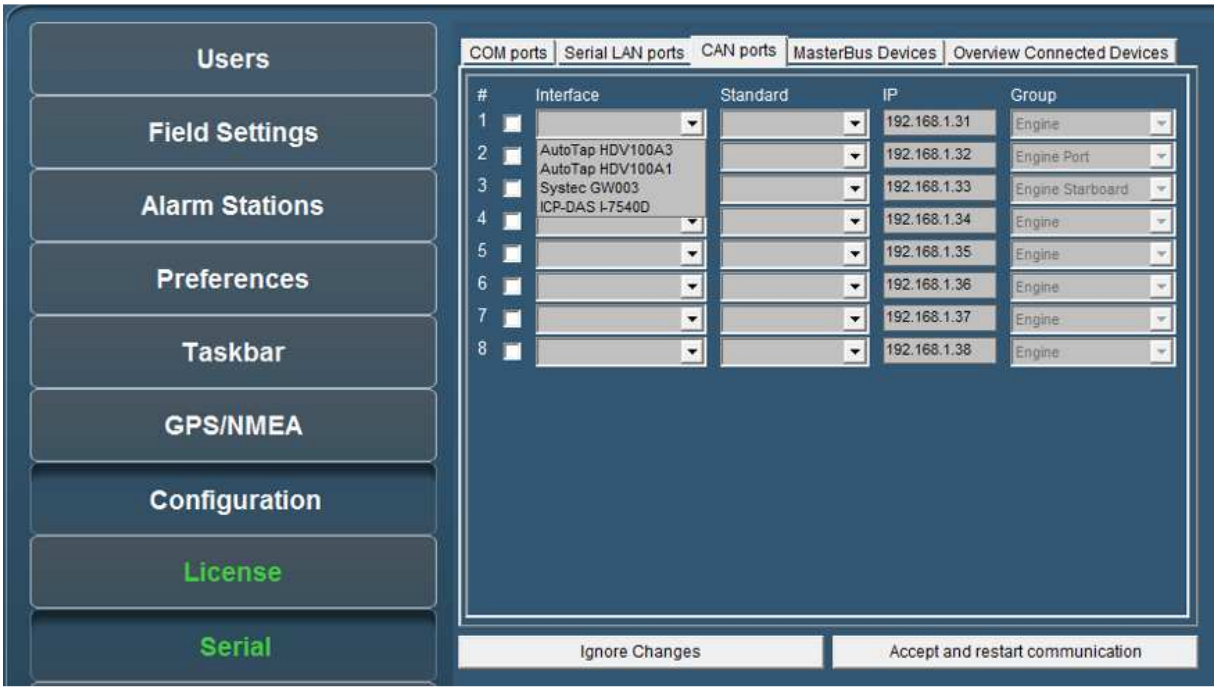


Figure 5-51: Interface

Under interface you can choose different kinds of Can-interfaces. The most used one is the ICP. If you come across an older version, you can choose it here (see Figure 5-51).

Figure 5-52: Standard

Under Standard you choose the protocol you want to use with the interface (see Figure 5-52). Most widely used are the NMEA 2000 and the SAE J1939. Which to use is depending on your attached protocol.

Under IP you can select the right IP address that reflects the connected ICP for example. You can best leave it as it is by default (which will become the 172.16.1.x range). For information on how to set the right IP-address in the ICP, please refer to the ICP installation manual.

The group you choose reflects under which group the information will be stored in NavVision. If you, for example, want the information from the interface to show up under Engine Port, you select that under Group (see Figure 5-52).

After each change you need to hit “Accept and restart communication” to save it to the system.

5.7.5 Overview connected devices

Under “Serial > Overview Connected Devices” (see Figure 5-53) an overview of the connected devices is shown.

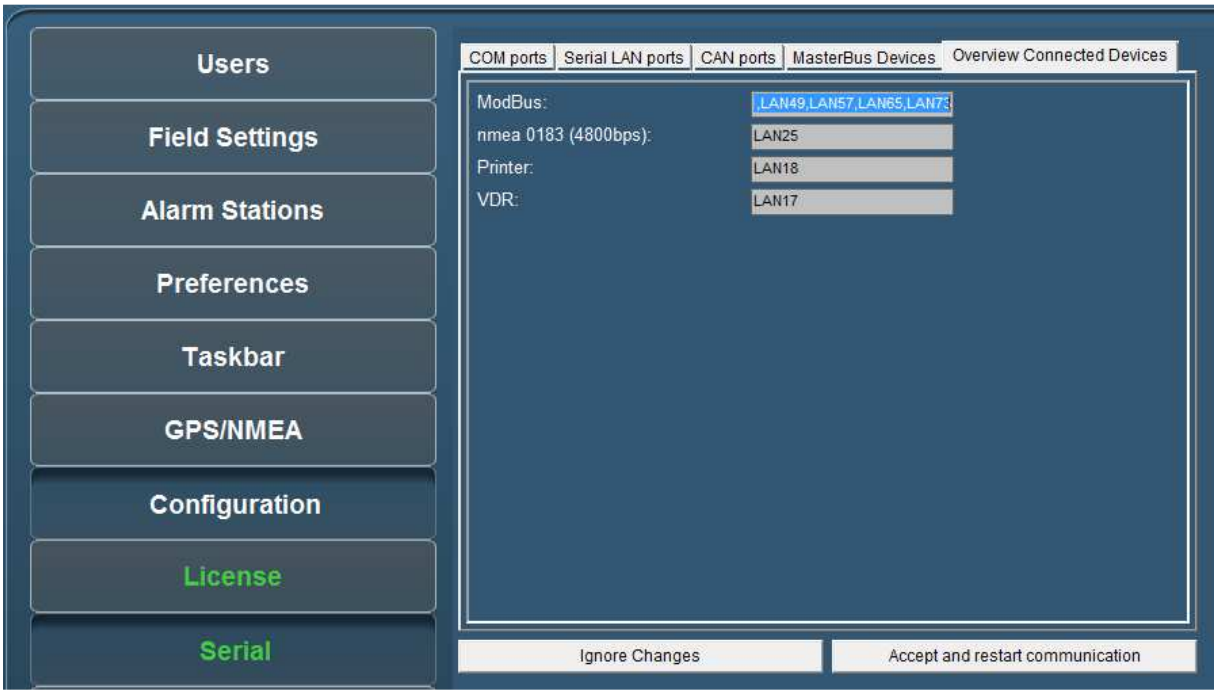


Figure 5-53: Overview connected devices

5.7.6 IP-Address standardization

For standardization purposes the same IP-addresses are used throughout each system. In the table below you'll find the IP-addresses (standard protocol) for most instruments.

Detail	IP-Address
PC I/O	172.16.x.x (172.16.24.35 for key number 2435)
PC I/O next ring	172.17.x.x (172.17.24.35 for key number 2435)
Duty Alarm Panels (DAP)	Using range x.x.1.8y Depending on the network connected, this will result in: DAP 1: 172.16.1.81 DAP 2: 172.16.1.82 DAP 3: 172.16.1.83
Serial LAN servers	Using range 172.16.1.4x (attached to I/O subnet 172.16) INT 1: 172.16.1.41 INT 2: 172.16.1.42 INT 3: 172.16.1.43
Wago	Using range 172.16.1.9x (attached to I/O subnet 172.16) Wago substation 1: 172.16.1.91 Wago substation 2: 172.16.1.92 Wago substation 3: 172.16.1.93
CAN-Interface	Using range 172.16.1.3x (attached to I/O subnet 172.16) CAN interface 1: 172.16.1.31 CAN interface 2: 172.16.1.32 CAN interface 3: 172.16.1.33
Axis	Using range 172.16.1.24x (attached to I/O subnet 172.16) Axis cam server 1: 172.16.1.241 Axis cam server 2: 172.16.1.242 Axis cam server 3: 172.16.1.243

5.8 Wago

5.8.1 General

Under “Tools > Configuration > Wago” (see Figure 5-54) all detected and connected Wago devices become visible including the server to which they are connected to.
You can check the MAC-address and see if the Wago is connected or not.

In general, by means of the sensor list changes are made. But for minor changes or to improve the control of the device, please refer to this menu.

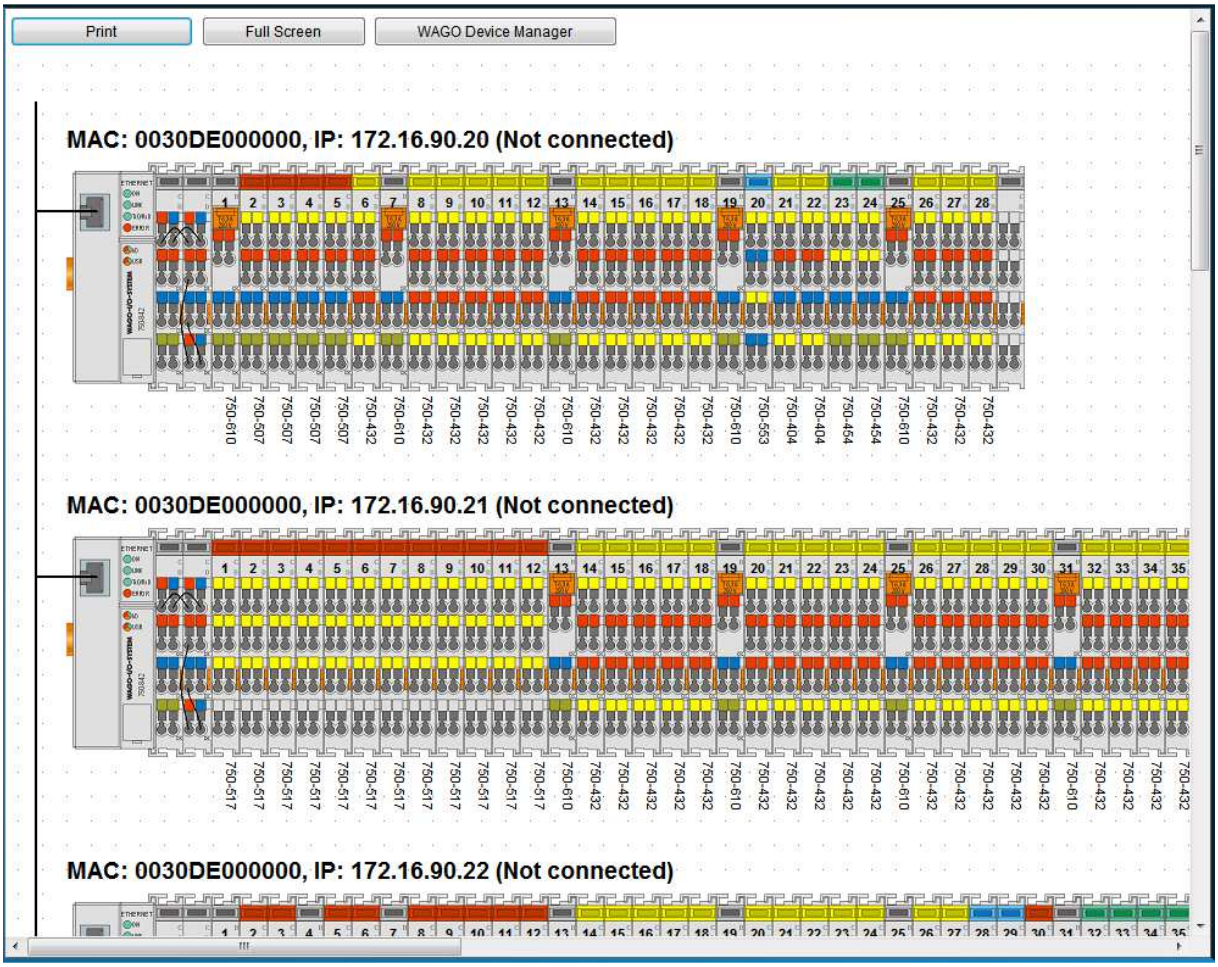


Figure 5-54: Wago configuration

Detail	Description
Print	Print the separate Wago-layouts for your convenience
Full Screen	Shows the Wago-layout full screen
Wago Device Manager	Opens a new window where you can set specific configuration settings

When you click on a Wago, it will expand and show you the separate slices with the connected fields (see Figure 5-55). Here you can fine-tune the selection, troubleshoot problems and calibrate sensors.

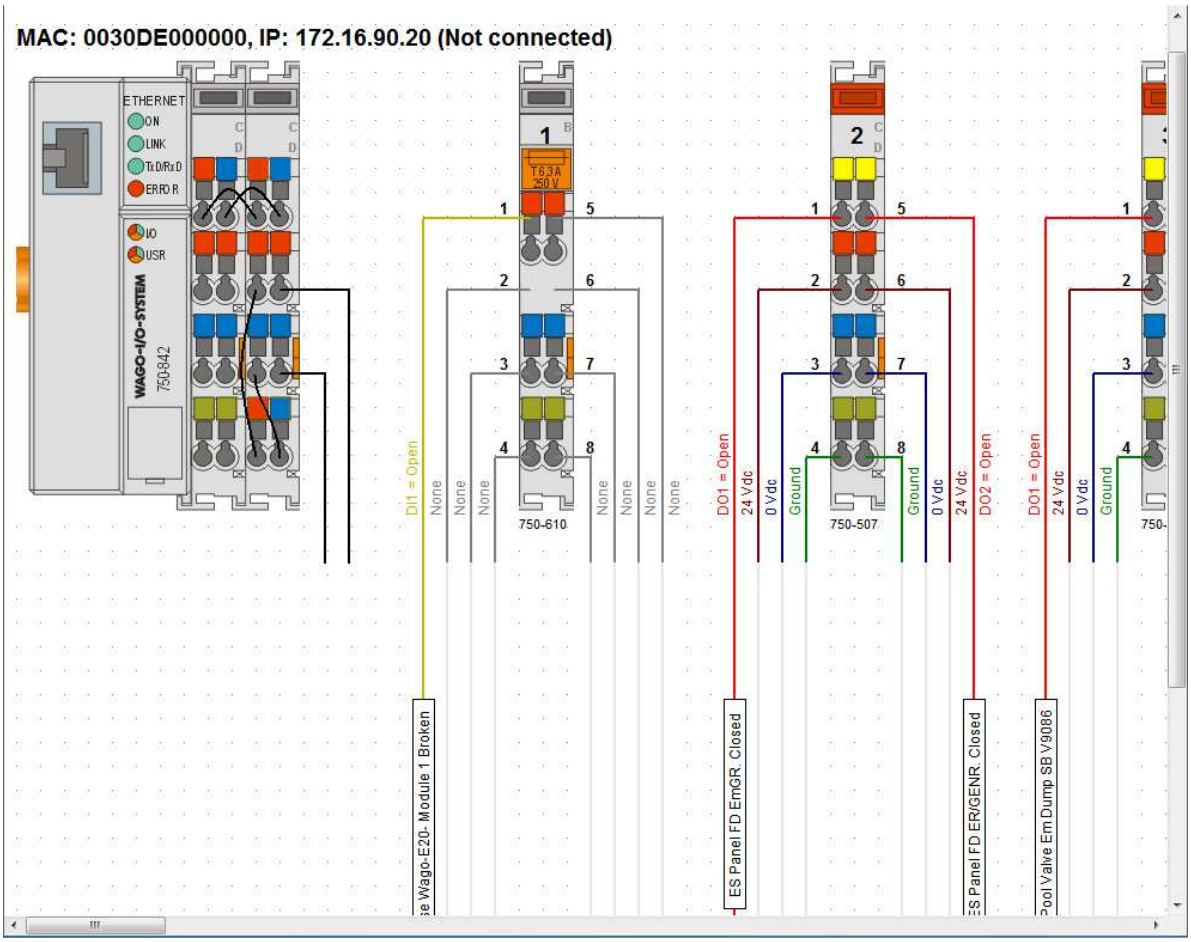


Figure 5-55: Wago expanded view

5.8.2 Adding a field to the Wago

If you want to add a new field to a Wago slice, just click on the field name box of the specific slice. If there was not already a field attached, the box will be blank (named sensor). By clicking it you will open a new window that shows all the fields within NavVision (see Figure 5-56)

Figure 5-56: Sensor-window

The following choices are possible:

Detail	Description
Input	NO or NC
Type	The behavior of the field (see 5.8.3)
Show all fields	Toggling between all fields and fields available
Search	Search for a specific field

5.8.3 Wago “Type” explanation

The Type architecture needs some extra explanation. Each field in NavVision has its own behavior. It can be an alarm, a status, or an analogue value. Sometimes you need to give a field a specific task. As add-on to its original task, or if the field is just a standard field.

By default the sensor will have “standard” as its type-value. This will set the behavior to the standard mode of the field. The choices you have and their behavior will be explained in the next paragraph.

5.8.4 Type and behavior

Under “Type” (sensor type) a variety of sensor types can be chosen. The most commonly used types are described.
Click the arrow button of the dropdown menu to open the sensor type list (see Figure 5-57).

