FT NavVision®

Software Installation and Commissioning Manual

Publication type:	Software Installation and Commissioning Manual
Publication number:	
Title:	FT NavVision®
Subject:	
Issue:	1.5
Publication date:	January 22, 2013
Total number of pages:	155
Author:	Vince Kerckhaert
Quality Control:	Frank Soonieus, Bart Lamme

1. Table of contents

Page #

2. Figures

NOTICE

3. References

Not applicable.

4. Introduction

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

5. About the installation and commissioning manual

The software installation manual contains the following chapters:

- Chapter “Safety instructions” presents warning, caution and note information, which the user should pay attention to.
- Chapter “Human Machine Interface” Contains explanation on the look and feel of the visible part of FT NavVision®.
- Chapter “Duty Alarm System” explains how to work with the AM(C)S system and how the different parts are integrated in FT NavVision®.
- Chapter “Personal Alarm” Explains the work and feel of the different Deadman-systems provided within FT NavVision®.
- Chapter “Setting and adjustment” contains instructions on how to set and adjust FT NavVision®.
- 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 FT 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

6. Safety instructions

This section provides only a summary of the most important safety requirements and notes, which will be mentioned in the individual sections. To protect your health and prevent damage to the devices, 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 essential to emphasize.

CAUTION

An operating procedure, practise or condition etc., which, if not strictly observed, may damage or destroy equipment.

WARNING

An operating procedure, practise or condition etc., which, if not carefully observed may result in personal injury or loss of life.

7. 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

8. Human Machine Interface

The Operator PC (OPC) Human Machine Interface (HMI) function enables to visualize the actual state of a physical platform object, by colour and/or shape animation. Moreover as soon as an undesirable platform state is detected the relevant operator will be notified by means of an audible alarm signal.
Messages concerning the alarm are displayed by the alarm presentation. The HMI also supports remote platform control signals in case operators control the platform via the Operator PC (OPC). The FT NavVision® HMI consists of the following features i.e.:

8.1 Taskbar

FT NavVision® main User Interface (UI) element is the taskbar, positioned on top of the main screen. The taskbar is home to the shortcuts to various viewers and time.
In addition, whenever an alarm is registered, the right most portion of the taskbar turns a bright red and shows a list of the alarm(s) currently active. A single click on this portion links to the extensive alarm viewer showing the data belonging to each alarm item such as time, alarm group, status and duration.

Figure 8-1: FT NavVision® taskbar

Features:

- Scroll feature (hold or click the mouse pointer on the taskbar arrow until the desired button is found)
- By clicking a particular button, you will open the corresponding module/viewer
- In case more than one monitor (MTR) on one PC is used, a monitor for a particular viewer must be selected. If no screen is chosen, a vacant screen will be selected at random.
- The selected and activated button will obtain a green spot, to indicate that the corresponding module is activated
- A module can be closed by clicking the corresponding button again. In case one screen is used, a module will close by clicking a new button
- When several screens are available, it will be possible to display the viewers of the modules on these screens;
- On the right-hand side of the taskbar there is an alarm zone that will display the active alarms. One or two alarms will directly be visible. In case there are more than two active alarms, they will alternately appear (scroll) on the taskbar;
- The alarm report screen can be opened by clicking the alarm zone.

8.1.1 Mimics and screens

The system's mimic presentation function provides schematic and graphical overviews of the vessel's systems like navigation lights, electrical, piping and hydraulic overviews etc.
The screens and mimics presentations are automatically updated with live data of the platform components illustrating components and/or system status (enhances smooth operation of instruments and images).
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.

8.2 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.

Logging in is required upon system start-up. After start-up, users can log off and in using a dedicated button on the taskbar.
The rights (configurable) for FT NavVision® ® are as follows:

Rights	Effect of rights
Administrator rights	Full access to the system's configuration parameters
Personal alarm settings	Set alarms on the particular DAP[1], for this user only
Certified alarm settings	Configuration of global alarm stations
Layout instruments	Edit instrument's display mode (digital, analogue, graphic)
Configuration of instruments	Change instrument's assigned field
Settings of logging	Enable/disable logging of fields
Able to close application	Right to shut down the panel
Settings of sliders	Changing the value of sliders
Edit layout viewer	Ability to edit a mimic of the layout viewer
Settings → Field settings	Access to the field settings page
Settings → Preferences	Access to the preferences page
Settings → Taskbar	Access to the taskbar page & configuration of the selectable & default viewers
Settings → Configuration	Access to the configuration page

Table 8-1: FT NavVision® rights (will be changed shortly)

[1] DAP = Duty Alarm Panel

8.2.1 Instruments and indicators

Instruments and indicators are distinguished as follows:

Feature	Instrument	Indicator
Display configuration	Yes	No
Alarm settings	Yes	No
Unity select	Yes	No
Choice of instrument	Yes	Yes

Table 8-2: Configuration features (instruments and indicators)

8.2.2 Analogue, digital and graphical instruments

Figure 8-2: Analogue/digital/graphical instrument

1. **Unity select**
   All represented data comes with a certain unity e.g. m/s, km, nm, KN etc. These initial values (default values) can be set at default. However, it is also possible for the user to directly adjust an indicator. Click the corresponding display button to adjust the unity.
2. **Setting of alarms**
   By means of the “Alarm” button it is possible to adjust the alarm angle or alarm settings. For example, course or wind angle can be set; the speed or depth indicator can be adjusted.
3. **Display configuration**
   Via the Graphic button the indicators (analogue or digital) can be set into a different display mode. The wind direction can also be set to close hauled. Click the button to adjust the mode of display.
4. **Choose instruments**
   The “Config” button allows you to alter the type of instrument by selecting a different measurable value from the list. This configuration list is integrated for all instruments. In the next paragraph the operation will be explained.

8.2.3 Indicators

Figure 8-3: Indicators

The indicators have the same functionality as the analogue instruments, only the graduation-scale differs. As a rule, indicators are being used for those values which do not require a precise reading, like e.g. voltages and pressures. The advantage of indicators over other instruments is that they take up less space. It is possible to change the mode of display of a certain indicator by clicking the right mouse button. Then the configuration list with system parts appears from which the operator can choose.