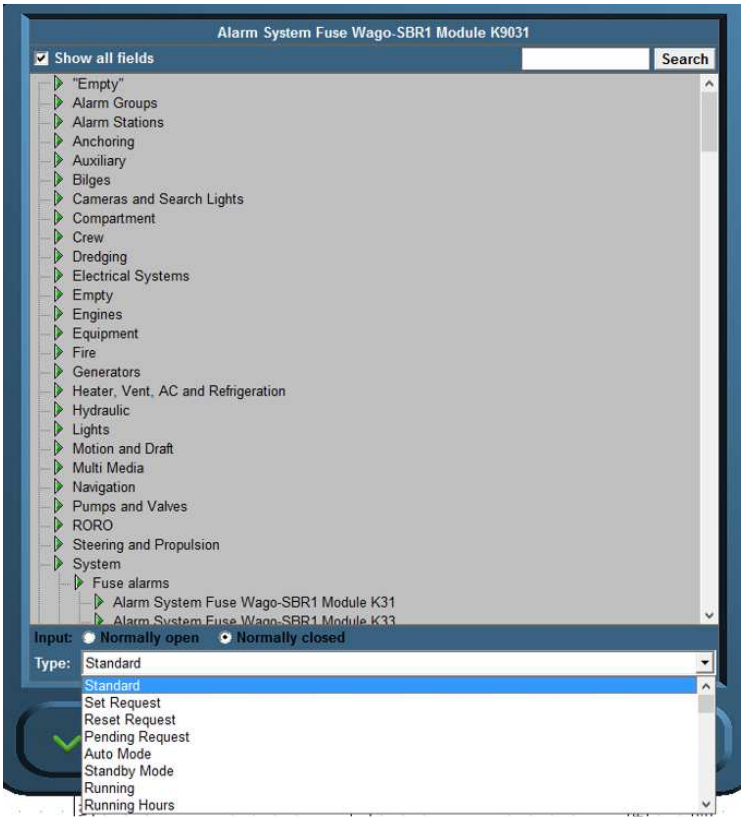


Figure 5-57: Sensor type list

SensorType (Mode: Read)		
Option	Sensor	Description
Standard	Value	Sensor value represents the state of the Data Field itself (Default)
Set	On	Request to turn on
	Off	No action
Reset	On	Request to turn off
	Off	No action
Pending	On	Processing a request.
	Off	No action
Auto	On	Switched by an automatic control sequence
	Off	Controlled by an operator
Manual	On	Controlled by an operator
	Off	Switched by an automatic control sequence
Low Speed	On	Running at low speed
	Off	Off, when not in “High Speed”. Otherwise no action
	On	Running at high speed

High Speed	Off	Off, when not in “Low Speed”. Otherwise no action
Closed	On	Switched off
	Off	Processing a request, when not “Open”
Open	On	Switched on
	Off	Processing a request, when not “Closed”
Ready	On	Ready for use
	Off	Not ready for use
Remote	On	Remote control. Controlled by AMCS
	Off	Local control. Not controlled by AMCS
Ack	On	Acknowledgement of alarm on the assigned field
	Off	No action
Request	On	Request to turn on
	Off	Request to turn off
Push	On	Request to turn on, when off. Request to turn off, when on.
	Off	No action
Too Low	On	Value is too low
	Off	Value is not too low
Low	On	Value is low
	Off	Value is not low
High	On	Value is high
	Off	Value is not high
Too High	On	Value is too high
	Off	Value is not too high
Failure	On	Defect
	Off	Not defect
Precision	On	High precision frequency counter in 0.01 Hz accuracy up to 10kHz
	Off	Low precision frequency counter in 1 Hz accuracy up to 100kHz
Counter	Value	The changes in this counter value will be added to the field
Sign	On	The value read by “Standard” is negative
	Off	The value read by “Standard” is positive
Index	Value	Value is the index of a serial message. See “Index” description
Pulse	On	Field’s value is counted 1 up
	Off	No action
Pulse 1/2	Value	Used in combination with “Pulse 2/2” to detect movement with two proximity switches.
Pulse 2/2	Value	
Pulse 1/3	Value	Used in combination with “Pulse 2/3” and “Pulse 3/3” to detect movement with three proximity switches.
Pulse 2/3	Value	
Pulse 3/3	Value	

SensorType (Mode: Write)		
Option	Sensor	Description
Standard	Value	Requested state of the Data Field itself (Default)
Set	On	Request to turn on

	Off	No action
Reset	On	Request to turn off
	Off	No action
Pending	On	Processing a request.
	Off	No action
Auto	On	Request to turn automatic control sequence on
	Off	Request to turn automatic control sequence off
Low Speed	On	Request to run at low speed
	Off	Request to turn off, when not in “High Speed”. Otherwise no action
High Speed	On	Request to run at high speed
	Off	Request to turn off, when not in “Low Speed”. Otherwise no action
Impulse	On	Request to turn on, when off. Request to turn off, when on.
	Off	No action
Status	Value	Output value represents the state of the field/ device itself (No control)
Ready	On	Ready for use
	Off	Not ready for use
Remote	On	Remote control. Controlled by AMCS
	Off	Local control. Not controlled by AMCS
Too Low	On	Value is too low
	Off	Value is not too low
Low	On	Value is low
	Off	Value is not low
High	On	Value is high
	Off	Value is not high
Too High	On	Value is too high
	Off	Value is not too high
Failure	On	Defect
	Off	Not defect

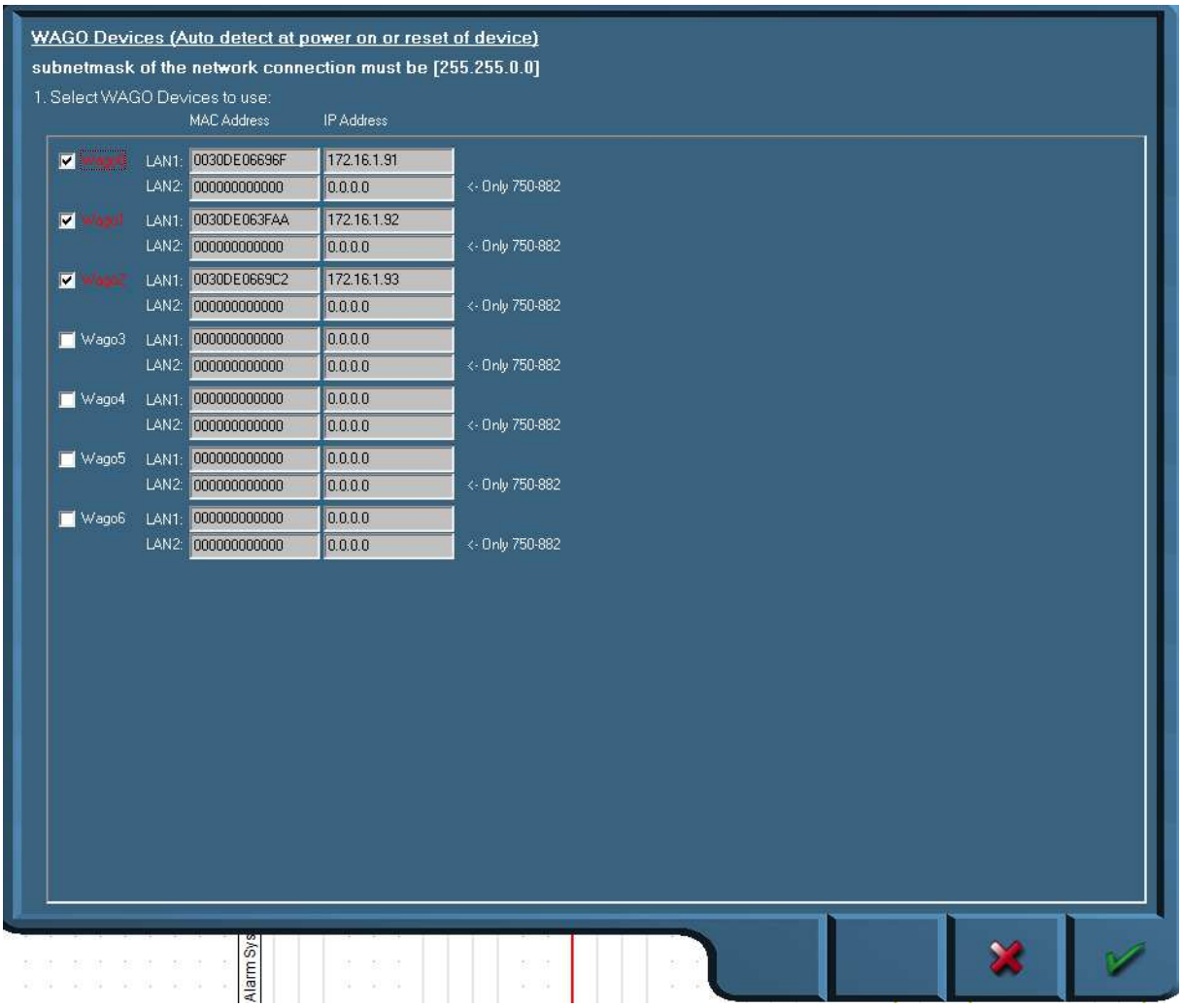


Figure 5-58: Wago Device Manager

When the devices are correctly installed and connected, the respective MAC addresses will be shown via the “Wago Device Manager” window. The “Mod0” and others that are found are shown green. If a Wago is specified with an IP address and there is no connection, the Text will be red.

If the MAC addresses is not showing, it is possible that there is no connection with the specific Wago or the Wago devices need to be restarted. This can be accomplished by

- Disconnecting electrical power from the Wago device for a short period of time
- By pushing down the operating mode switch (see Figure 5-59).

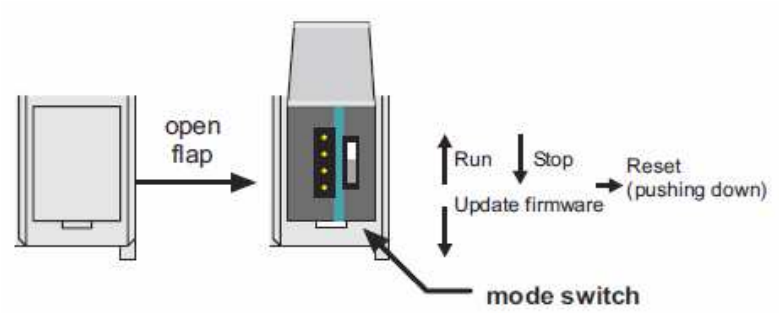


Figure 5-59: Operating mode switch (Wago)

The operating mode switch (see Figure 5-59) is a push/slide switch with 3 settings and a hold-to-run function.

Operating mode switch	Function
From center to top position	Activate program processing (RUN)
From top to center position	Stop program processing (STOP)
Lower, bootstrap	For original loading of firmware, not necessary for user
Push down (i.e. with screwdriver)	Hardware reset. All outputs and flags are reset; variables are reset to 0 or to FALSE or to an initial value. Retain variables or flags are not changed. The hardware reset can be performed with STOP as well as RUN in any position of the operating mode switch!

If the device manager shows a MAC address, check this against the MAC address on the head station on the Wago. If it is right, click the check box.
Fill in the IP address the Wago device (must be in the same range as the PC, i.e. 172.16.x.x).
For Wago the last digits are in the 90 range. The very first connected Wago will be set to 172.16.1.91 and the next available to 172.16.1.92 etc.
Confirm the settings by clicking the “OK” button. The screen will show the connected Wago devices, their respective MAC addresses, their given IP addresses and the server they are connected to.

5.8.5 Wago calibration

In Wago you can calibrate the analogue sensors, which is especially proficient when it is non-linear. As example we'll show the calibration of a tank.
The best steps to calibrate the tank sensors are as following:

1) Shut down all the NavVision installations (i.e. other servers and clients) except for one server. This must be done to make sure this server's calibration will not accidentally be overwritten by any other system on the network
2) On the running Server system, open the Wago configuration and follow the next steps for every field
3) Press the "W" on the (i.e 750-454) modules containing the tank level sensors. The 750-454 modules measures 4 to 20 mA (see Figure 5-60)
4) You now see the old calibration or the standard linear one. Be aware of the measuring unit used.
   The graph (see Figure 5-61) shows the unity on the Y-axis; depending on the actual field settings
5) Write down the measured mA for an empty tank. The measured mA is shown below the graph.

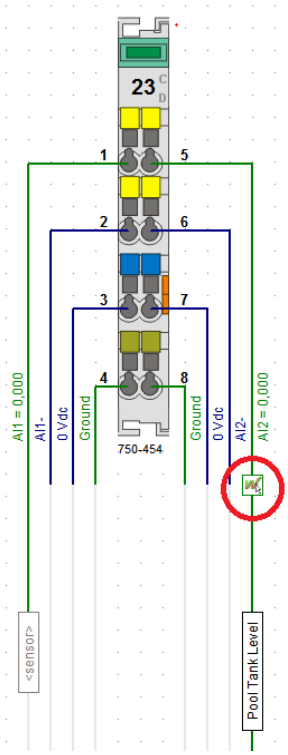


Figure 5-60: Calibration

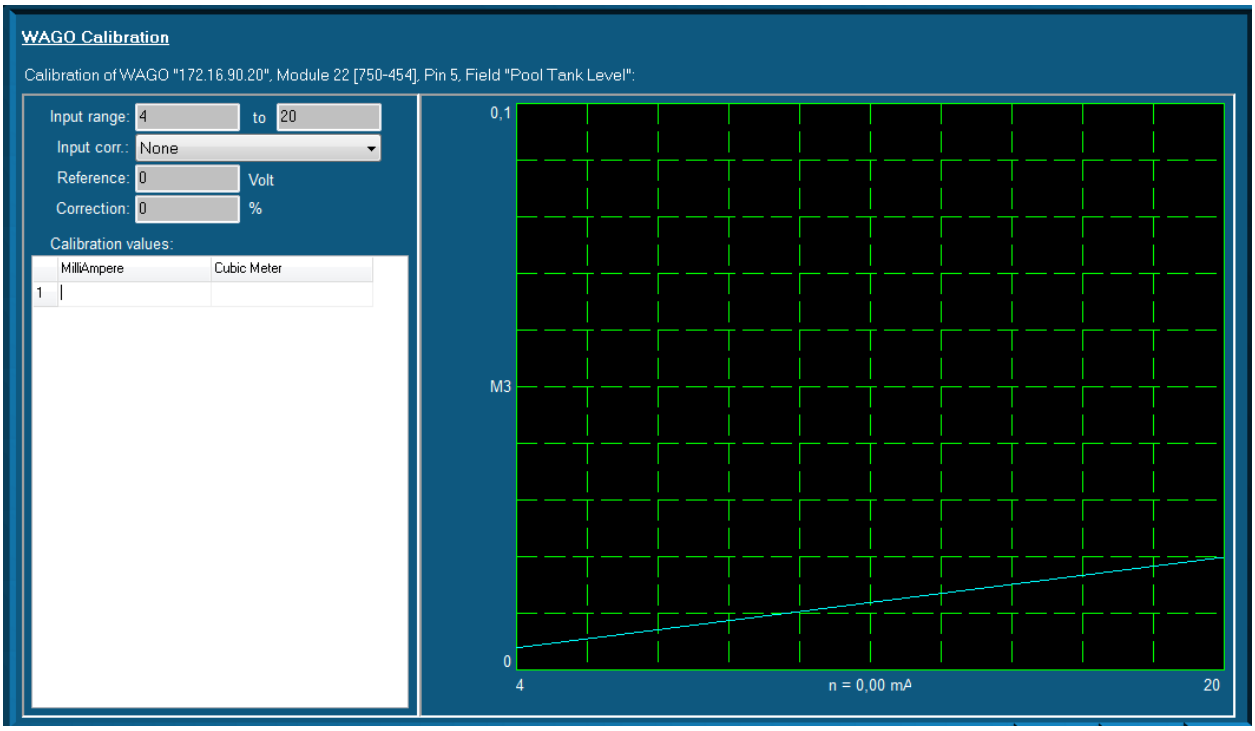


Figure 5-61: Graph (WAGO calibration)

You can enter this value in the first row/first column of the table. In the right column, enter "0". This column is the amount of unity's noted down in step four.
You now have configured that this amount of mA gives "0" (gallons/liters/...)

6) Fill the tank until you see the mA changing.
   Depending on the sensor, it can be that the first amount is not measured
7) Write down this mA and amount of liters/gallons (depending on the unity) on the next row
8) Repeat the filling/noting down the values steps as much times as you like. If the tank is completely linear, four times could be a good choice. If not, it's better to make more measurements concerning the odd-shaped part of the tank
9) Finally, be sure to take a measurement with a full tank. You now see the blue line containing your calibration (see Figure 5-62)
10) Repeat step 3 t/m 9 for every tank sensor available on the ship
11) Shut down NavVision ®
12) Copy the file "cal.ini" from the "config" folder of the configured NavVision to an USB stick. This file contains all the calibrations made
13) Copy this file ("cal.ini") FROM the USB stick TO every server system on the ship. Choose to overwrite the old calibration of the servers.

From this particular moment each system is calibrated.

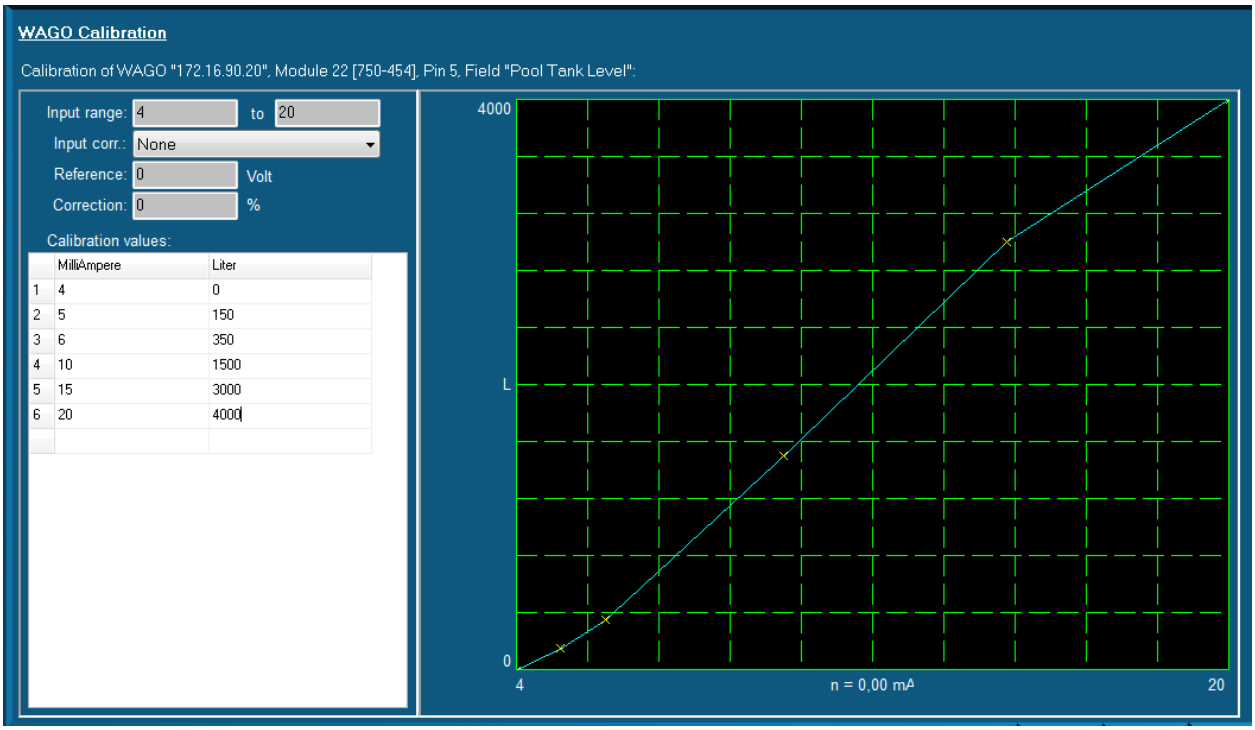


Figure 5-62: Graph Calibrated

5.9 Network

Under “Configuration > Network” the present network connections are shown (on right-hand side of window).
Select the IP-addresses of the network ports to use with the network server / client module (click and hold the Ctrl-key to select multiple network ports).
To confirm the settings, click “Accept and restart communications”.

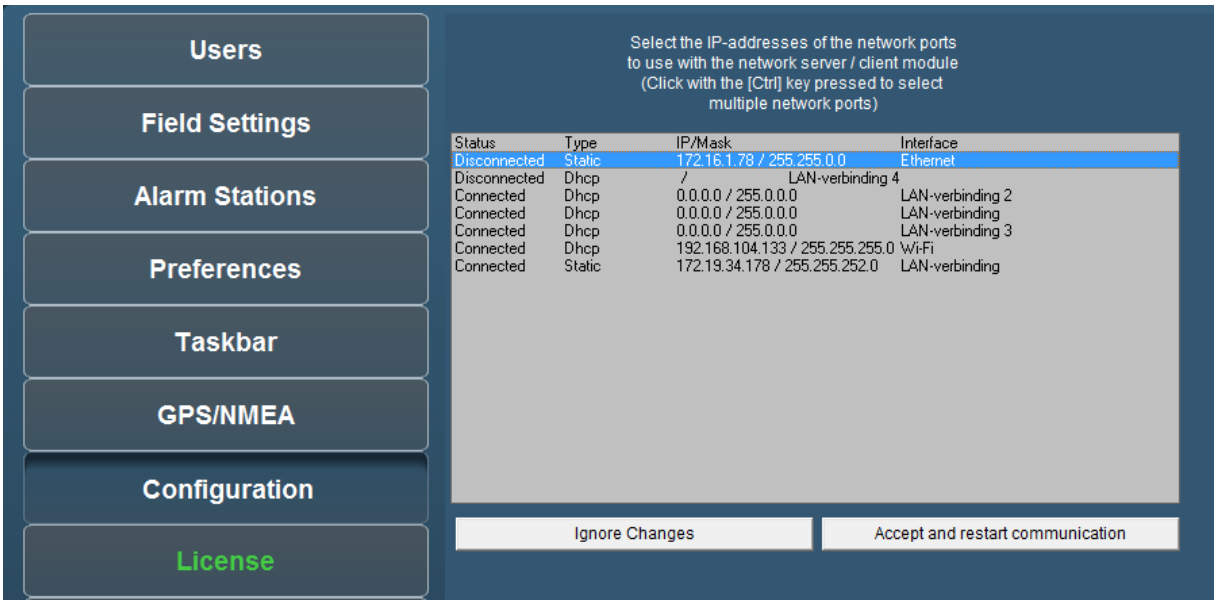


Figure 5-63: Network

If there is no connection between server-clients or server-server, this is the most appropriate way to check. If the network ports aren’t selected here, there is no connection possible. Make sure that all the network ports are selected and then acknowledge via button “Accept and restart communications”.

5.10 System Layout

The system layout is a visible representation of the complete topology. Here you can find all the devices and interfaces with their respective connections (see Figure 5-64).

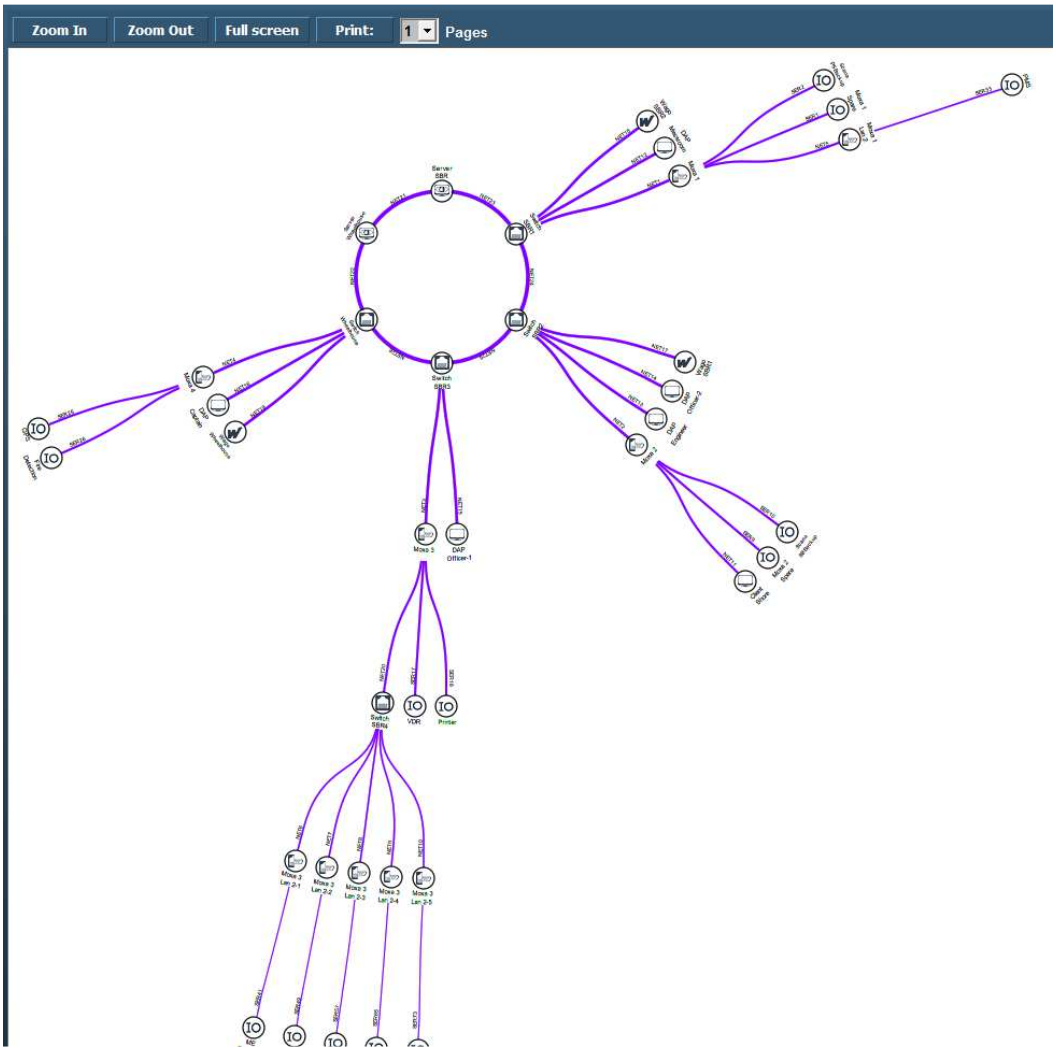


Figure 5-64: System Layout

If set-up alright here you will find a perfect circle with all the separate devices attached. Also the names of the devices and interfaces will be available. You can zoom in and out and print the page.

The lines are at first purple, which means that the connection haven't been seen yet. Once the connection is established, the lines should turn green. It is, of course, important that all the lines are green for the system to work properly. If a connection gets lost, the line, and all the adjacent lines that are influenced, will turn red, meaning that the connection is lost. An alarm will also appear.

This is perfect for quick troubleshooting of the network.

5.11 Soft PLC

5.11.1 General

A PLC (programmable logic controller) is an electronic device with a microprocessor that, on the basis of its various inputs, controls its outputs. A good example is the Wago PLC that we use often with our system. To make it easier to use and also to extend the range to use it with, we developed a soft PLC for NavVision. It is way beyond the scope of this manual to explain in depth the various ways to use this soft PLC, so we merely touch the handling features. For more information please refer to Free Technics and in the future to the Soft PLC Manual.

5.11.1.1 Basics

When you open Soft PLC for the first time you get an empty screen (see Figure 5-65)

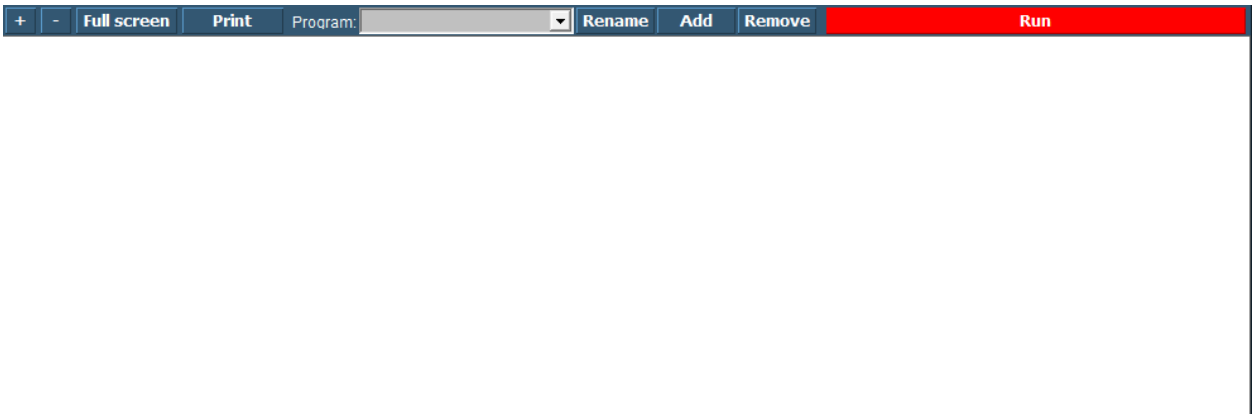


Figure 5-65: Soft PLC

The following figures apply to the buttons on the screen:

Soft PLC Switch	Function
+/-	Zoom in or out
Full Screen	Goto Fullscreen mode
Print	Print the Ladder Diagram
Program	Choose which PLC program you want to adjust by clicking the dropdown button
Rename	Rename the PLC program
Add	Add a new PLC program
Remove	Remove a PLC program
Run	Manually run or stop a specific PLC program

5.11.2 Simple example

Just to explain how it works, we will show a small example. This is merely to show how the diverse methods of implementing work in case you are already familiar with PLC programming.

5.11.2.1 Start

When you click “Add” you will start a new program. This program starts with an empty line an is called “SoftPLC1” if it is the first program you start. If you click “Rename” you can give it a distinctive name, which will pay off when you have a lot of PLC programs in your system (see Figure 5-66).

Figure 5-66: SoftPLC Rename

Once you renamed it, you can go on with the program. For those familiar with PLC programming, you will recognize this as a ladder diagram. With the “+” you can add lines before or after and with “–“ you can remove the line.

We start this program with a bilge pump, which should run when a certain bilge alarm is high. When you click at the left side of the “0” a new pop-up appear with choices (see Figure 5-67). These are beyond the scope of this manual to discuss, but if you know PLC programming, you will know what they are.

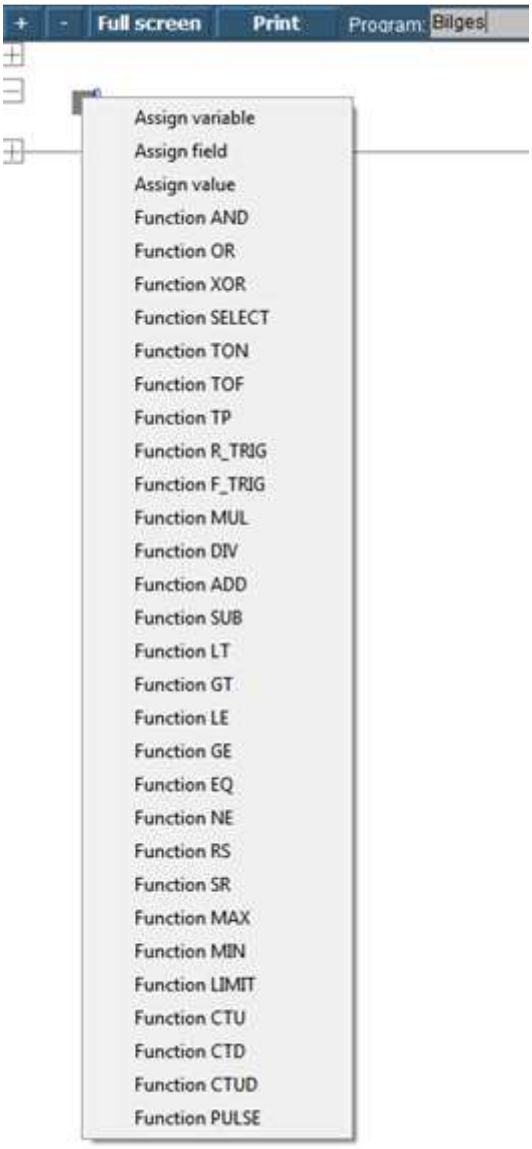


Figure 5-67: SoftPLC pop-up

We choose for “Assign Field” to assign the Bilge Alarm as a trigger (see Figure 5-68). Now we get into the FT part of the SoftPLC, the element-fields. After choosing this field the PLC line will look as in Figure 5-69

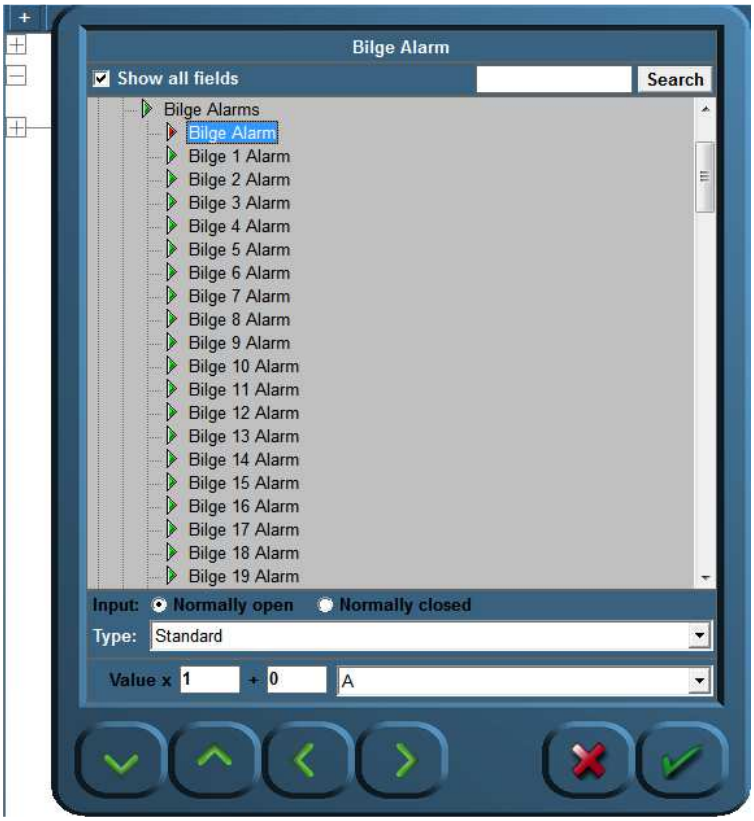


Figure 5-68: SoftPLC Assign Field

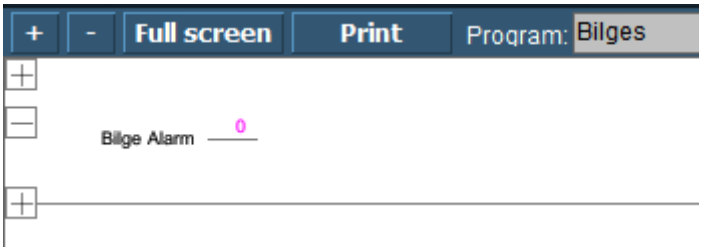


Figure 5-69: SoftPLC first Line

We do the same at the right side of the “0” but this time we choose the Bilge Pump. We end up with a line like in Figure 5-70.

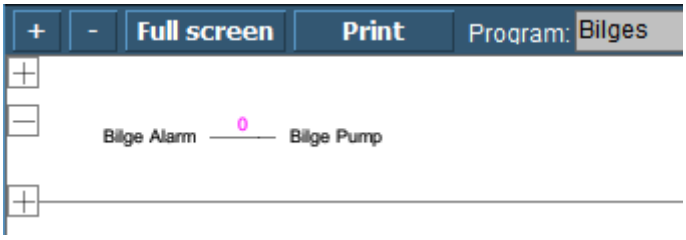


Figure 5-70: SoftPLC First Line_2

So now when you press “Run” the program will run and check the bilge alarm over and over. Once it gets high, the connection in the line gets high (1) and the Bilge Pump starts running until the alarm is not high anymore.

5.11.2.2 Control

You can understand that you can control the NavVision installation much more once you use SoftPLC. You can make all kind of interactive switches and much more. Much of the ACS (automatic Control Sequences) will be made in SoftPLC.

5.12 Tank Tables

5.12.1 General,

Each ship must have some kind of device to show the content of the different tanks. Whether it is a glass tube, a pressure sensor, a capacitive sensor or a float unit, they are all designed to show the contents of the particular tank. While the first is a mechanical device, the rest is merely electrical.

The bigger ships will rely more on an accurate reading. Not only will they travel over longer distances, or need to be cost effective, they also often need to balance the ship by even things out in diverse ballast tanks. You can understand that the calibration of these sensors will have to be quite accurate.

5.12.2 Types of sensors

We will focus here on the electrical sensors as the mechanical ones gets more and more obsolete. The most used ones are

- The floating sensor
- The capacitive sensor
- The pressure sensor

5.12.2.1 Floating sensor

The floating sensor can be compared with the float unit that is used in toilets. These type of sensors are level-sensors. They measure how high (or low) the level of the fluid in the tank is. They can be equipped with a floating device connected to a hinged part, where the hinged part is electrically connected to a resistor which will give a voltage or milli-amperage that can be used to show the actual level of the liquid. The floating device can also be a magnetic ring attached around a pipe.

5.12.2.2 Capacitive sensor

The principle of capacitive level measurement is based on change of capacitance. An insulated electrode acts as one plate of capacitor and the tank wall (or reference electrode in a non-metallic vessel) acts as the other plate. The capacitance depends on the fluid level. An empty tank has a lower capacitance while a filled tank has a higher capacitance. While this is also a level measuring type.

5.12.2.3 Pressure sensor

The pressure sensor is not a level indicator. It measures the liquid pressure (Pl) of the column of liquid above the sensor. In conjunction with the density of the liquid you can calculate the volume of the liquid. When the architect of the tanks has provided a sounding table, with the liquid pressure you can calculate the height of the liquid as well as the m3 of liquid. Again with the density you can calculate the mass (tonnage). You can see that this provides a very accurate and diverse scheme for the tanks that is very useful.

Within the NavVision system all this calculations are done automatically once you provided one of the variables (see Figure 5-71).

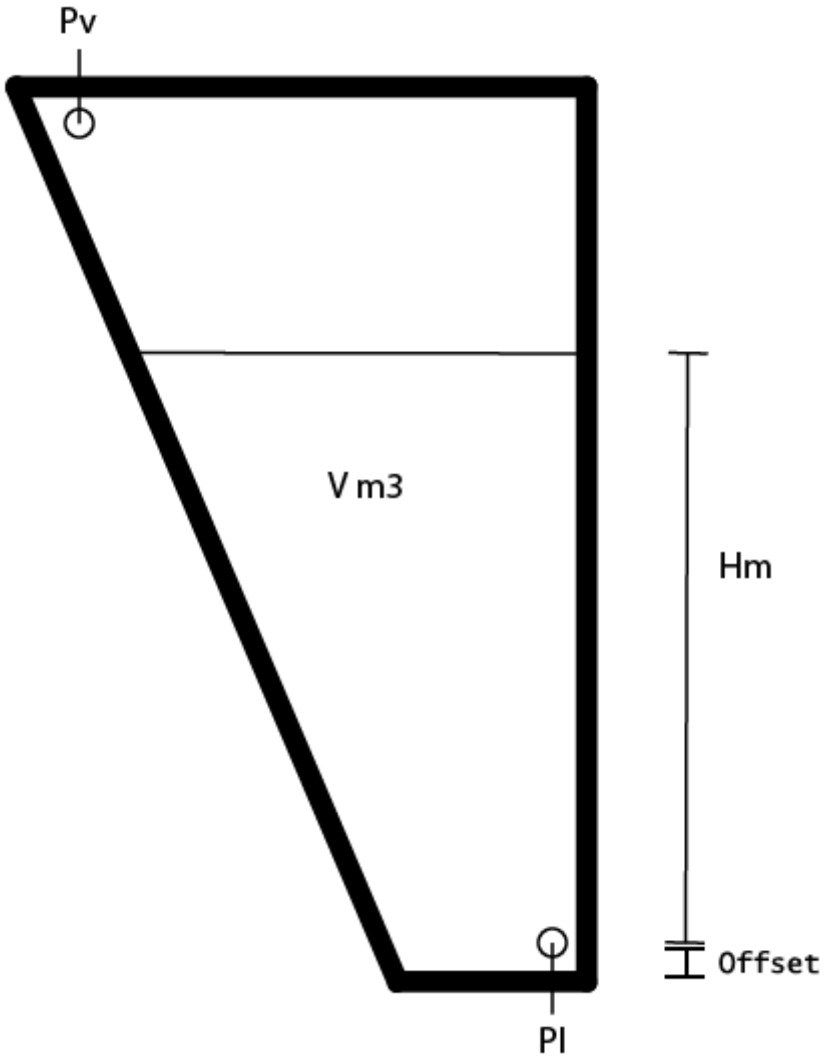


Figure 5-71: Tank Pressure Sensor

Abrreviation	Explanation
Pl	Liquid Pressure
Pv	Vent Pressure
V m3	Volume in square meter
Hm	Height in meter
Offset	Offset sensor in meter

Table 5-4: Pressure sensor explanation

When not provided with a Pressure Vent Sensor it might give some strange irregularities. Especially when the vent-pipe is too small it will interfere with a good reading of the pressure sensor, while the air above the liquid column will be shifting all the time. It might then be necessary to place a Vent Pressure Sensor to even this out. Also this calculation is done automatically within FT NavVision ©.