8.2.4 Bar graph display

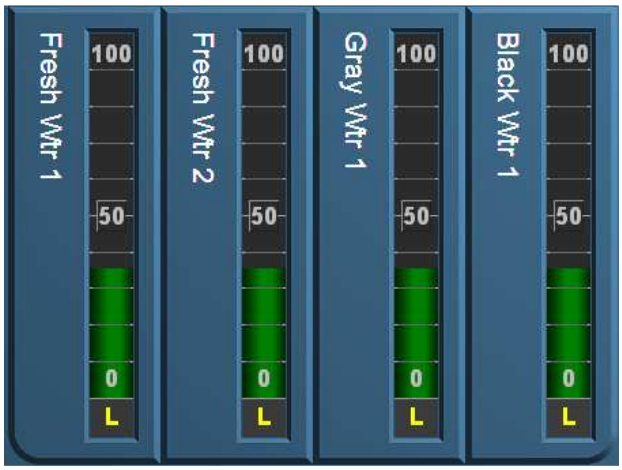


Figure 8-4: Bar graph display

The fuel tank level can be displayed with bar graphs. Like other instruments bar graphs are configurable (other values). The bar graph indication runs vertically, from bottom to top, to indicate the appropriate level.
The colored segments (value adjustable) indicate the current level. The displayed subject part can be changed. Different systems to be monitored can be selected in the configuration list.

: *By clicking with your mouse on the colored bar, you can change the color of the bar to your liking.*

Diagrams

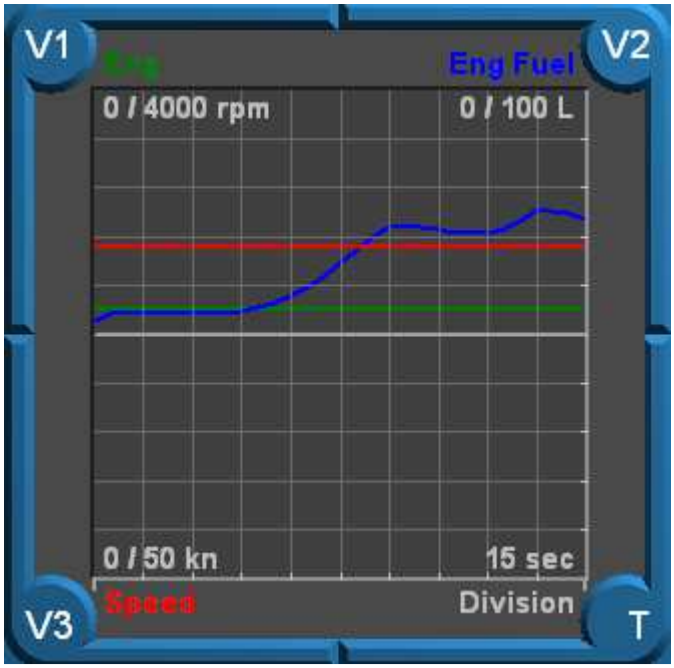


Figure 8-5: Trend diagrams

By means of diagrams parts of the system can be displayed over a longer period of time. With the diagram instrument different types of data can be displayed at one time. With the buttons V1, V2 and V3 a data selection can be made. The time-scale of the diagram can be changed by clicking the T-button. Each click will enlarge the scale until it reaches the smallest scale of 15 s. The largest scale is 24 hrs.

8.2.5 Buttons/switches

Figure 8-6: Buttons

With these buttons, systems can be switched on or off or changes can be made to certain parts of the system. An operator can use the left mouse button to activate a button, by clicking it again, the button will be disengaged.
A small green spot in the relevant button lights up, indicating that the corresponding application is active. As long as the button lights up blue, it means that the software is processing data in order to activate the application. Details of this list are described in the “Config list” (see chapter 8.3).

8.2.6 Meters

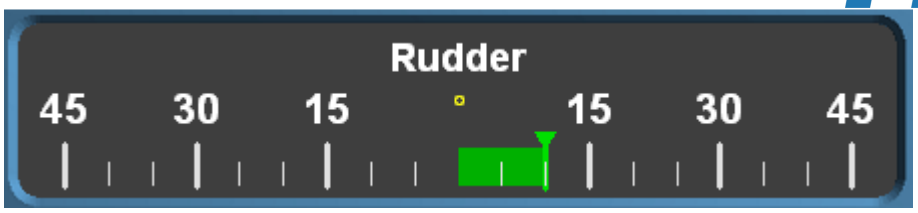


Figure 8-7: Meter

Meters are used for position information (e.g. rudder position). A deflection to the right and the left are compared to a neutral position (centre of the meter).

8.3 Config list

Basically any instrument allows you to display any type of data. Changes can be done by an operator with sufficient user rights. To change, press the config button (see paragraph 8.2.2) of a particular instrument within the “Config list”, or click the right mouse button on the instrument when no button is visible. The following window appears:

Figure 8-8: Config list

From this list (1) you can select the type of data you wish to direct to a certain instrument. At the bottom of the list there is a check-box. In case this check-box is not ticked, only those groups will show of which data is being configured. In case the check-box is ticked, all available groups will then be shown.

8.4 Mimics

8.4.1 General

In general we say that every page that represents a set of values, switches or any other representation of data is a mimic. At this time we work with two kind of mimics. We have the static pages, where we have predefined instruments (see Figure 8-9 and Figure 8-10) in which you can alter the data that will be shown in the instrument and we have mimics that are freely adjustable (see Figure 8-17). In the near future FT NavVision will only consist of the free adjustable mimics. Up till then we will provide a mix depending on the wishes of the customer.

Figure 8-9: Electrical distribution mimic

Figure 8-10: Tank level mimic

8.4.2 Free adjustable mimics

We will focus here on the free adjustable mimics. Depending of the license the client bought, you can have as many mimics as you like. They are represented in the taskbar under the mimic button (see Figure 8-11). Once you open that you can choose the mimic number and an empty mimic will appear (see Figure 8-12).

Figure 8-11: Mimic button taskbar

Figure 8-12: Empty Mimic

8.4.2.1 Building the mimic

To start building the mimic you can right-click anywhere on the empty mimic. There will be an option to choose to open the edit mode (see Figure 8-13). Once opened you get a new window (see Figure 8-14).