5.12.3 Calculations

Just for your understanding we will put down the calculations we make in NavVision.

Depending on which value you have, we distinct the following calculations:

$$H = \frac{\mathrm{Pc} * 100}{\mathrm{g} * \mathrm{D}}$$

$$Pc = \frac{\mathrm{H} * \mathrm{g} * \mathrm{D}}{100}$$

Pc = Pl – Pv (mBar)

g = 9.80665 (m/s^2)

D = Density (kg/m^3)

Abrreviation	Explanation
H	Height
Pc	Pressure column
g	Average gravity
D	Density
Offset	Offset sensor in meter

5.12.4 Offset

Every sensor will have an offset. None of the sensors will be exactly on the bottom of the tank. Especially when the tank expands upwards, a small offset can make a big difference when the tank is full.

When you know the offset of the sensor you can adjust this in the tune table of that particular tank. Goto Fieldsettings/tune and look for the tank that you are about to adjust. Make sure you use the “Height” value. See the following figure:

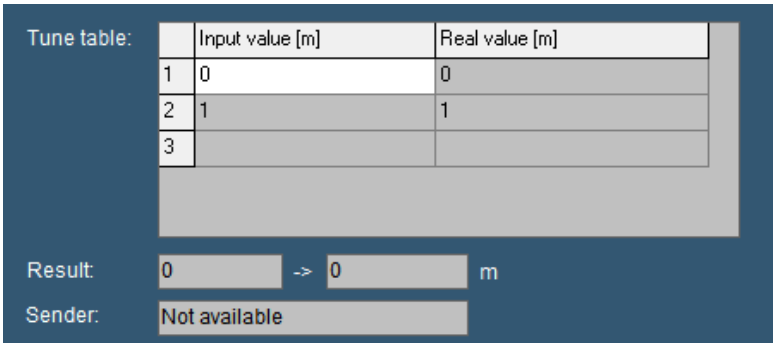


Figure 5-72: Tune table

As shown in the x/y-matrix (see Figure 5-73), it gives a linear line that is 0-output at 0-input and 1-output at 1-input.

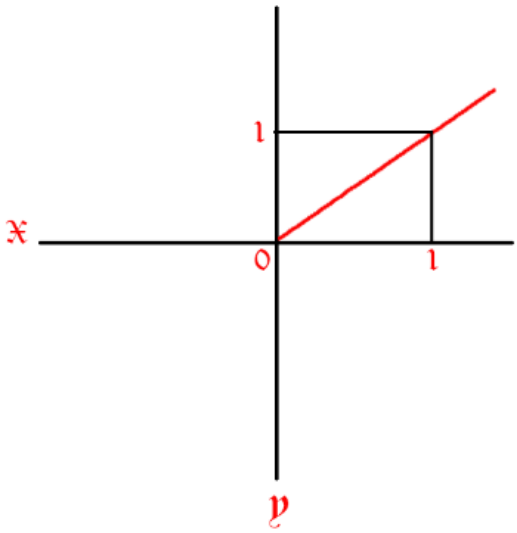


Figure 5-73: Tune Example 1

When you want to set an offset, you have to change at least 2 set-points to make the whole line go up and stay linear (see Figure 5-74). If you change just 1 point it will skew in another direction. As soon as you set 2 new set-points in the tune-table, the line will move up- or downwards and will be linear adjusted (see Figure 5-75).

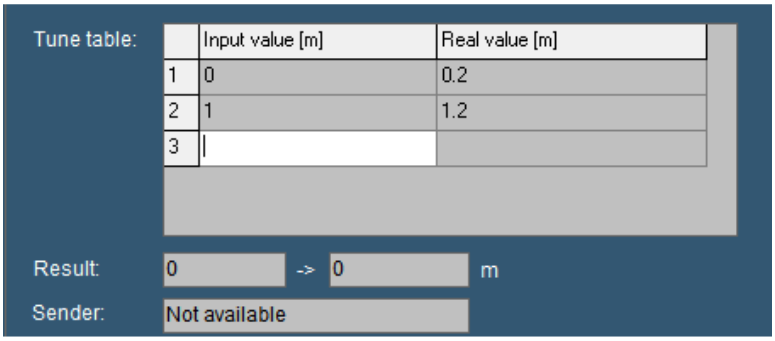


Figure 5-74: adjusted tune table

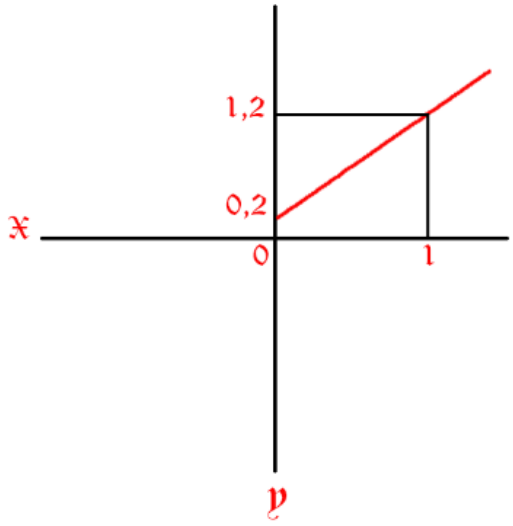


Figure 5-75: Tune Example 2

5.12.5 Inserting sounding tables

Under Configuration>Tank Tables you can find all the tanks (see Figure 5-76).

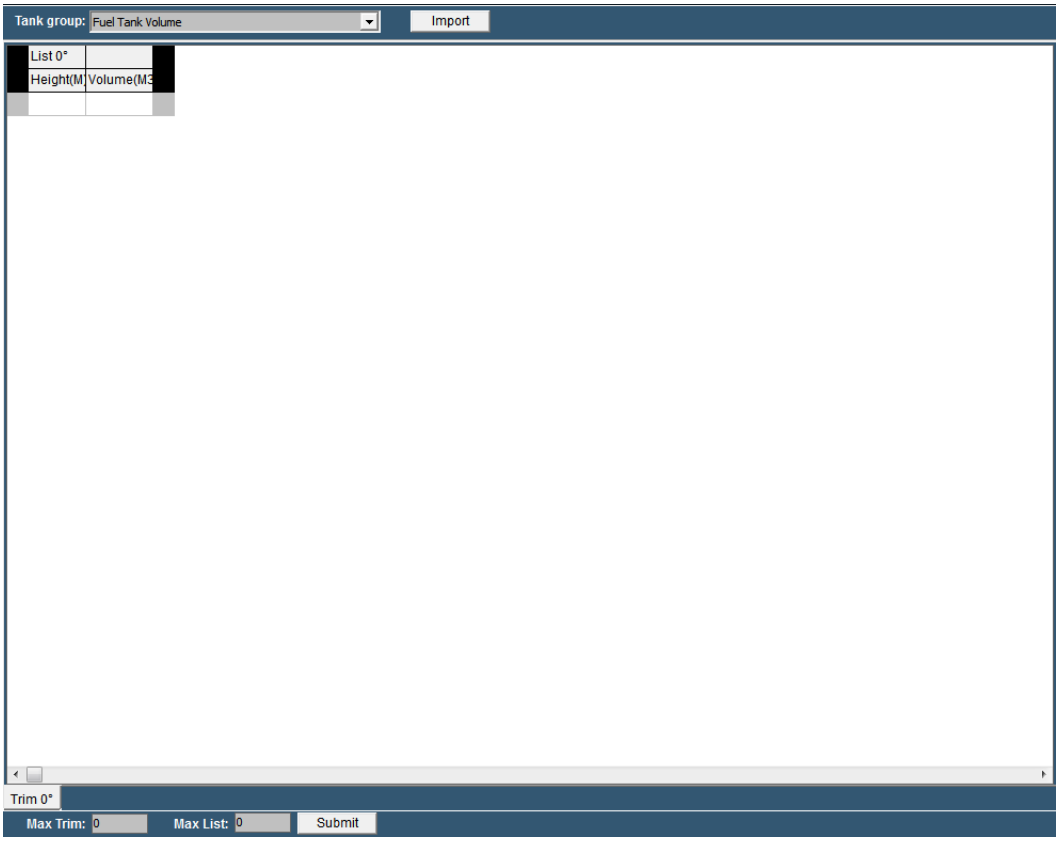


Figure 5-76: Tank Tables

Detail	Description
Tank Group	Find the tank you want to adjust a tank table for
Import	Import an Excel-sheet with sounding data
Max Trim	Max pitch (if provided in sounding table)
Max List	Max Roll (if provided in sounding table)
Submit	Submit Trim and List

Table 5-5: Tank Tables

5.12.5.1 Tank Group

In the drop down menu you can search for the tank that you are about to adjust. You will get all the tanks available. In this example we will use the Fuel Tank 1 Volume (see Figure 5-77).

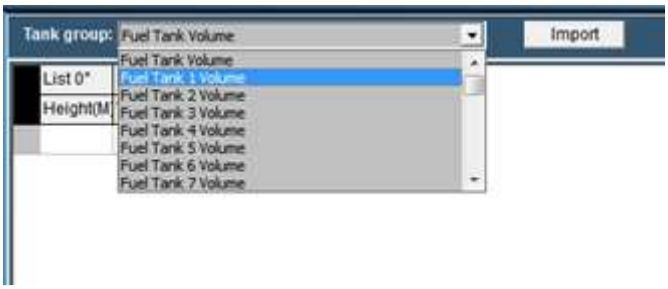


Figure 5-77: Tank Group Drop Down

You'll notice it only shows the tank group volumes, as that is what you get in the sounding table. As mentioned earlier with height and volume, FT NavVision © can calculate all the other values.

Now that you have chosen the right tank, you can manually fill in the diverse heights and volumes. Make sure you start with "0" and end with the highest value or your value will be the wrong way around.

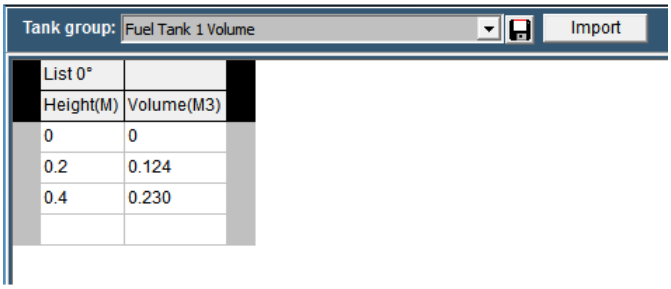


Figure 5-78: Filling in tank tables

As soon as you start filling in the numbers you will see a "save button" appear next to the drop down menu (see Figure 5-78). With this button you can save the calibration table to the specific tank. NavVision will immediately start working with this values.

Of course filling in large amounts of data like this will be quite time consuming. Therefor it is possible to import the data from an excel sheet providing the excel sheet is setup the right way.

5.12.5.2 Excel import

Most times the calibration tables or sounding tables will be available in some kind of excel format. It is wise to start with a new excel-sheet where you transfer the data from the sounding tables to, one by one. You can name the different tabs to the "trim" and "list" (see Figure 5-79).

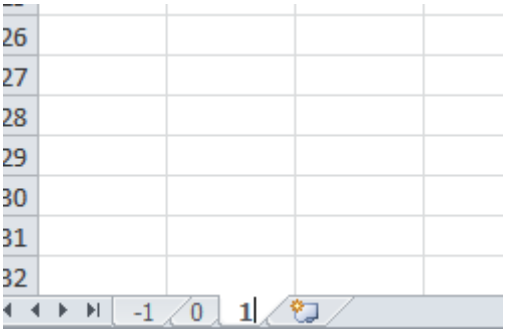


Figure 5-79: Excel tabs

So for an example list we take the following sounding table:

SENSOR BOTTOM HEIGHT FROM TANK TOP (METER)	TANK CAPACITY (M^3)
2.335	25.987
2.235	24.565
2.135	23.112
2.035	21.688
1.935	20.274
1.835	18.871
1.735	17.480
1.635	16.103
1.535	14.741
1.435	13.396
1.335	12.071
1.235	10.768
1.135	9.491
1.035	8.243
0.935	7.030
0.835	5.856
0.735	4.730
0.635	3.665
0.535	2.684
0.435	1.830
0.335	1.140
0.235	0.612
0.135	0.248
0.000	0.046

Figure 5-80: Example Sounding Table

As you can see it goes from high to low, which is the wrong way around, but we change that later. First select all the values and “control-c” to copy the data. Go back to your original excel document and paste it on the SECOND row (see Figure 5-81).

Use Paste Special “values” or “Unicode”

In the first row you need to use an empty cell and the second cell with the "List" degree-number

	A	B
1		0
2	2.335	25.987
3	2.235	24.565
4	2.135	23.112
5	2.035	21.688
6	1.935	20.274
7	1.835	18.871
8	1.735	17.48
9	1.635	16.103
10	1.535	14.741
11	1.435	13.396
12	1.335	12.071
13	1.235	10.768
14	1.135	9.491
15	1.035	8.243
16	0.935	7.03
17	0.835	5.856
18	0.735	4.73
19	0.635	3.665
20	0.535	2.684
21	0.435	1.83
22	0.335	1.14
23	0.235	0.612
24	0.135	0.248
25	0	0.046

Figure 5-81: Excel sheet import list

Now select all the values except for the upper row and choose "Sort>from low to high" to get the data in the right order. Once this is done you will have the right values for the list (see Figure 5-82).

1		0
2	0	0.046
3	0.135	0.248
4	0.235	0.612
5	0.335	1.14
6	0.435	1.83
7	0.535	2.684
8	0.635	3.665
9	0.735	4.73
10	0.835	5.856
11	0.935	7.03
12	1.035	8.243
13	1.135	9.491
14	1.235	10.768
15	1.335	12.071
16	1.435	13.396
17	1.535	14.741
18	1.635	16.103
19	1.735	17.48
20	1.835	18.871
21	1.935	20.274
22	2.035	21.688
23	2.135	23.112
24	2.235	24.565
25	2.335	25.987

Figure 5-82: Excel list sorted

Now save the new made table as “Excel97-2003 *.xls”file. In this case we name it “Fuel Tank 1”.

5.12.5.3 Import from excel

Now go back to the “tank tables” and click on “import”. Look for the excel file you just created and choose it for import. Click OK and the list will be imported and shown (see Figure 5-83).

At this time you can save the table and it will be used within the calculation of NavVision.

List 0°	
Height(M)	Volume(M3)
0	0,046
0,135	0,248
0,235	0,612
0,335	1,14
0,435	1,83
0,535	2,684
0,635	3,665
0,735	4,73
0,835	5,856
0,935	7,03
1,035	8,243
1,135	9,491
1,235	10,768
1,335	12,071
1,435	13,396
1,535	14,741
1,635	16,103
1,735	17,48
1,835	18,871
1,935	20,274
2,035	21,688
2,135	23,112
2,235	24,565
2,335	25,987

Figure 5-83: Imported Table

5.12.6 Trim and List

Ships move in different directions. They can roll over the latitude axis (the roll or list), or over the longitude axis (the pitch or trim). You can imagine that when the ship is moving, the liquids in the tanks will also move. This way the method of measuring with a pressure sensor will have some shortcomings.

For instance, when the ship is rolling over, the liquid column above the pressure sensor can alter. In this example it gets shorter (see Figure 5-84). This way the calibration will alter. The pressure sensor thinks it has a smaller column of liquid and will refer to the calibration table. While the tank is abating here, there will be much more liquid available than the calibration table will say.

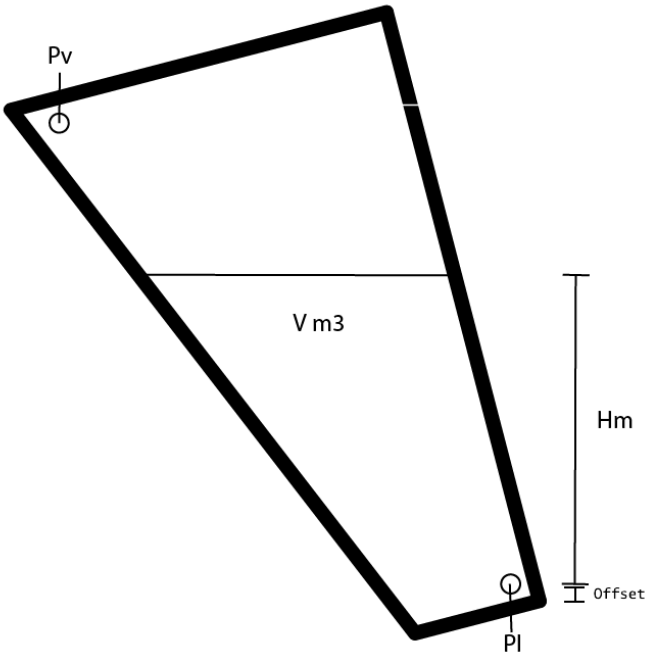


Figure 5-84: Roll and Pitch

When an architect kept that in mind he surely will have the calibration or sounding table recalculated in different roll and pitch positions. This way you can make an even more accurate calibration.

5.12.6.1 Roll and Pitch in the Tank Table

In the tank table page you will find two “edit fields”. One for the Trim and one for the List. While Trim is the Pitch of the ship and List is the roll of the ship you can alter the number accordingly to the number of different sounding tables you have. If, let’s say, you have seven Trim Tables, fill in the number “3” and press “submit”. You’ll notice that there are now three tabs on either side of the 0-degree tab. -3,-2,-1,0,1,2 and 3 degree (see Figure 5-85). For this you need to have 7 different sounding tables from the architect.

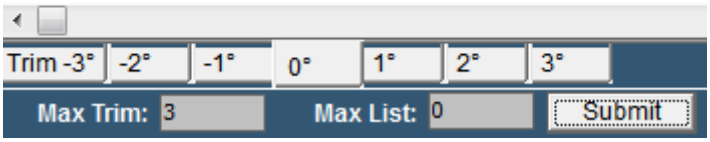


Figure 5-85: Max Trim

Now let’s say that you have only three sounding tables for the roll (List). Fill in the number “1” and press “submit”. Now you will have three different columns for the sounding tables of the “List” -1,0 and 1 degree (see Figure 5-86).