Figure 8-13: Edit Mode

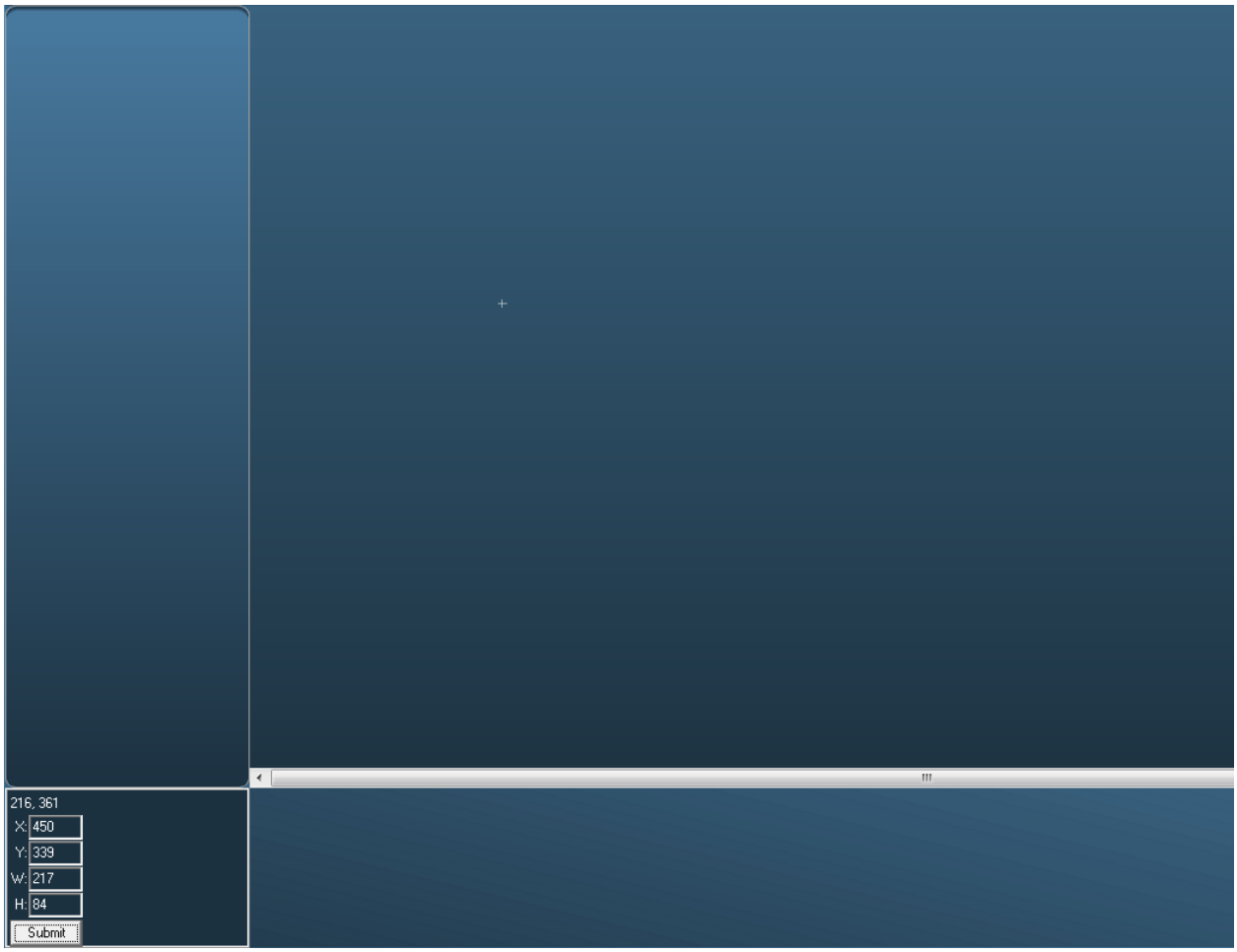


Figure 8-14: Edit Mode Window

Right-clicking again will give you a window with all the options you have to build the mimic (see Figure 8-15).

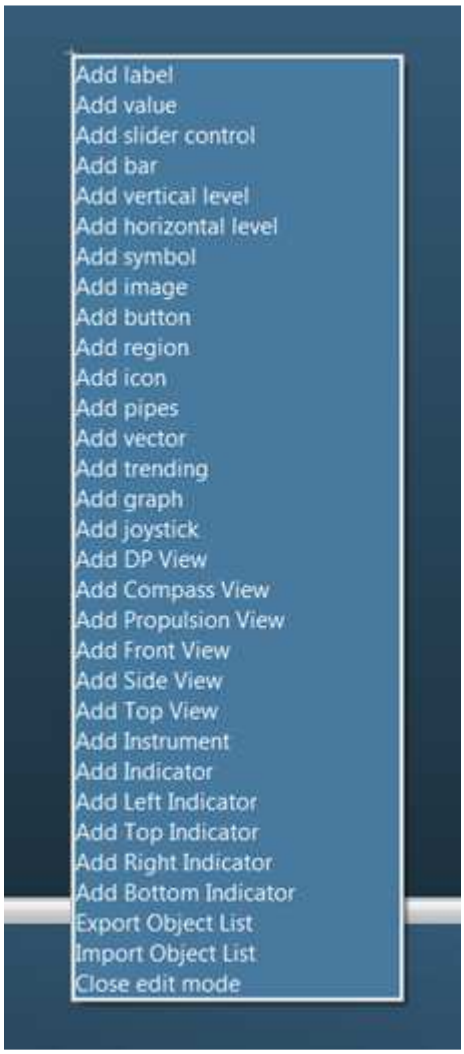


Figure 8-15: Mimic Option Window

Option	Explanation
Add Label	A Label is a text frame
Add Value	Any value that is given by a sensor
Add Slider Control	A slider to control settings to any output
Add Bar	A bar without index
Add Vertical Level	Vertical Level Bar
Add Horizontal Level	Horizontal Level Bar
Add Symbol	Choose a FT NavVision symbol
Add Image	Choose any image
Add Button	Button to trigger events
Add Region	Region to divide separate spaces
Add Icon	On/Off icon for indication
Add Pipes	Pipes to show ships piping system
Add Vector	Vector
Add Trending	Trending page (freely adjustable)
Add Graph	Graphic visualization of data
Add Joystick	Joystick for control
Add DP View	Dynamic view of ship for DP

Add Compass View	Show compass
Add Propulsion View	Propulsion
Add Front View	For DP
Add Side View	For DP
Add Top View	For DP
Add Instrument	Instrument for data sensors
Add Indicator	Small indicator mostly for engine data
Add Left Indicator	Variation on indicator
Add Top Indicator	Variation on indicator
Add Right Indicator	Variation on indicator
Add Bottom Indicator	Variation on indicator
Export Object List	Export tool for assigning mimic
Import Object List	Import tool for assigning mimic
Close Edit Mode	Close the editing mode