List -1°		List 0°		List 1°	
Height(M)	Volume(M3)	Height(M)	Volume(M3)	Height(M)	Volume(M3)

Figure 5-86: Max List

This way you'll have 3 different "list" columns for 7 different "trim" tabs so 21 different calibration points (see Figure 5-87). In this ideal configuration you will have a very accurate calibration.

List -1°		List 0°		List 1°	
Height(M)	Volume(M3)	Height(M)	Volume(M3)	Height(M)	Volume(M3)
		0	0,046		
		0,135	0,248		
		0,235	0,612		
		0,335	1,14		
		0,435	1,83		
		0,535	2,684		
		0,635	3,665		
		0,735	4,73		
		0,835	5,856		
		0,935	7,03		
		1,035	8,243		
		1,135	9,491		
		1,235	10,768		
		1,335	12,071		
		1,435	13,396		
		1,535	14,741		
		1,635	16,103		
		1,735	17,48		
		1,835	18,871		
		1,935	20,274		
		2,035	21,688		
		2,135	23,112		
		2,235	24,565		
		2,335	25,987		

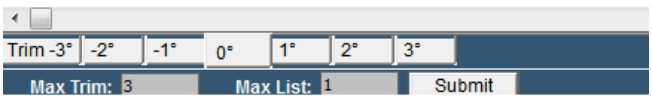


Figure 5-87: Trim/List example

5.12.6.2 Trim and list in Excel

When you are importing sounding tables through an Excel list you would like to put in the trim and list at the same time. This is possible by doing the following:

Taken the previous as example you will have to make 7 tabs and rename them according to the degrees in the sounding table. For the trim you will make a column for each degree that you have in the sounding table and rename these in the upper row right cell of each separate column (see Figure 5-88).

	A	B	C	D	E	F
1		-1		0		1
2	0	0.046	0	0.046	0	0.046
3	0.135	0.248	0.135	0.248	0.135	0.248
4	0.235	0.612	0.235	0.612	0.235	0.612
5	0.335	1.14	0.335	1.14	0.335	1.14
6	0.435	1.83	0.435	1.83	0.435	1.83
7	0.535	2.684	0.535	2.684	0.535	2.684
8	0.635	3.665	0.635	3.665	0.635	3.665
9	0.735	4.73	0.735	4.73	0.735	4.73
10	0.835	5.856	0.835	5.856	0.835	5.856
11	0.935	7.03	0.935	7.03	0.935	7.03
12	1.035	8.243	1.035	8.243	1.035	8.243
13	1.135	9.491	1.135	9.491	1.135	9.491
14	1.235	10.768	1.235	10.768	1.235	10.768
15	1.335	12.071	1.335	12.071	1.335	12.071
16	1.435	13.396	1.435	13.396	1.435	13.396
17	1.535	14.741	1.535	14.741	1.535	14.741
18	1.635	16.103	1.635	16.103	1.635	16.103
19	1.735	17.48	1.735	17.48	1.735	17.48
20	1.835	18.871	1.835	18.871	1.835	18.871
21	1.935	20.274	1.935	20.274	1.935	20.274
22	2.035	21.688	2.035	21.688	2.035	21.688
23	2.135	23.112	2.135	23.112	2.135	23.112
24	2.235	24.565	2.235	24.565	2.235	24.565
25	2.335	25.987	2.335	25.987	2.335	25.987
26						
27						
28						
29						
30						
31						
32						

-3 -2 -1 0 1 2 3

Figure 5-88: trim and list excel example

Now save the excel sheet, import it in the tank table page, save it and you will have all the data ready to be used by NavVision (see Figure 5-89)

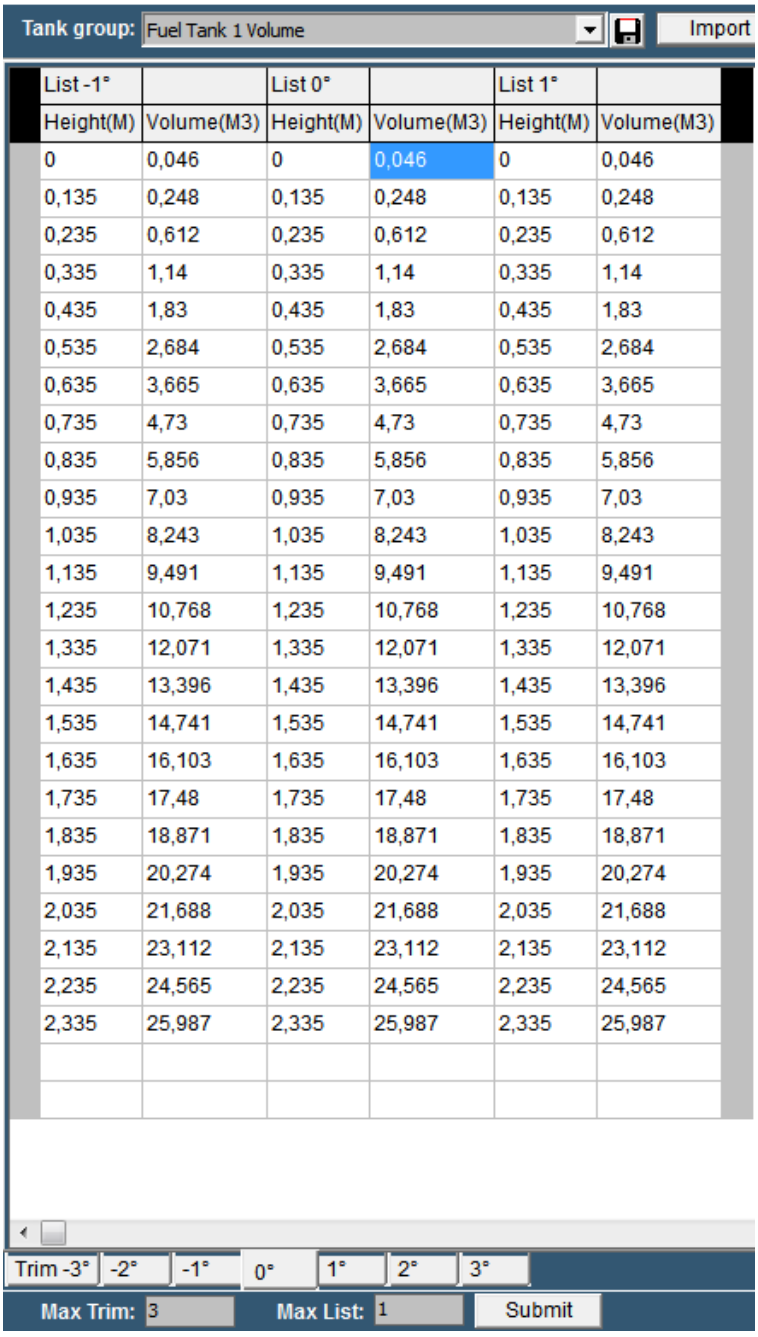


Figure 5-89: Tank Table excel Trim and List import

Max Trim and Max List is 20 degrees

5.13 WatchIO

WatchIO is the uniform language protocol of the Unimacs Bridge. NavVision can talk with the Unimacs Bridge using the WatchIO protocol.

This connection results in the following:

- Unimacs (sensor) data can be shown in NavVision and, if necessary, it can be changed by NavVision (i.e. the color scheme).
- NavVision data can be published through WatchIO to be used in other Unimacs Applications.

5.13.1 Programming

The programming of the WatchIO is done by NavVision itself. Make sure that you use at least revision 9.18.03.3904 or higher.

The best way to import the WatchIO fields that you want to use is by using the sensorlist. We refer to the sensorlist manual for information on how to setup WatchIO by importing a sensorlist.

Once imported and running you can see the fields that are imported under Tools>Configuration>WatchIO (see Figure 5-90).

:

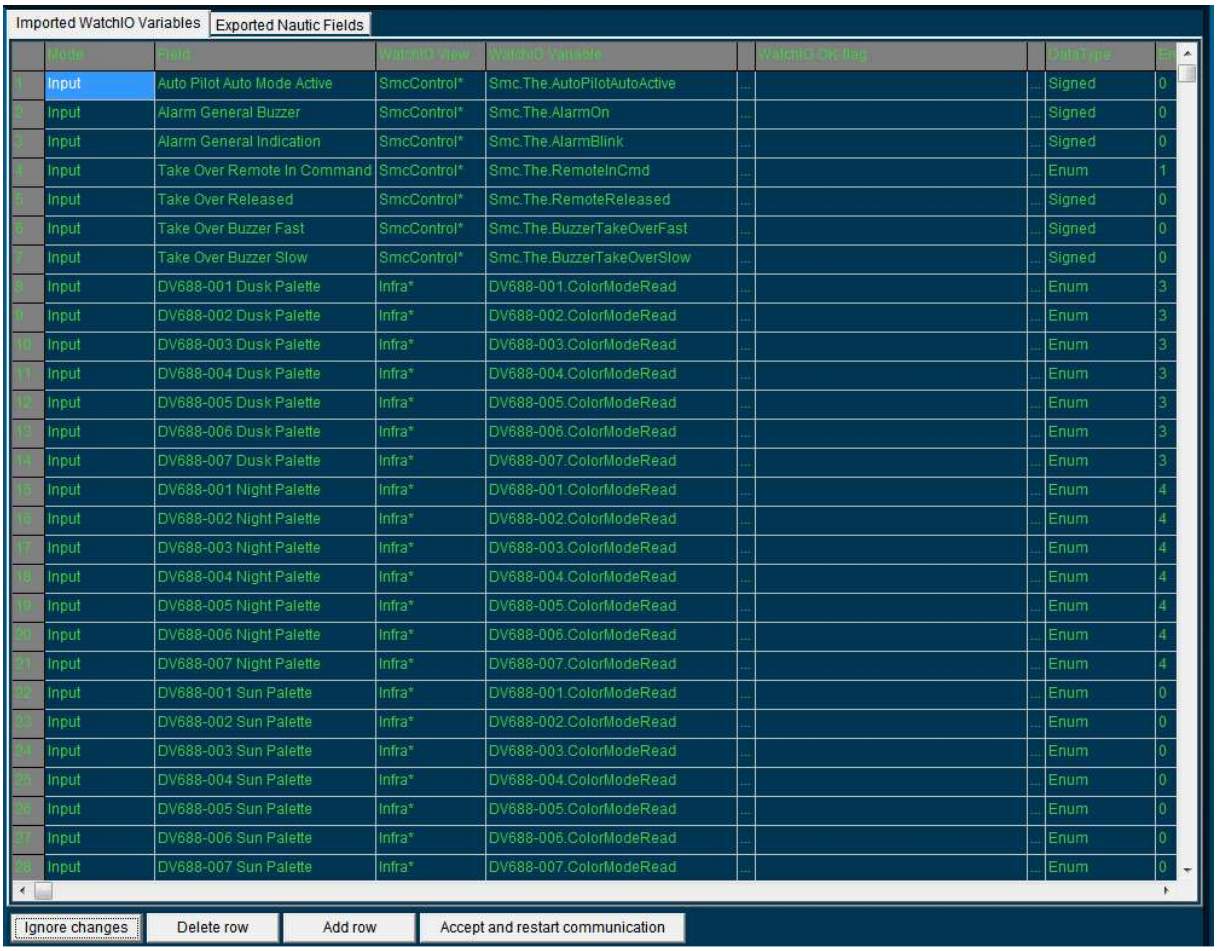


Figure 5-90: WatchIO panel

Here you will find all the fields that are imported through the sensorlist along with all the variables that you have set in the sensorlist. By clicking on a field you can change these fields, either by a drop down menu or by changing the text. You can even add or delete complete rows. The fields that are published by NavVision are on the tab “Exported nautic fields” (see Figure 5-91).

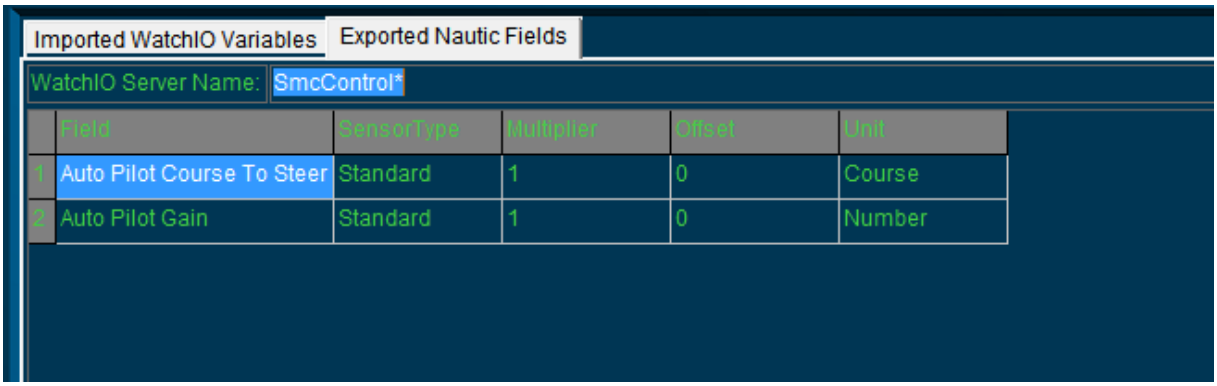


Figure 5-91: Exported nautic fields

Detail	Description
Ignore changes	Ignore all the changes that you have made
Delete row	Delete the row that you highlighted
Add row	Add a row at the bottom
Accept and restart communication	Save changes and restart communication

Table 5-6: WatchIO

5.13.2 Communication problems

If you have imported the sensorlist and still do not see fields under Tools>Configuration>WatchIO, than there is probably something wrong in the ini-file. Look in the NavVision folder under config>local for the file “watchIO.uc.ini”. Double-click to open it. You will see something like the following”

```
[Paths]
ServiceDir=C:\Users\Vince\Desktop\FT Test\Imtech\bin
DataDir=C:\Users\Vince\Desktop\FT Test\Imtech\Data\blueline_dp\infra
SmcInfradllDir=C:\Users\Vince\Desktop\FT Test\Imtech\bin
WatchIOdllDir=C:\Users\Vince\Desktop\FT Test\Imtech\bin
StartService=true
StartServer=true

[Publish]
Field0=ApilotCourseToSteer,Standard,StaticUnit,1,0
Field1=ApilotGain,Standard,NumberUnit,1,0
Server=SmcControl*
```

Figure 5-92: watchIO.uc.ini

Under “Paths” check that these paths are pointing at the right location.

Take care that the server names (the names of the main workstations in the NavVision system) are exact as they are in the Unimacs Bridge application. If these two names differ, there will be no connection. If you work in close cooperation with the bridge-engineers, this shouldn’t be a problem.

6. BNWAS Settings

Under the tab “Alarm Settings” you will find the BNWAS Configuration button. It will open up the following window.

‘

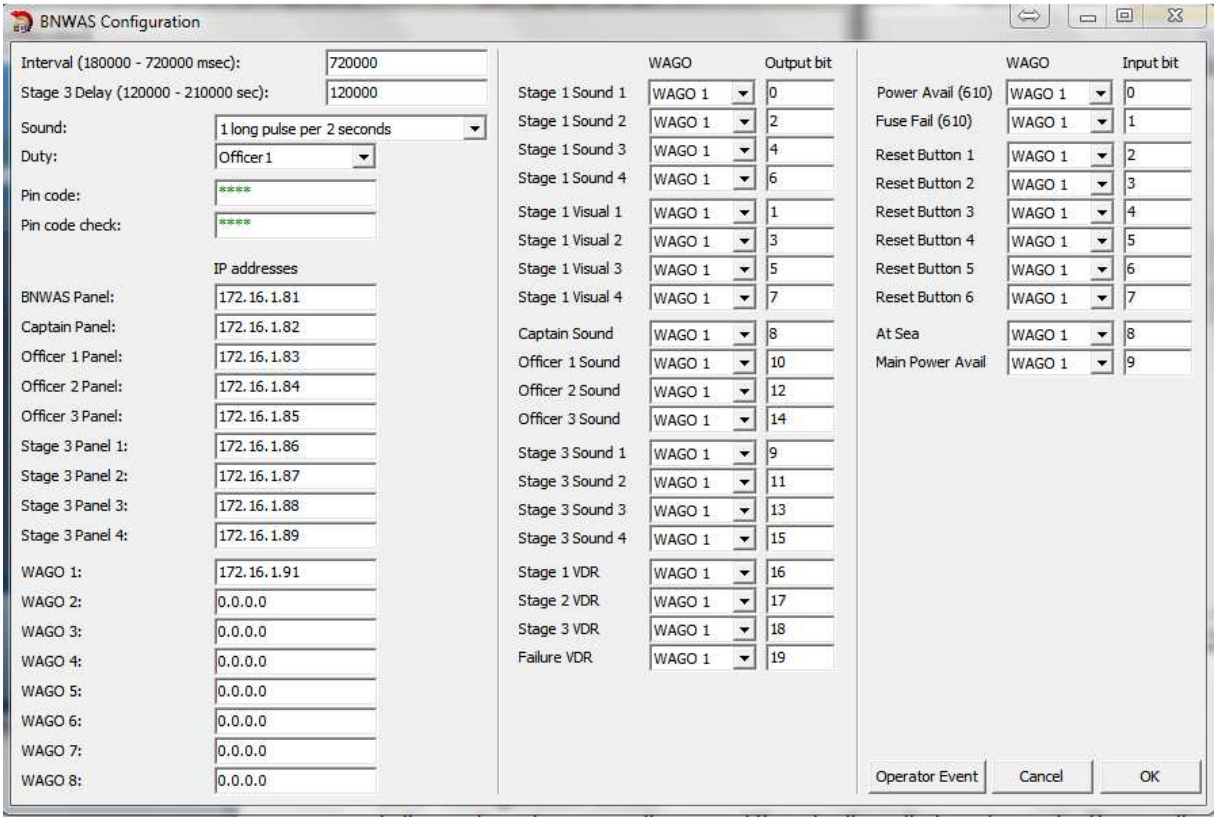


Figure 6-1: BNWAS configuration screen

The different parts of this configuration screen will be discussed hereafter.

6.1.1 Configuration screen

In the configuration screen there are different settings that can be made. These settings will be split up hereafter.

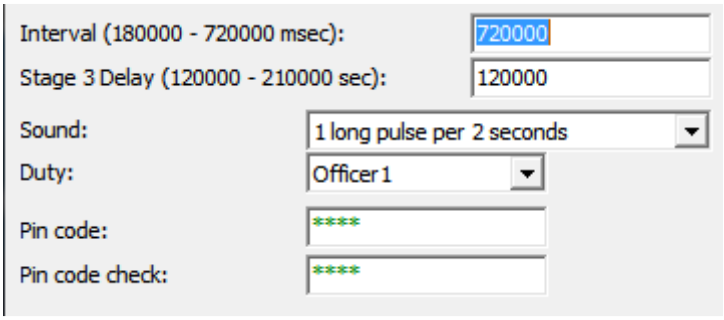


Figure 6-2: General settings

In the general settings, the same settings can be made as can be done in the program itself under “setup”.