Table 8-3: Mimic options

: Not all options can be available due to license issues

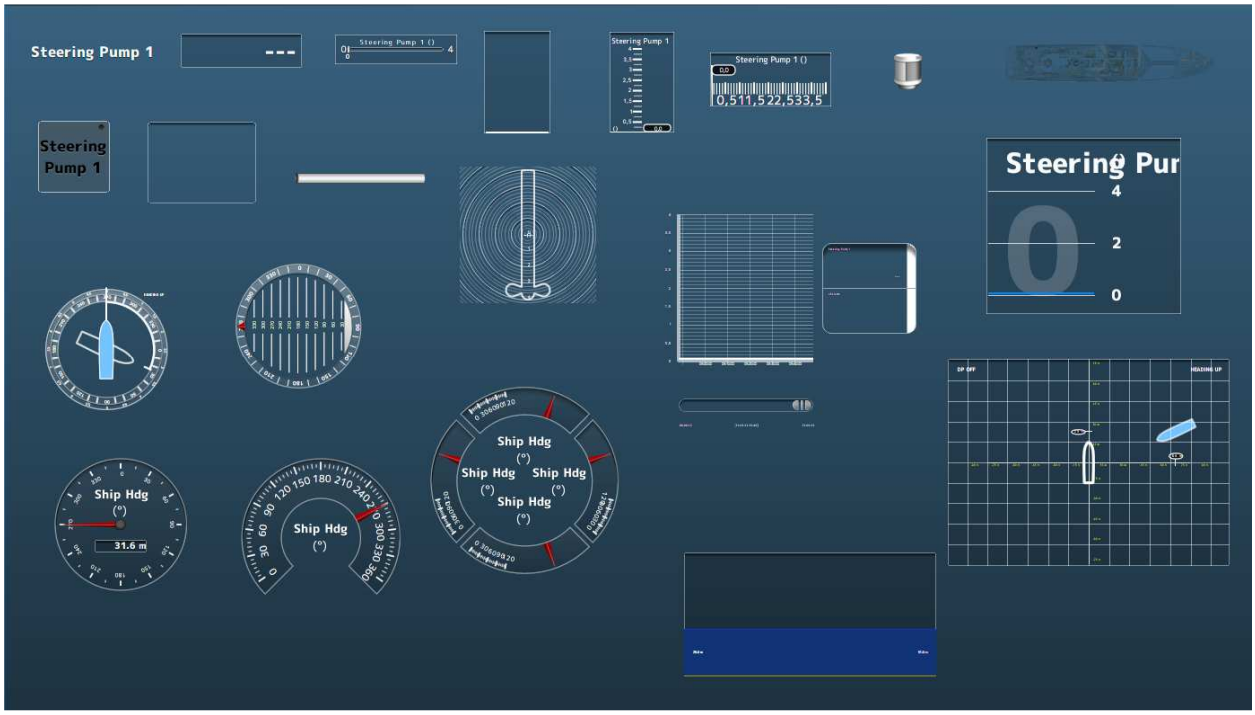


Figure 8-16: example mimic options

It is beyond the scope of this document to elaborate too much on the mimics. For extensive explanation of working with mimics, please refer to the separate mimic manual. For general knowledge we will explain some basic features of standardization in mimics.

8.4.3 Colour usage

Platform statuses are preferably to be visualized to remote operators by using animation i.e. by changing the relevant symbol colour and/or symbol shape an operator will be able to interpret statuses much easier rather than by *reading text* strings or by interpreting numbers.

This chapter defines colours and shapes relevant for the majority of platform objects frequently being used on a ship's platform.

8.4.4 Colour coding

Mimics will use the following colour set for pipeline circuits and static (non-animated) symbols:

Colour	RGB			Medium description
	RED	GRN	BLU	
Brown	195	65	0	Fuel oil
Olive	128	128	0	Lubrication oil
Dark green	0	128	0	Sea water, ballast water, fire main system
Teal blue	0	128	128	Low temperature fresh water (cooling water and potable water)
Aqua blue	0	255	255	High temperature fresh water (cooling water and potable water)
Grey	128	128	128	Bilge water, hydraulics, grey/black water
Bright green	0	255	0	Electrical distribution – Medium Voltage
Orange	255	102	0	Electrical distribution – High Voltage
White	255	255	255	Compressed air, ventilation air, exhaust gas

Table 8-4: Colour markings of pipes

8.4.5 Symbols

To learn about animated symbols you must be familiar with the basics of element processing first. Platform objects can be classified regarding their electrical interface and functional behavior into so called, element types.
In this way it is possible to distinguish sensor types, valves, motors etc. Once classified into element types it is quite easy to specify the applicable symbols since the element type identifies the relevant monitoring and control abilities as well.

However mimics not only comprise of animated objects. For instance in case a platform object is not involved with alarm monitoring and control features at all then from PMS[2] point of view it makes no sense to comprehend this object.
Still these objects might be displayed in mimics as static (i.e. not animated) to improve clarity. This set of static symbols is based on nowadays widely accepted icons being used in system diagrams and P&ID[3] drawings. Static symbols will be drawn in the colour of the applicable medium.