Setting	Detail
Interval	Set interval of Td between 3 and 12 minutes (180000-720000 msec)
Stage 3 Delay	Delay of the stage 3 time between 2 and 3,5 minutes
Sound	Change the modulation of the alarm-sound
Duty	Select OOW on duty
Pin code	Set Pin code for setup
Pin code check	Pin code check

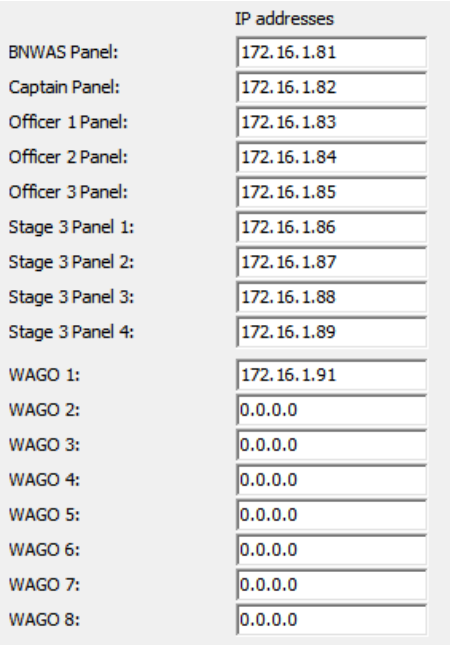


Figure 6-3: IP address settings

In the IP address section, settings can be made to distinguish the different panels and WAGO’s. The main panel (the panel in charge) is always the BNWAS panel.

If used in the system other DAP’s can be set as 2nd or 3rd stage panels by selecting their respective IP addresses behind the right panel. There are four 2nd stage panels

- Captain panel
- Officer 1 panel
- Officer 2 panel
- Officer 3 panel

And four 3rd stage panels

- Stage 3 panel 1
- Stage 3 panel 2
- Stage 3 panel 3
- Stage 3 panel 4

The IP addresses of the DAP's and the WAGO's are first set in NavVision. Corresponding you can set these IP addresses to the right DAP panel or WAGO.

If no other DAP or WAGO is used, leave the IP addresses at 0.0.0.0

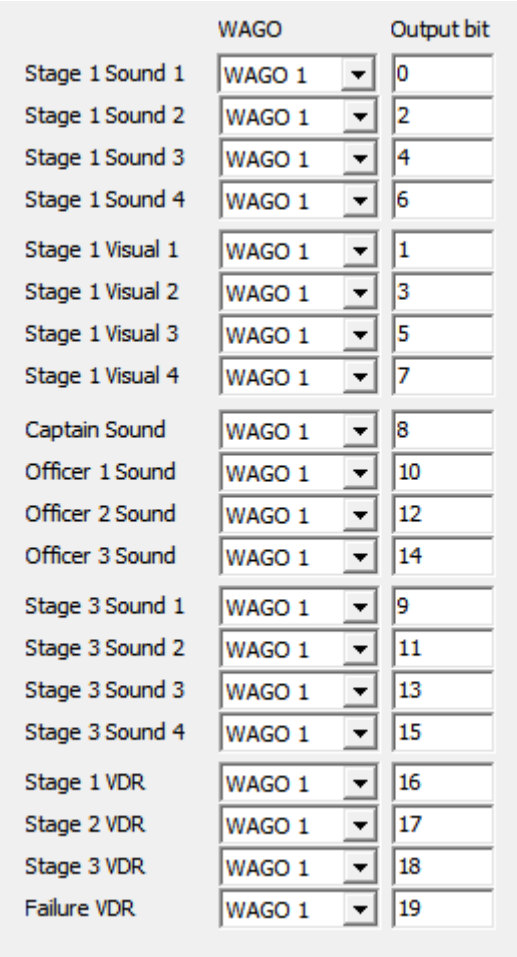


Figure 6-4: Wago output bit setting

The Audible and visual outputs are set here. Each output represents a stage of the BNWAS system. These outputs will be set on the dedicated Wago slice. There are 3 different stages of alarm outputs and a separate output to the VDR.

- Stage 1 Visual 1 (2,3,4) – output to the bridge visual alarms
- Stage 1 sound 1 (2,3,4) – output to the Bridge Audible alarms
- Captain, Officer 1,2,3 sound – combined visual and audible output to the duty cabin
- Stage 3 sound 1 (2,3,4) – combined visual and audible output to the 3rd stage places
- Stage 1,2,3, failure VDR – output to the VDR for mandatory alarms

In the column “WAGO” you can choose on which WAGO the connection is made. This depends on the order of the setup. Normally it is just 1 WAGO, so you can leave it as is. If the setup is divided over more WAGO’s the order is set by the IP range

- 172.16.1.91 = WAGO 1
- 172.16.1.92 = WAGO 2
- 172.16.1.93 = WAGO 3
- Etc

In the column “Output bit” you can set the exact pin on the particular slice where that field is connected to.

Notice that for the Output bit we count via the internal program of the WAGO. So we count all the available outputs from the beginning of the WAGO (see Figure 6-6*)*

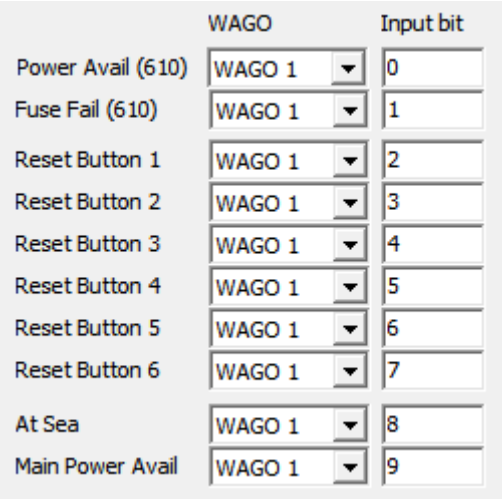


Figure 6-5: Wago Input bit setting

In the column “WAGO” you can choose on which WAGO the connection is made. This depends on the order of the setup. Normally it is just 1 WAGO, so you can leave it as is. If the setup is divided over more WAGO’s the order is set by the IP range.

- 172.16.1.91 = WAGO 1
- 172.16.1.92 = WAGO 2
- 172.16.1.93 = WAGO 3
- Etc

In the column “Input bit” you can set the exact pin on the particular slice where that field is connected to.

Notice that for the Output bit we count via the internal program of the WAGO. So we
count all the available outputs from the beginning of the WAGO (see Figure 6-6*)*

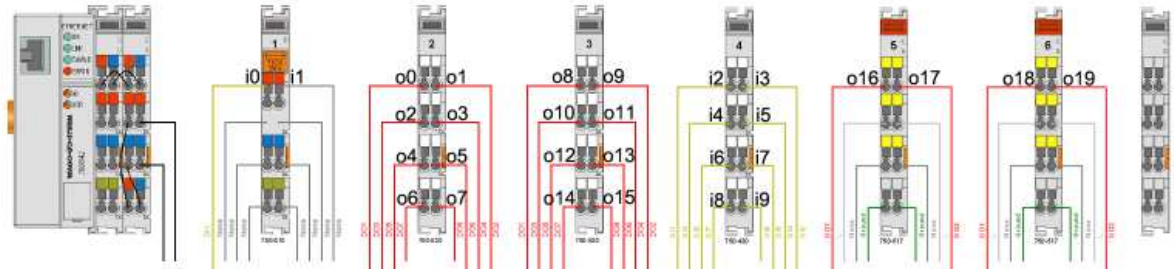


Figure 6-6: Input Output counting Wago (i=Input, o=Output)

7. Performance

7.1.1 Preface

This section of the Operator Manual is for background information only. The Performance section does not contain essential information for the user to make full use of NavVision.

7.1.2 Modules

Under “F11 > Modules” the time period is shown that each NavVision module uses in relation to the total NavVision time.

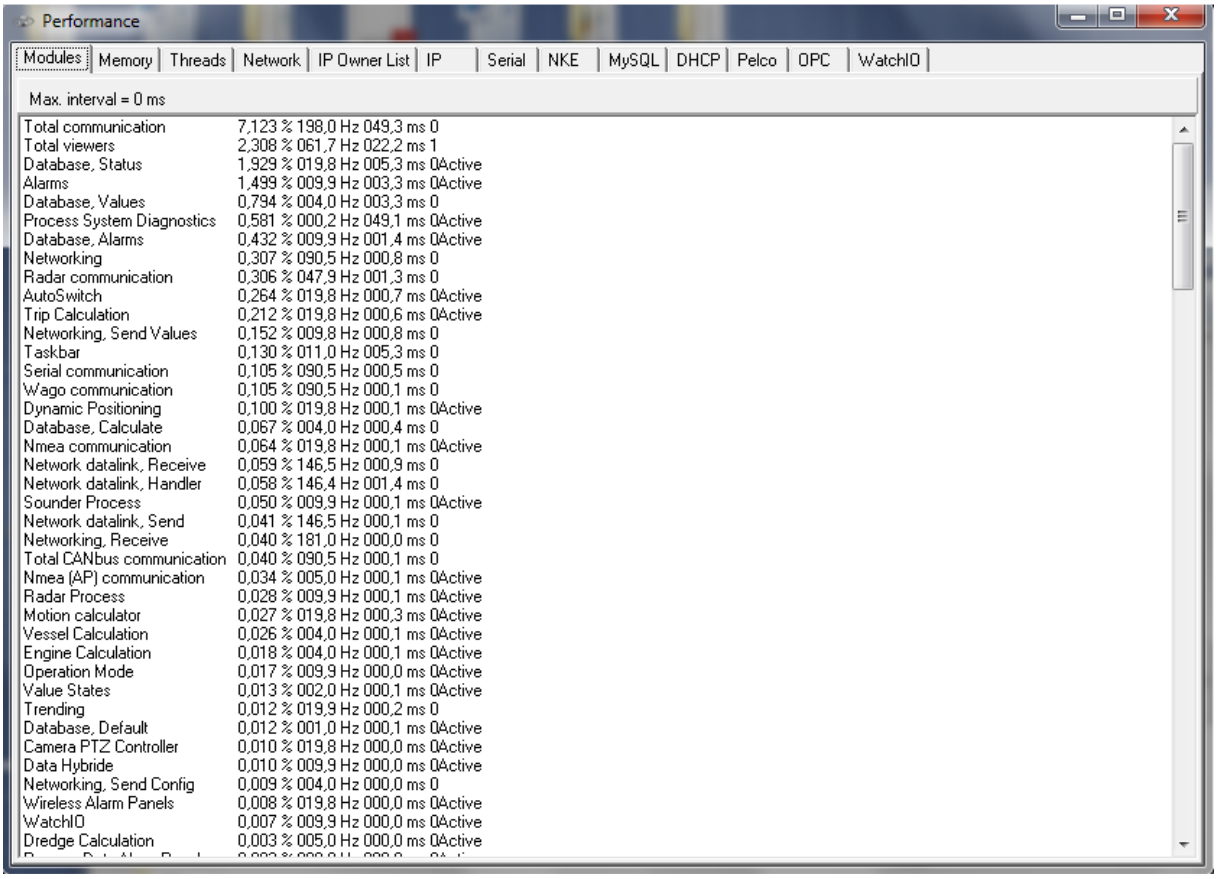


Figure 7-1: Performance

The columns are arranged as follows:

Detail	Description
Module Name	Internal name used by NavVision® to describe the module
Percentage	Percentage of processing time, where total NavVision® is 100%
Refresh Rate	Processing time in milliseconds
Total time	Total (module) processing time (in milliseconds)
Semaphore	Should be “0” or “1”
Active	Shows during refresh of screen

7.1.3 Memory

Under “F11 > Memory” developers can track for the presence of possible memory leaks. By default the option “Activate memory manager” is disabled to avoid significant performance degradation.

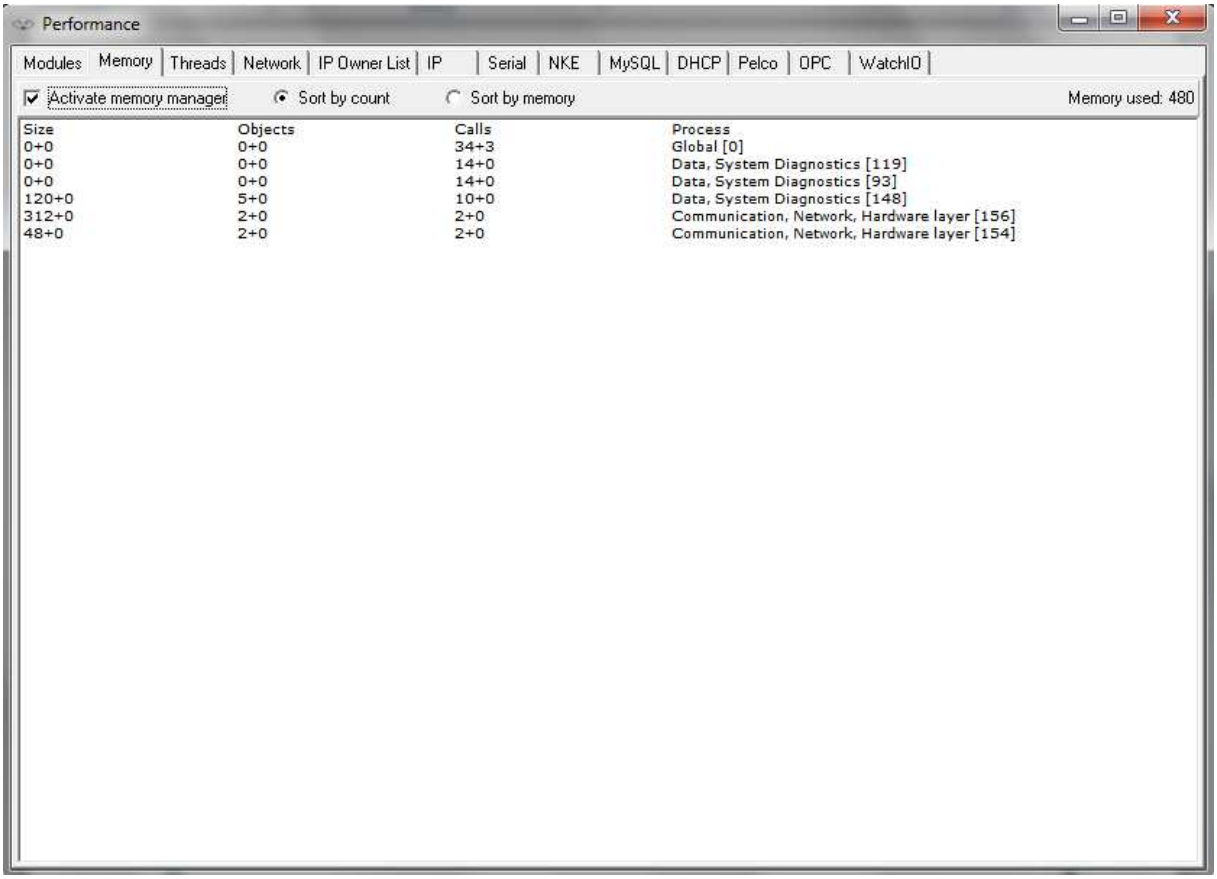


Figure 7-2: Memory

The columns are arranged as follows:

Detail	Description
Size	The size (bytes) of an object
Objects	Relative number of objects created or deleted since activation of memory manager
Calls	Number of creation / deletion calls
Process	Process creating / deleting the objects

: *Take special notice of the “Memory Used” at the right top of the pane. If it keeps rising beyond your memory available, a memory leak is imminent.*

7.1.5 Threads

Under “F11>Threads” all the threads that are currently running will be visible. This option is quite easy for troubleshooting certain threads.

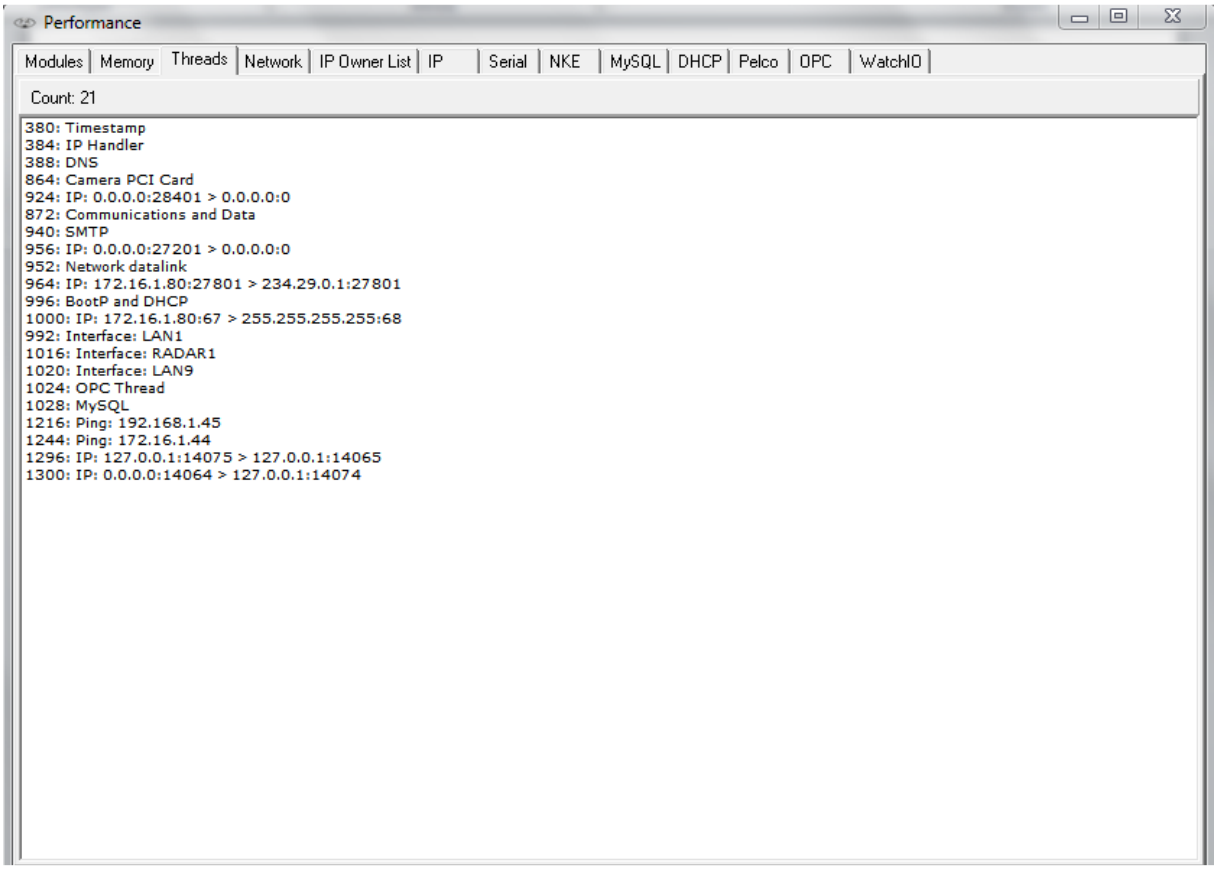


Figure 7-3: Threads

7.1.6 Network

Under “F11 > Network” the Connection to other workstations within the same system is shown. With all workstations connected and running, you will see your complete topology visible here.