[2] PMS = Platform Management System
[3] P&ID = Piping & Instrumentation Diagram

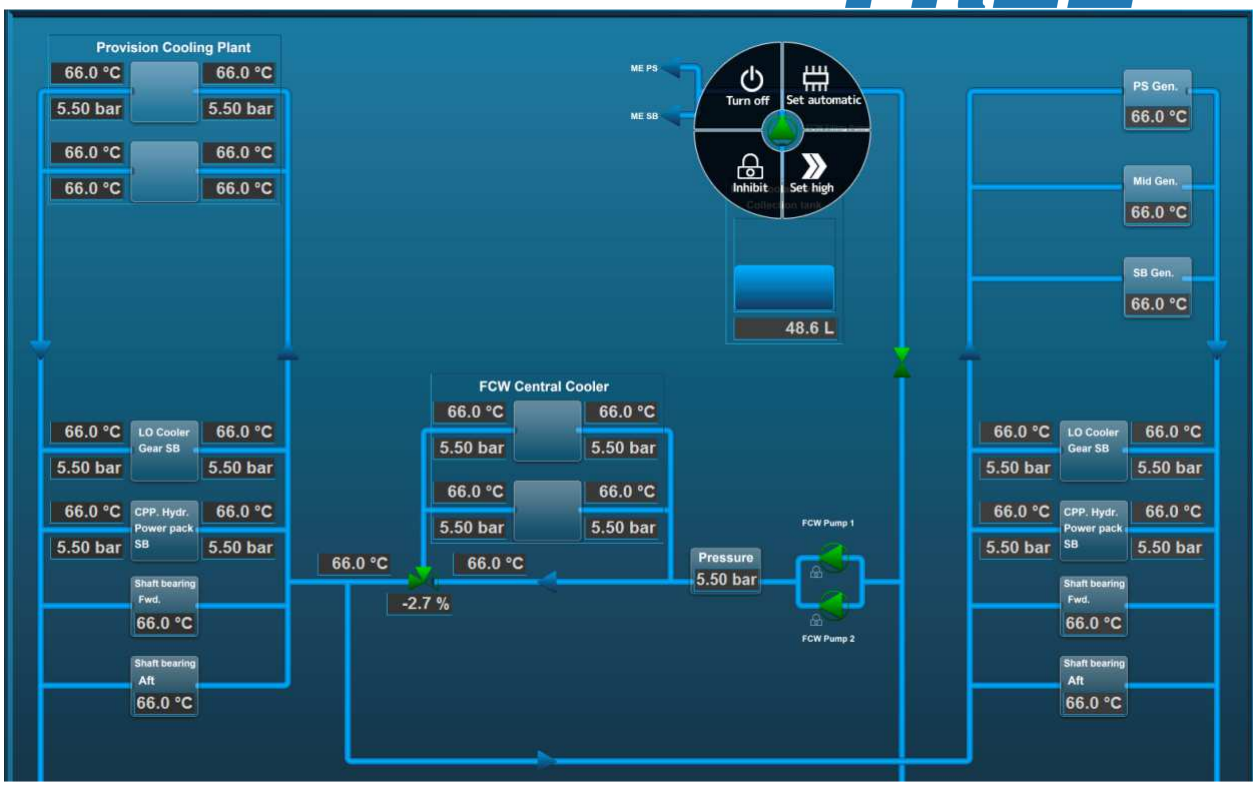


Figure 8-17: Mimic layout

8.4.6 Control elements

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. Colour 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.

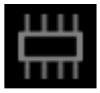
Status	Control element	Symbol
Operable in two speeds, system off	Double chevron (no fill)	
Operable in two speeds, system running at low speed	Double chevron (single chevron filled)	
Operable in two speeds, system running at high speed	Double chevron (double chevron filled)	
Operation is disabled (local control only or controlled by other OPC)	Padlock	
Manual operation (controlled remotely)	Hand	
Automatic operation (controlled by ACS[4])	Chip	

Table 8-5: Control element status

[4] ACS = Automation Control Sequences

Table 8-6: Colour codes (control elements)

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

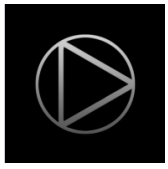
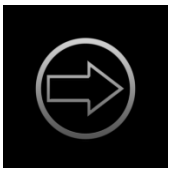
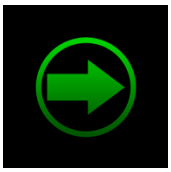
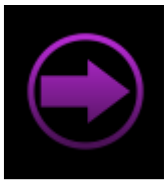
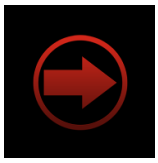
Centrifugal pump	Piston pump	Generator	Status description
			OFF
			ON (condition ok)
			ON, WARNING condition
			ON, DEFECTIVE condition
			ON, CRITICAL condition

Table 8-7: Control elements and colour animation

8.4.7 3- Way valve control element

3-way valve OFF	Status description	3-way valve ON	Status description

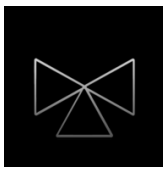
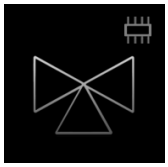
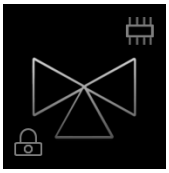
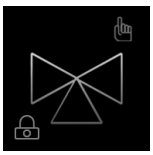
	3-way valve OFF (status indication only)		3-way valve ON (status indication only)
	3-way valve OFF, AUTO (control by AMCS[5])		3-way valve ON, AUTO (control by AMCS)
	3-way valve OFF, AUTO (local control)		3-way valve ON, AUTO (local control)
	3-way valve OFF (local control)		3-way valve ON (local control)
	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 8-8: Control elements with status indication

	Centrifugal pump ON, Operable in two speeds, system off
	Centrifugal pump ON,

[5] AMCS = Alarm, Monitoring and Control System

	Operable in two speeds, pump running at low speed
	Centrifugal pump ON, Operable in two speeds, pump running at high speed

Table 8-9: Control elements with speed indication

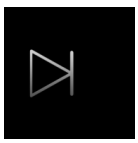
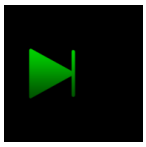
		Fan OFF and ON
		2-way valve OFF and ON
		Check valve OFF and ON

Table 8-10: Other control elements

8.5 Functional description

8.5.1 Measuring and control of Fresh Cooling Water (FCW) temperature

The description of the sequence below serves as a model for process measuring and control functions. The three-way valve regulates the temperature of the FCW automatically.

Item description	Sensor type	Condition
Three-way valve central cooler position indication	AI	Status
Three-way valve central cooler position control	A0	Status
Three-way valve central cooler error signal	DI	Alarm
Three-way valve FCW inlet temperature	AI	Status
Three-way valve FCW outlet temperature	AI	Status

Table 8-11: I/O declaration (FCW temperature)

Figure 8-18: Measuring and control of FCW temperature

8.5.2 Alarm and monitoring of main engine exhaust gas system

The description of the sequence below serves as a model for alarm and monitoring functions with programmed calculation.
By means of NiCrNi sensors the exhaust gas temperature of all cylinders will be measured. Alarms are generated when certain cylinder temperatures are reached.

Item description	Sensor type	Condition
Engine temperature exhaust bank cylinder A1	AI	Alarm
Engine temperature exhaust bank cylinder A2	AI	Alarm
Engine temperature exhaust bank cylinder A3	AI	Alarm
Engine temperature exhaust bank cylinder A4	AI	Alarm
Engine temperature exhaust bank cylinder A5	AI	Alarm
Engine temperature exhaust bank cylinder A6	AI	Alarm
Engine temperature exhaust bank cylinder A7	AI	Alarm
Engine temperature exhaust bank cylinder A8	AI	Alarm
Engine temperature exhaust average value	Analogue	Alarm

Table 8-12: I/O declaration (engine exhaust gas system)