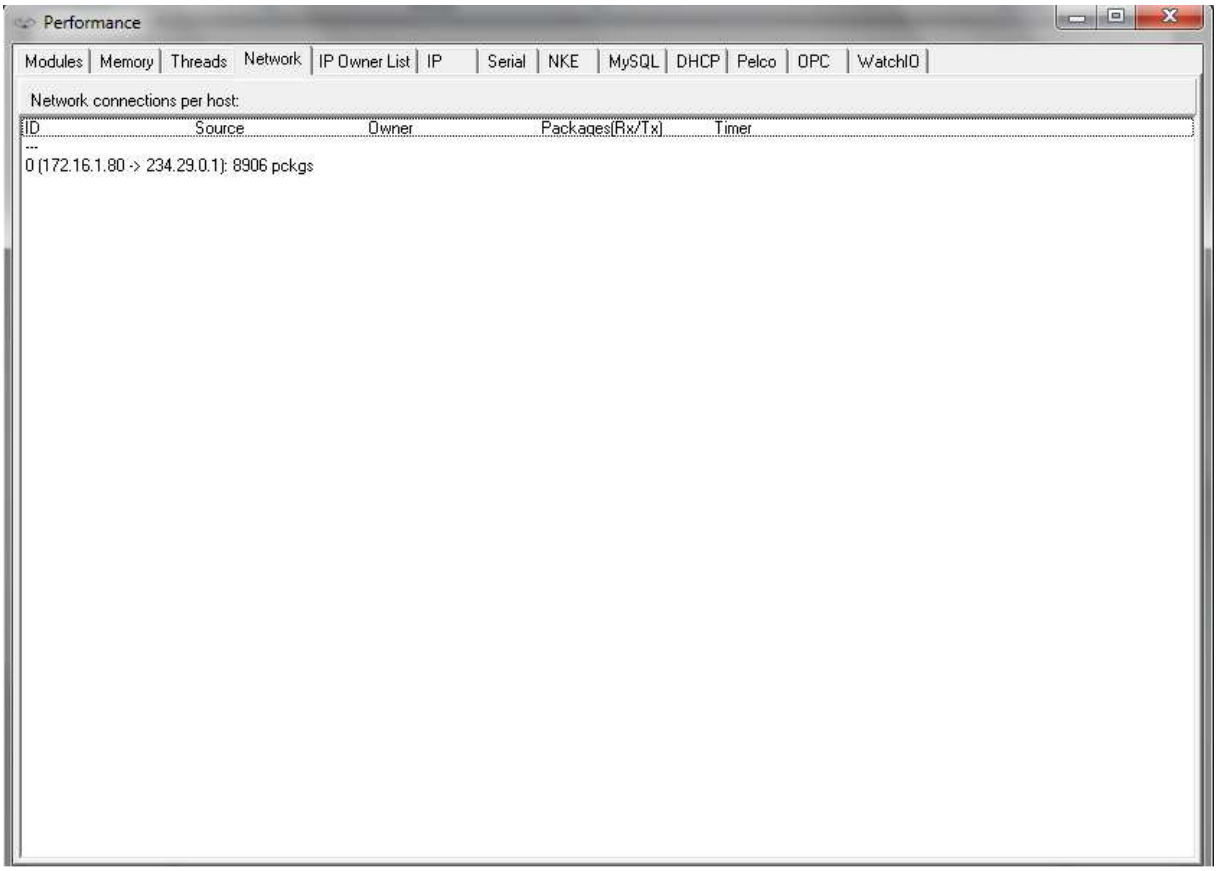


Figure 7-4: Network

The columns are arranged as follows:

Detail	Description
ID	Internal index used by NavVision®, not of importance in this list
Source	Active > when connected Connect > when trying to connect Closing > when closing the connection
Owner	UDP server, UDP client, TCP server or TCP client
Packages	The source of the connection. When “0.0.0.0:0” is shown, no source address was specified when opening the connection, where “0.0.0.0:x” means that port “x” on this computer is being used for server functionality
Timer	The destination of the connection

7.1.7 IP Owner List (which OWS is handling which ip's)

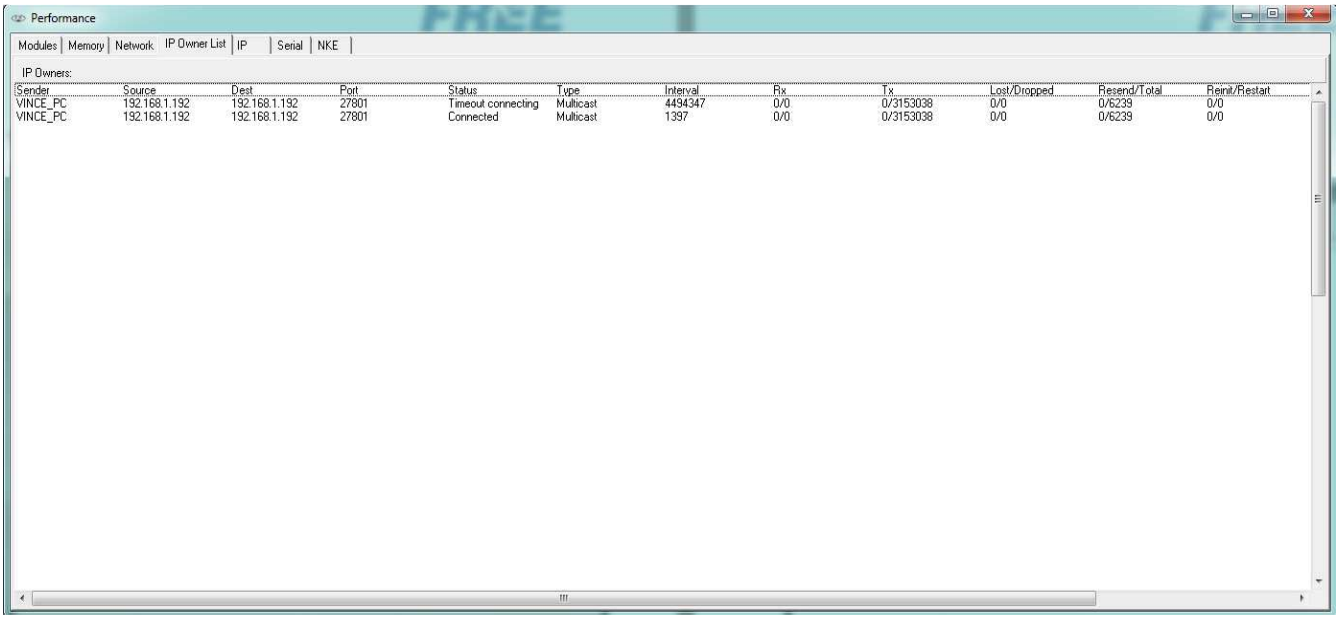


Figure 7-5: IP Owners List

The columns are arranged as follows:

Detail	Description
Sender	The workstation you are working on
Source	The workstation the connection is made from
Dest.	The interface that the source is (trying) to reach
Port	The port that is used for the connection
Status	The status of the connection
Type	Type of connection: Multicast, TCP, UDP
Interval	The interval between the last attempt
Rx	Receiving side
Tx	Transmitting side
Lost/Dropped	Packages lost/dropped
Resend/Total	Packages asked to be resend/total
Reinit/Restart	Reinitialisation/restart of the connection

7.1.8 IP

Under “F11 > IP” a list of all network connections as handled by the relevant NavVision workstation is shown

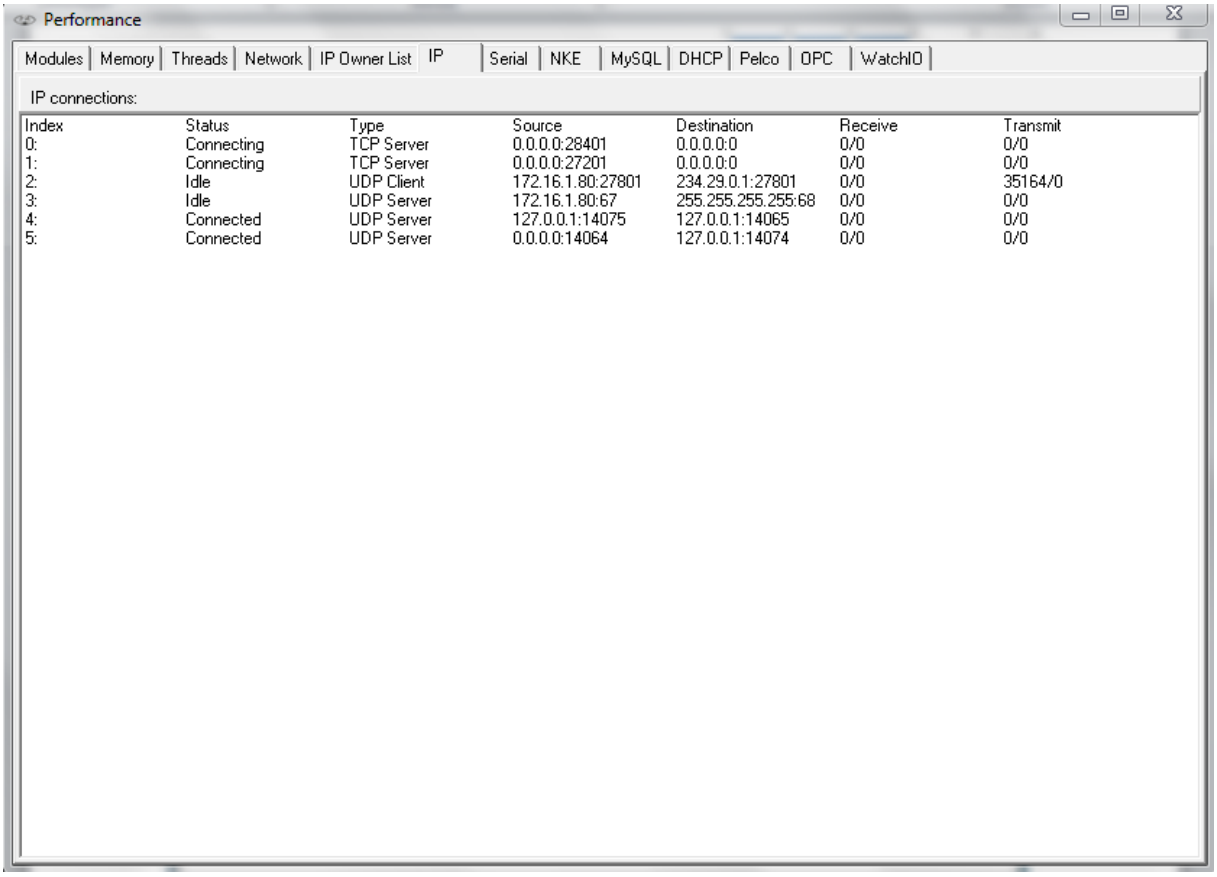


Figure 7-6: Performance > IP

The columns are arranged as follows:

Detail	Description
Index	Internal index used by NavVision®, not of importance in this list
Status	Active > when connected Connect > when trying to connect Closing > when closing the connection Idle > When doing nothing
Type	UDP server, UDP client, TCP server or TCP client
Source	The source of the connection. When “0.0.0.0:0” is shown, no source address was specified when opening the connection, where “0.0.0.0:x” means that port “x” on this computer is being used for server functionality
Destination	The destination of the connection
Receive	Number of Bytes left in the internal buffer / Number of bytes received
Transmit	Number of Bytes left in the internal buffer / Number of bytes sent

7.1.9 Serial

Under “F11 > Serial” the serial port status is indicated.

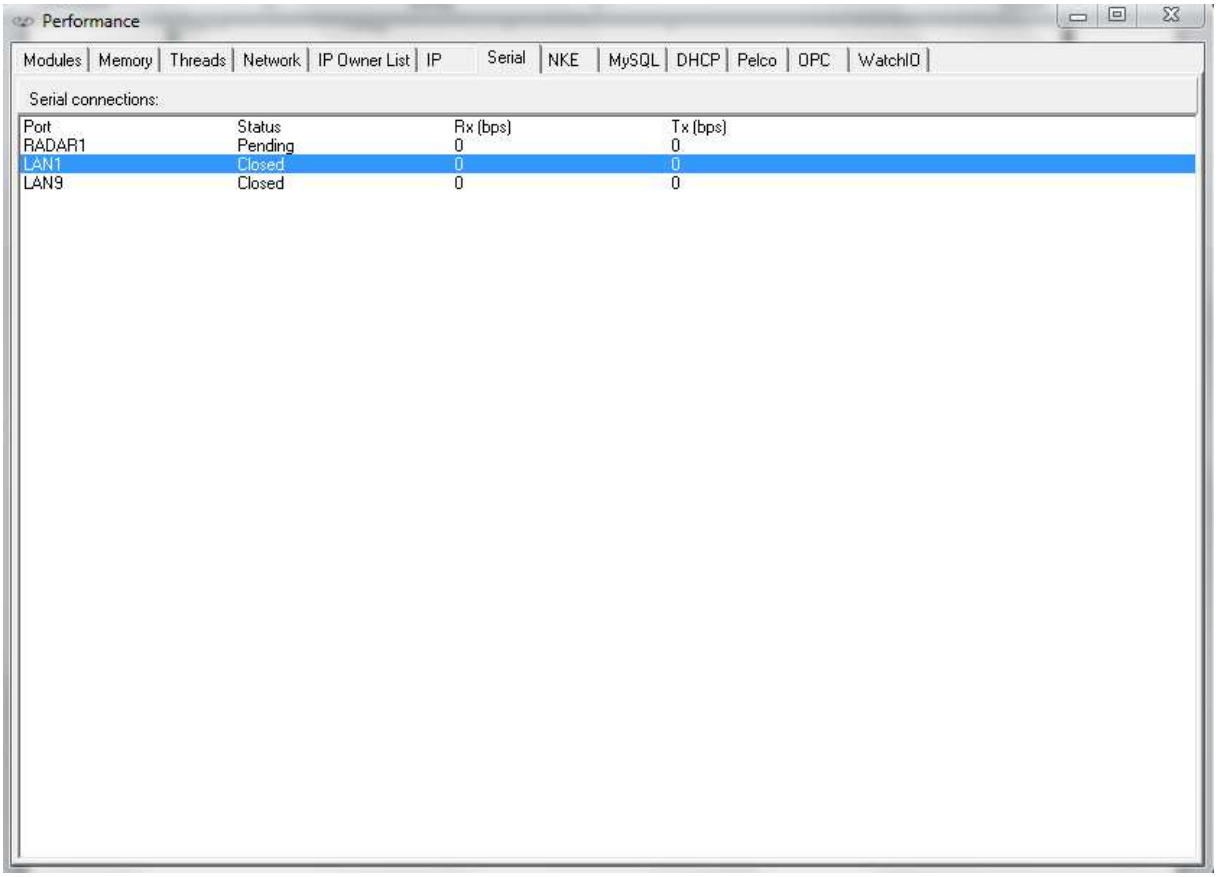


Figure 7-7: Serial

The columns are arranged as follows:

Detail	Description
Port	The serial port name. The possible radar port is also shown as a serial port, named “RADAR1”. When it is not used, the status stays on “Pending”.
Status	Serial port status i.e. “Failed”, “Pending”, “Closed” and “Open”
Rx (bps)	Number of bits “Received (Rx)” during the last second
Tx (bps)	Number of bits “Sent (Tx)” during the last second.

For troubleshooting you can right-click on a serial port to see a pop-up you can click for additional data (See Figure 7-8)

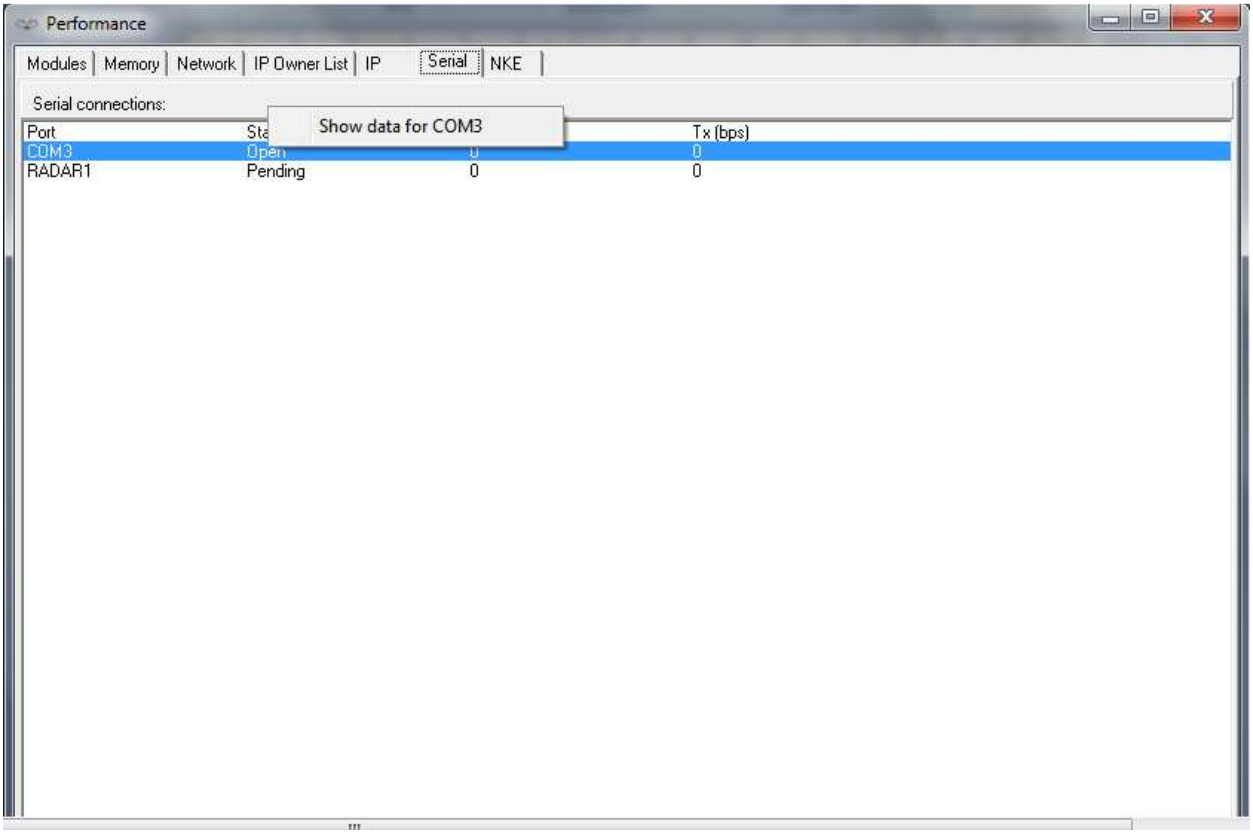


Figure 7-8: Additional Serial Data

After clicking “show data for x” where x is the appropriate port, you will get a new pop-up field Communication Diagnostics (see Figure 7-10 and Figure 7-10)

This tool you can use to troubleshoot data over serial ports. Here it shows all the data that is actually seen by NavVision on the specific port.