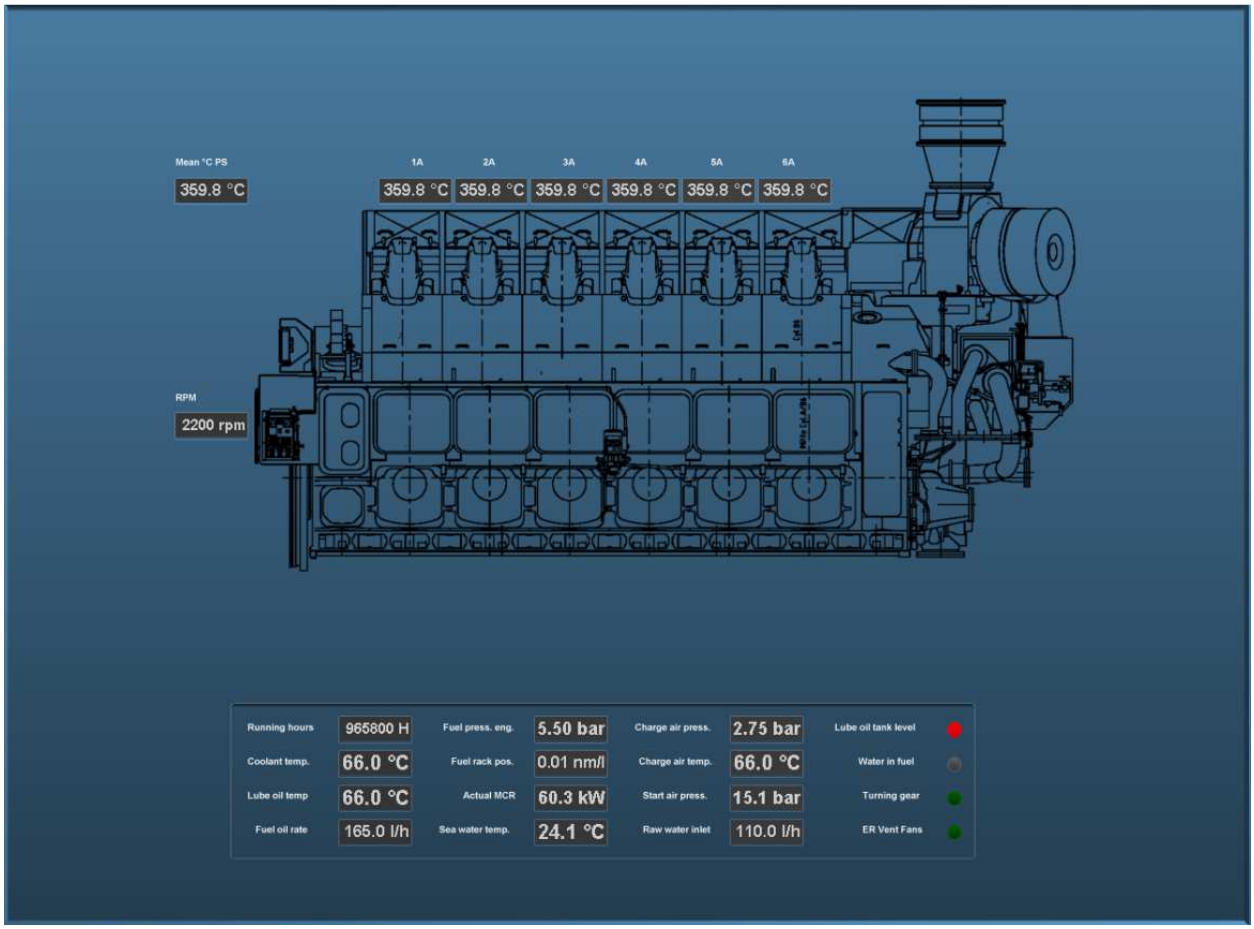


Figure 8-19: Exhaust gas temperature measurement

: *for more examples see our "mimic example booklet".*

9. Duty alarm system

9.1 Introduction

The duty alarm system provides machinery alarms to bridge, cabins and public areas for an unattended (unmanned) machinery space. The duty alarm system will be configured from a particular Operator Work Station (OWS).
Duty Alarm Panels (DAPs) at each location are connected with the automation system via the system network (network switch and local processing unit). 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 essential alarm is present in the unmanned engine room. A watch safety timer on the workstation monitors the engineer working in the engine room.
When the engineer does not acknowledge within 30 minutes, the relevant engineers alarm is invoked, warning all engineers and bridge.
An engineer can be called on demand from the ECR on the OWS. Each station has its own caller identification.

 : *For more detailed information on “manned” and “unmanned” systems we refer you to the appropriate manuals.*

The “On duty” selection, “Call”, “Unattended” and “Attended” functions are implemented on a dedicated mimic.

In general an alarm comes with visible and audible notifications.
The duty alarm system distinguishes two different alarm modes i.e.:

- Attended alarm mode
- Unattended alarm mode

9.2 General

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 Operator PC (OPC).
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.

The duty alarm system distinguishes two different alarm modes i.e.:

- Attended (see chapter 9.3.4)
- Unattended (see chapter 9.3.5).

Alarms will be distributed to all Duty Alarm Panels (DAPs), servers and clients.

9.3 Design principle

9.3.1 Alarm groups

All alarms monitored values are divided into alarm groups. Alarms belong to a specific alarm group (see Figure 9-1). Active alarms are indicated by a flashing light (unacknowledged alarm) or steady light (acknowledged alarm).
The alarm messages are displayed on top of the screen and can be scrolled by means of the scroll buttons (see Figure 9-2).

Figure 9-1: Alarm groups

Figure 9-2: Alarm scroll buttons

9.3.2 Alarm types

9.3.2.1 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.

9.3.2.2 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.

9.3.2.3 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.

9.3.3 Alarm inhibits

Some alarms are conditional and will be inhibited when a specific condition is present. This function is accomplished by defining a signal as an inhibit source for a specific alarm or a specific group of alarms. This will show in the Alarm page (see Figure 9-3).

9.3.4 Attended alarm mode

FT 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).

9.3.5 Unattended alarm mode

In case the operator is not present at the OPC in-control, but making his round to one of the machinery spaces or doing routine maintenance. Within this period of time, alarms that are present are visible on all Duty Alarm Panels (DAPs).
The “Unattended” mode can be activated on the workstation that has control over the sensor alarm group. Activation of the unattended machinery space mode can only be done when all alarms of “Unattended” sensor alarm groups are acknowledged.

FT 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).

When a sensor alarm group is unmanned in “Unattended” mode, new alarms are indicated on the DAP of the engineer. On the panels, the alarm sounding (horn/buzzer) can be silenced (only local), but the alarms still need to be acknowledged on the OPC within the relevant technical area.
If alarms are not acknowledged within a specific period of time on the OPC in-control, 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

9.4 How an alarm is displayed

Panel	Alarm displayed
Duty Alarm Panel (DAP)	On main screen
Operator Work Station (OWC)	On taskbar On alarm viewer In logbook On any mimic showing the field-in-alarm

:The alarm viewer on the OWS uses the same layout as the DAP, thus making it easier for an operator to understand and operate the screen.

Figure 9-3: Alarms on alarm viewer and taskbar

9.4.1 How to acknowledge an alarm

The alarms must be acknowledged on the Operator PC (OPC) in the Engine Control Room (ECR) by means of:

- Double clicking the corresponding alarm line (alarm viewer)
- Double clicking the field (when red) in the MIMIC showing the field-in-alarm.

9.4.2 When an alarm is not acknowledged within a specific period of time

The General Engineers Alarm will sound on all alarm stations, until it is accepted / acknowledged, in which case the alarm goes off.
Any unacknowledged alarm is always shown on top of the acknowledged alarms of the alarm viewer (incl. DAP) and will be flashing red.

DATE	TIME	GROUP	ITEM	STATUS	TIMER	ACK
18-02-10	10:26:33	None	Group General Engineer	Alarm	00:02	N
18-02-10	10:20:32	Slow Down	ME Fresh Water Inlet Temperature	Defect	00:08	N
18-02-10	10:20:32	Slow Down	ME Exhaust Valve 2	Defect	00:08	N
18-02-10	10:20:32	Slow Down	ME Exhaust Valve 1	Defect	00:08	N
18-02-10	10:20:32	Stop	ME Alarm Coolant Pump Alarm	Warning	00:08	Y

Figure 9-4: One acknowledged and three unacknowledged alarms (incl. GEA)

9.4.3 How to silence an alarm (not at ECR)

You can silence an alarm on all other locations.
This will silence the alarm buzzer for 3 minutes, but will not acknowledge the alarm.
The engineer is required to go to the Engine Control Room (ECR) to acknowledge the alarm.
On other systems, silencing the alarm is also called an “audible acknowledge”. We will however use the term “silencing” throughout all of our documentation.

9.4.4 When will an alarm disappear

An alarm will disappear only when rectified AND acknowledged. Acknowledged alarms will show in the normal instrument colour. (see Figure 9-5).

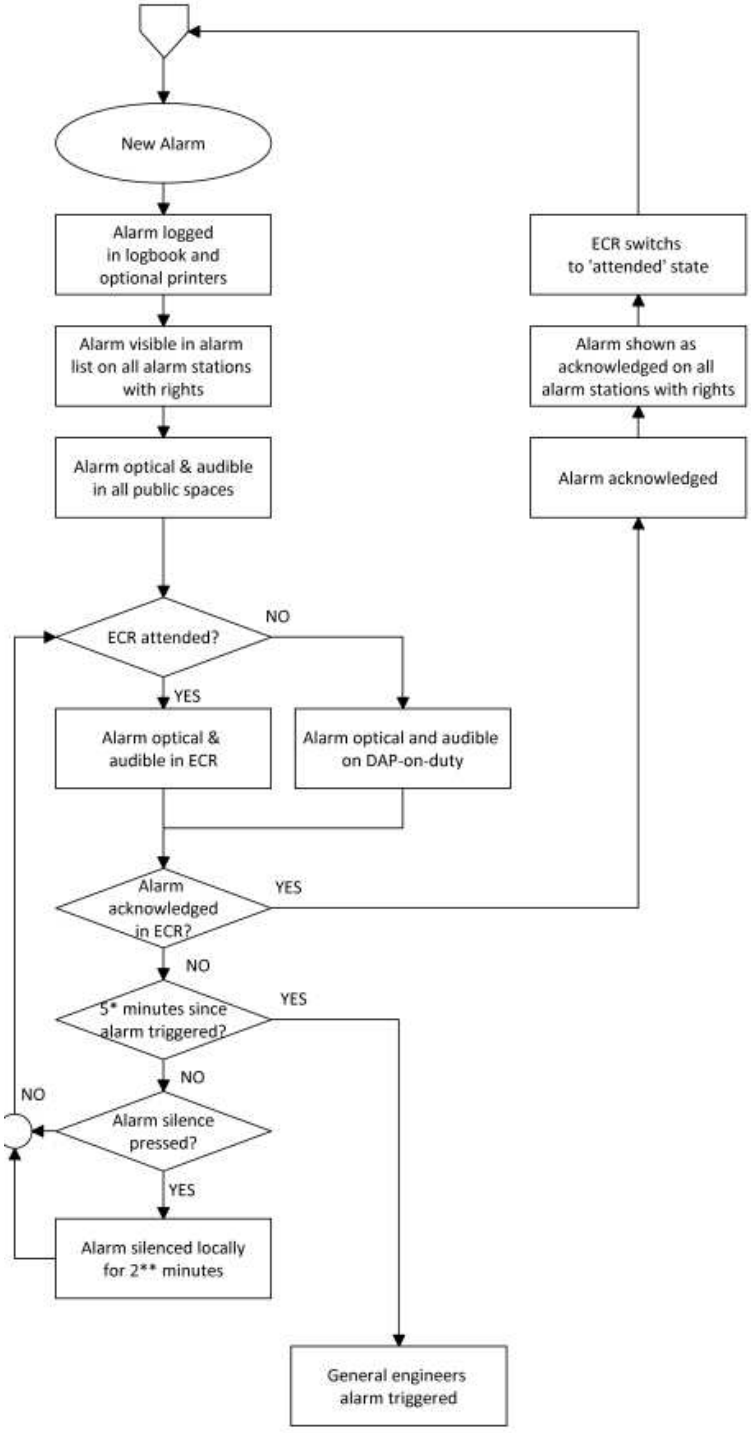


Figure 9-5: typical alarm sequence

9.4.5 Duty Alarm Panel (DAP)

Figure 9-6: Duty Alarm Panel (DAP)

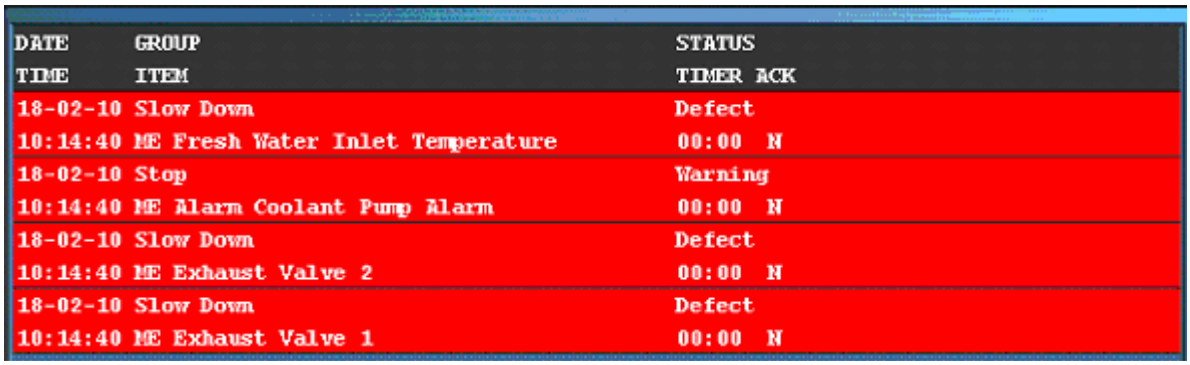


Figure 9-7: Alarm and status area

Figure 9-8: Alarm groups

9.4.6 Controls and indications

The on-duty selection, call, attended and unattended functions are implemented on a dedicated mimic. The on-duty mimic can be called up by selecting one of the two buttons at the bottom of the screen

- Call button

- On-duty indication
- Duty select button.