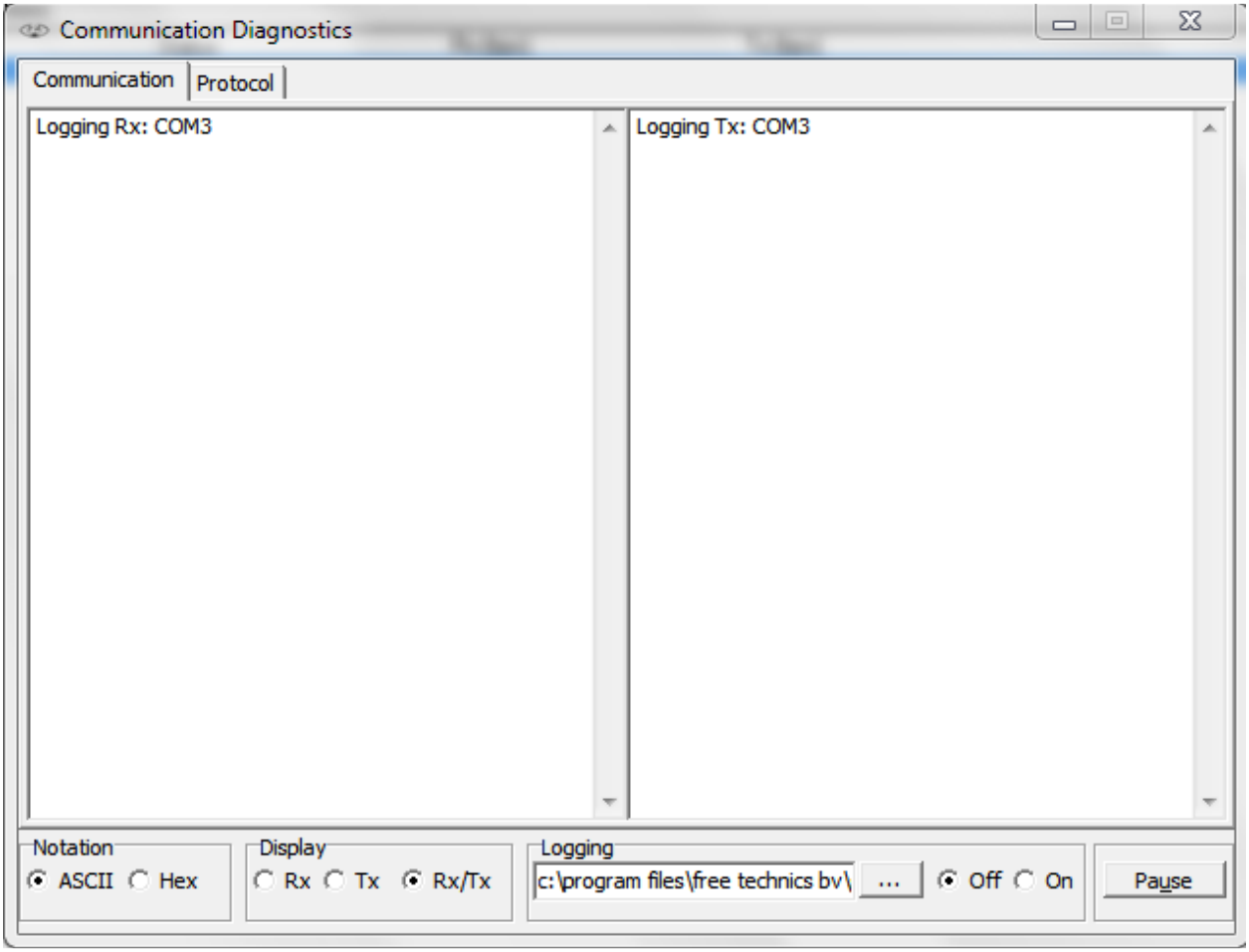


Figure 7-9: Communication Diagnostics 1

Detail	Description
Notation	Show data in ASCII or Hex
Display	Rx > Only show receiving side Tx> Only show transmitting side Rx/Tx > Show receiving and transmitting side
Logging	Choose destination to save logfile and switch it off or on
Pause	Pause the data stream

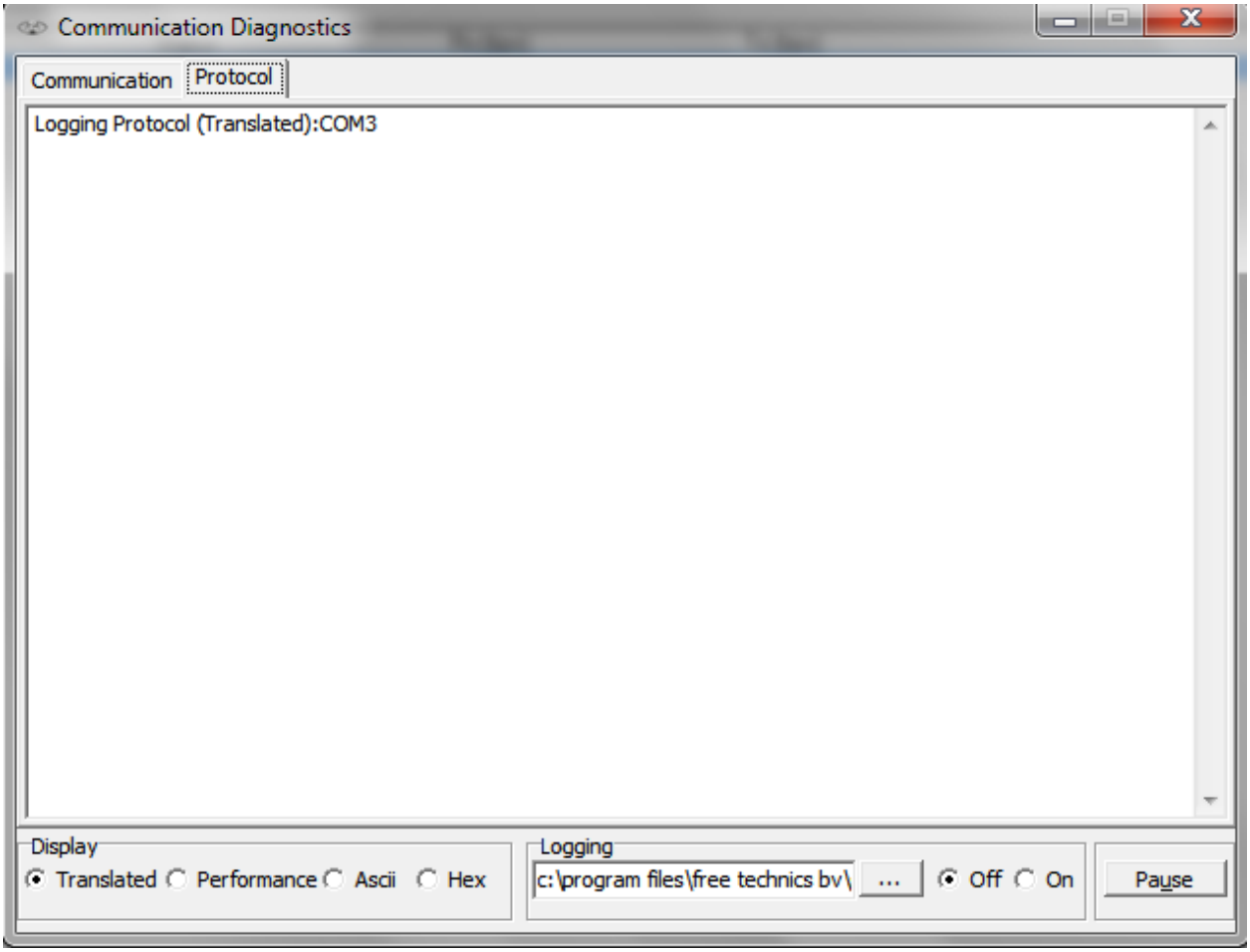


Figure 7-10: Communication Diagnostics 2

Detail	Description
Protocol	Shows the different protocols
Display	Translated > shows the data in readable output Performance > Shows the performance of the data ASCII > Shows Data in ASCII Hex > Shows Data in Hex
Logging	Choose destination to save logfile and switch it off or on
Pause	Pause the data stream

8. Commissioning

8.1 Purpose

This chapter contains the information about the commissioning of NavVision on board of the vessel.

8.2 Preconditions

- All NavVision system components like computers, switches, PLC, interfaces, have to be mounted, connected and powered
- All components like sensors, engines, generators, I/O components must be connected to the corresponding sensors and interfaces of the NavVision system
- The server computer(s) as well as client computer(s) must be up and running
- All network and serial cables, must be connected
- Engines, generators, radar and all other equipment within the NavVision system must be ready for testing
- The alarm system(s) must be working and ready for testing
- During the time of commissioning and acceptance tests there need to be assistance from a technician who is familiar with the system installation.

8.3 Safety information

Commissioning must not start until you have ensured that the machine in which the components described here are installed as described in the relevant Installation Manual.

WARNING

- **NavVision devices and software must only be commissioned by suitably qualified personnel**
- **The personnel must take into account the information provided in the technical customer documentation for the product, and be familiar with and observe the specified danger and warning notices**
- **When the machine or system is operated, hazardous movements can occur**
- **All of the work carried-out on the electrical machine or system must be carried-out with it in a no-voltage condition**
- **When electrical equipment and motors are operated, the associated electrical circuits are at hazardous voltage levels**
- **The successful and safe operation of these devices depends on correct transport, proper storage and installation, as well as careful operation and maintenance.**
- **In addition to the danger and warning information provided in the technical customer documentation, the applicable national, local, and system-specific regulations and requirements must be taken into account.**

8.4 Commissioning steps

8.4.1 Wiring schematics

Check	Contents of check	Passed
Wiring schematics	Verify that all wiring connections are in conformity with the latest version schematic.	
	Check USB connections vs. COM port connections.	
	Check LAN port connection vs. IP-address.	
Remarks		

8.4.2 Wiring, cables and connections

Check	Contents of check	Passed
Wiring / cables	Check that the correct category cable is used (e.g. UTP, STP, CAT5E etc.).	
	Check that the cables are free of kinks, knots or snags.	
	Check that the cables are not overstressed by overload.	
	Check that the cables are correctly tightened with tie wraps.	
	Check that the cables are properly supported.	
	Cable run:	

	Do not allow the cable to form right angles or sharp bends. Check if the correct bend radius has been applied.	
	Check that the cables are not squeezed.	
Remarks		

Check	Contents of check	Passed
Connections	Check that the electrical connections are correct.	
	Check that contacts are clean and that parts are correctly installed to protect them from dust and dirt.	
	Check the switch port connections vs. fault indications.	
	Check if CAT5 cable connectors are properly prepared (use Fluke).	
Remarks		

8.4.3 System components

Check	Contents of check	Passed
System components	Verify that the components used are in conformity with the latest version schematic.	
	The mechanical and electrical environmental conditions at the installation site must be within the limits described in the technical data. Dusty, damp places, places susceptible to rapid temperature variations, powerful vibrations and shocks, surge voltages of high amplitude and fast rise time, hot places with no ventilation or AC, strong induced magnetic fields or similar extreme conditions should be avoided.	
	Check power and data connections.	
Remarks		

8.4.4 System start-up

Check	Contents of check	Passed
Software	Check if the appropriate software version (latest software release) is installed.	
	Ensure that all change log specifications are correct for this installation (check on all systems).	
Anomalies	Check if there are any irregularities at and during startup. Look for long startup, error messages, boot loader problems, boot loader icon problems etc.	
	Push F11 (Performance) for detailed information on the network. If there is an alarm right away, write it down for later investigation and check if the other servers show the same.	
Input devices	After starting tests, shutdown all servers and clients except for one server where you will work on. Check all input devices.	
	Check boot loader network icons for connection. Look for device data at viewers. In menu “Settings > Configuration > Network” verify if all network adapters are available and connected.	
Remarks		

8.4.5 NavVision software

Check	Contents of check	Passed
NavVision ® software version	Check if the appropriate software version (latest software release) is installed.	
	If necessary, install the new version on every computer in the network.	
	Check for changed subfolders (icons, symbols.dat, boot loader etc.) see sub.2 to make sure that all the specifications in the change log are correct for the current installation.	
	Push F11 for detailed information on the network. If there is an alarm right away, write it down for later investigation and check if the other servers show the same.	
Input devices	After starting tests, shutdown all servers and clients except for one server where you will work on. Check all input devices.	
	Check boot loader network icons for connection. Look for device data at viewers. In menu “Settings > Configuration > Network” verify if all network adapters are available and connected.	
Remarks		

8.4.6 Firmware devices

Check	Contents of check	Passed
V-Linx serial interface	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Axis IP camera	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
ICP DAS	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Victron Mk2.2b	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Moxa serial interface	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Remarks	Latest versions are to be found on the manufacturers website.	

Check	Contents of check	Passed

Victron J1708 – J1939	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
GPRS modem	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Ethernet J1939 interface	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Wago	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
NavVision	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Remarks		

8.4.7 LAN and serial connections

Check	Contents of check	Passed
LAN connections	Test all LAN network connections. If necessary, use the Fluke network-tester to test every individual LAN cable.	
	Check if crossed cabling (TX to RX) is used. Use F11 for network information.	
Serial connections	Test all serial connections. Check the LED indicators (see supplier manual).	
	Check if the correct (type and brand) cabling (e.g. shielded twisted pair, CAT5e) is used. Check that NavVision recognizes the connection.	
	Use Debug mode to see if there is any data transfer. Look at the RX/TX LEDs to see if data is transmitted. For NMEA look under menu “Tools > Settings > NMEA” to see if the proper strings are coming in.	
Remarks		

8.4.8 CAN bus connections

Check	Contents of check	Passed
CAN bus connections	Verify the FT viewer readouts to ensure that the CAN bus connections are correct.	
	Check if the correct cabling (type and brand) is used.	
	If no connection is established, make a log of the specific Can bus channel. If a CANOP/ICP is used, check the RX/TX LEDs.	
Remarks		

8.4.9 Wago

Check	Contents of check	Passed
Sensor list	Use the enclosed sensor list to functional test each slice and pin. Use the sensor list as checklist. Make sure it is recorded if there is no data on a pin. Notify the responsible technician or shipyard.  Do not intend to repair it yourself. Making changes in the Wago is recommended only at completion of the relevant commissioning steps. If faults need to be corrected, use the sensor list as the update mechanism.	
	Check the Wago for its actual performance. Go to menu “FT > Tools > Settings > Wago” to verify the status of operation. Make sure the operating mode switch on the station is in the top (RUN) position. Check if station is supplied with electrical power (see voltage status LED). Verify that the Wago slices are correctly installed and connected (monitor error LED).	
Remarks		

8.4.10 PLC program

Check	Contents of check	Passed
PLC program	Make sure you have the latest release PLC program with you. Test if the program is running with CODESYS on your laptop and connected to the Server.	
	Test the PLC program. Test each line of the program by running it on the server while checking it in CODESYS.  Modifying the PLC program software must only be done at completion of the relevant commissioning steps.	
Remarks		

8.4.11 Wago performance

Check	Contents of check	Passed
Actual performance	Check the Wago for its actual performance. Go to menu “FT > Tools > Settings > Wago” to verify the status of operation.	
	Make sure the operating mode switch on the station is in the top (RUN) position. Check if station is supplied with electrical power. Verify that the Wago slices are correctly installed and connected (see wiring schematic).	
Performance connected devices	Check each device pin for proper connection. Use sensor list to mark if the right data is on the pin and if data is coming in.	
	Check all the pins one by one. Verify if the right sensor is connected (see wiring schematic).	
	If necessary change or adjust instrument in NavVision ®. Continue until all slices have been done. Inform technician or shipyard for every connection that has no data or is wrongly connected.	
	Trigger the sensor and verify if the status indication LED on the Wago is blinking (digital slices).	
	If I/O must trigger another I/O, make sure that it works correct.	
	If it is an analogue IN signal, check the NavVision ® viewer to verify that data gets in.	
Remarks		

8.4.12 Buttons

Check	Contents of check	Passed
Buttons and mimics	Check all hardwired buttons to verify if they trigger the right pin on the Wago. When triggering a sensor check the respective mimic response.	
	In case of any irregularities or malfunctions please inform the shipyard or technician on their responsibilities.	
Remarks		

8.4.13 Alarms and viewers

Check	Contents of check	Passed
Alarms and viewers	Trigger the sensors (one-by-one) and verify if the respective alarm message is shown via NavVision ® (where applicable).	
	Check instruments, viewers and mimics to ensure that analogue data is presented.	
	In case of any irregularities or malfunctions please inform the shipyard or technician on their responsibilities.	
Remarks		

8.4.14 Tank calibration

Check	Contents of check	Passed
Calibration	Calibrate all analogue slices (especially tanks).	
	Where possible, fill up tank with a small amount of liquid (ratio = 1 to 20), and note the associated voltage on the calibration screen.	
	List all successive measurements (calibration screen) until the tank is full.	
	Where necessary, fine-tune instrument scaling (see “Tune” button).	
	Adjust min/max setting for each instrument to match the right instrument scale.	
Remarks		

8.4.15 Servers and clients

Check	Contents of check	Passed
Servers and clients	Check servers and clients for connectivity.	
	Select F11 to check connections.	
	Make sure that one of the servers (master) has all the connections.	
	Check if the viewers on the other servers and clients show the same data.	
Remarks		

8.4.16 Alarms

Check	Contents of check	Passed
Servers and clients	Check if incoming alarms are shown on all servers and clients. Check that silencing and acknowledging of alarms on each server / client functions in accordance with the unique alarm station setting.	
	Make sure there are no irregularities in the settlement on the different servers and clients. Make settings according to the respective entitlements of the specific station.	
Remarks		

8.4.17 Network connection

Check	Contents of check	Passed
Monitoring network connection	Disconnect the network cables one-by-one, and check if the system shows the right alarms and/or takeover the connection to other servers.	
	Check OWS takeover.	
	Check if renaming of cables and serial connections is right.	
	Check if connections come back quickly after disconnecting / connecting a network cable.	
	Check serial connections for alarms.	
Remarks		

8.4.18 Viewer and mimics

Check	Contents of check	Passed
Tuning of viewers and mimics	Adjust viewers and mimics to meet the customer's demands.	
	Carry out small / minor adjustments. No major changes in the mimics, only minor adjustments. Setting of instruments in the viewer and personal alarms.  Do not alter the layout of the mimics.	
Remarks		

Check	Contents of check	Passed
Taskbar	Change taskbar settings to meet the customer's demands.	
	Set the viewers that are available on the taskbar. Set the viewer to startup automatically on which screen.	
Remarks		

Check	Contents of check	Passed
Users	Setup a new user for the customer.	
	Setup a new user as an operator. Ensure that this new user starts up automatically.	
	Ensure that the new user has the proper user rights.	
Remarks		

8.4.19 Cold start and completion of test

Check	Contents of check	Passed
Cold start and completion of test	Shutdown full system and restart it. Ensure system functions correctly.	
	Verify all adjustments and settings as set before.	
	Make sure the system works properly.	
	Simulate sample alarms to verify if it functions properly.	
	Backup all the systems for storage.	
	Check electrical schematics and sensor list to see if you wrote down all adjustments.	
	Startup in export-mode to make a sensor list for storage.	
	 Check if all “Warranty void” stickers are in place and in good condition. Replace / renew where necessary.	
	Ensure that the new user has the proper user rights.	
Remarks		

Special remarks:
Owner’s/representative remarks:
Unfinished business:
Remarks for sales representative (contact, work to do, new quotation etc.)