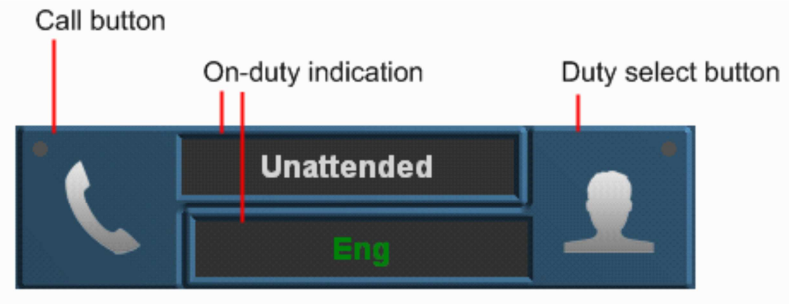


Figure 9-9: Call button / on-duty indication / duty select button

9.4.6.1 Call button

From the duty alarm panel it is possible to call for a specific area (e.g. bridge or engine room), engineer or all engineers.
Press the “Call button” (see Figure 9-9), the call indicator will lit, and the selected area or engineer is called.
To cancel the call, push the “Call button” again.

9.4.6.2 On-duty indication

Press the “ATTENDED” button to signal that the engine control room is manned.
Press the “UNATTENDED” button to signal that the engine room is unmanned.
Via the “Duty select button” (see Figure 9-9) the responsible engineer (on-duty engineer) can be selected and will be displayed on the display (“On-duty indication”).

9.4.6.3 Duty select button

Push the “Duty select button” (see Figure 9-9) and select the responsible engineer. The “On-duty indication” displays the responsible engineer.

9.4.6.4 Panel active button

The switch-on or switch-off the duty alarm panel. When duty is selected it is automatically turned on. Other stations can chose if they want to hear the alarms by switching their station on or off.

Figure 9-10: Panel active button

9.4.6.5 On-duty selection

The on-duty mimic contains duty selection and call buttons. In addition, the selection attended/unattended can be made.
The “Bridge watch safety timer”, “Engine room watch safety timer” (see Figure 9-11**Fout! Verwijzingsbron niet gevonden.**) including the “Engine room watch active button” and “Bridge watch active button” are also implemented on the server (dead man’s watch).
At the bottom of the screen, the state of the watch safety timer is displayed:

- When the engine room is UNATTENDED, the engine room watch safety timer is “OFF”

When the engine room is ATTENDED, the engine room watch safety timer is “ON” (remaining time is counting down).

9.4.6.6 Watch safety timer

The watch safety timer (DM Timer[6]) remaining time is displayed at the bottom of each screen on the workstation. The timer counts down from 30 minutes back to 0 minutes.
When the timer reset has not taken place and the 3 minutes pre-alarm limit is reached, an alarm occurs on the workstation that no “Reset” button has been selected within the last 27 minutes.
The watch safety timer “Remaining time” indication (see Figure 9-12) displays now in a red.
When selecting the “General Engineers Alarm” (GEA) button, or after countdown to 0 minutes (3 minutes warning cycle has passed) this means that the “Reset” button has not been selected within the last 30 minutes and the GEA is invoked.

Figure 9-11: Watch safety timer

Figure 9-12: Watch safety timer (remaining time indication)

Figure 9-13: Bridge watch

[6] DM Timer = Dead Man’s Timer

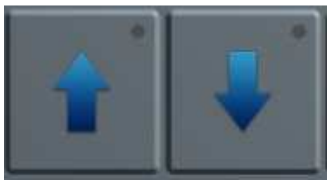


Figure 9-14: Operating buttons

Figure 9-15: On duty indication

Figure 9-16: Bridge watch safety timer

Figure 9-17: Engine room watch safety timer

Figure 9-18: Engine room watch button

Figure 9-19: Call button

Figure 9-20: Acknowledge button

Figure 9-21: Panel active button

9.5 Duty Alarm Panel functionalities

Functionality	Description
Alarm & status area (see Figure 9-7)	In the “Alarm & status area” the alarm summary, alarm history and tag details will be presented. The alarm summary will present the active alarms with time stamps and values. The alarm history will present the alarms with time stamp of the alarm occurrence, acknowledge and gone date and time.
Operating buttons (see Figure 9-14)	The “Operating buttons” (arrow up & down) are used for scrolling through the alarm page(s). While pressing the “Enter” button an alarm history, tag details and alarm summary menu is shown.
On duty indication (see Figure 9-15)	The “On duty indication” indicates which engineer is on duty. The panel that is in the operational mode “On duty” the Field “On duty” will light up. In addition, the field that defines the engineer will illuminate (1st, 2nd, 3rd etc). The panels that are not on duty will indicate the engineer on watch.
Alarm groups (see Figure 9-8)	The “Alarm groups” button indicates if an alarm is active within a critical group.
Failure indication (see Figure 10-2)	In case of a failure (network) an audible alert (buzzer) is triggered. The text “Connecting” appears on the display to indicate the lack of connectivity. The alert can be silenced by touching the display screen.
Bridge watch safety timer[7] (see Figure 9-17)	In case of a one man bridge, the bridge watch alarm can be enabled for safety purposes. The bridge watch safety timer must be reset within a specific amount of time (using the reset button of an alarm panel on the bridge), else a General Engineers’ Alarm (GEA) is invoked on all stations.
Engine room watch alarm (see Figure 9-18)	The Duty Alarm Panel indicates whether the machinery space is “Attended” or “Unattended”.

Table 9-1: Duty Alarm Panel functionalities

9.6 On duty select procedure

An engineer on duty can be selected on duty from the allocation control button on the Duty Alarm Panel (DAP). The engineer will be warned when an alarm is present in one of the “Unmanned” alarm groups. Using the alarm panel of the engineer on duty, the engineer is notified of new alarms. This is done by warning light, buzzer and/or on-screen functions. Alarms are always represented on the screen.

The duty alarm system sends alarms to the responsible persons in case of incorrect situations whenever the machinery spaces are unattended. The release procedure for duty

[7] Not part of the type approval process.

alarms will be done (before leaving the area) at the main Operator PC (OPC) in the Engine Control Room (ECR).

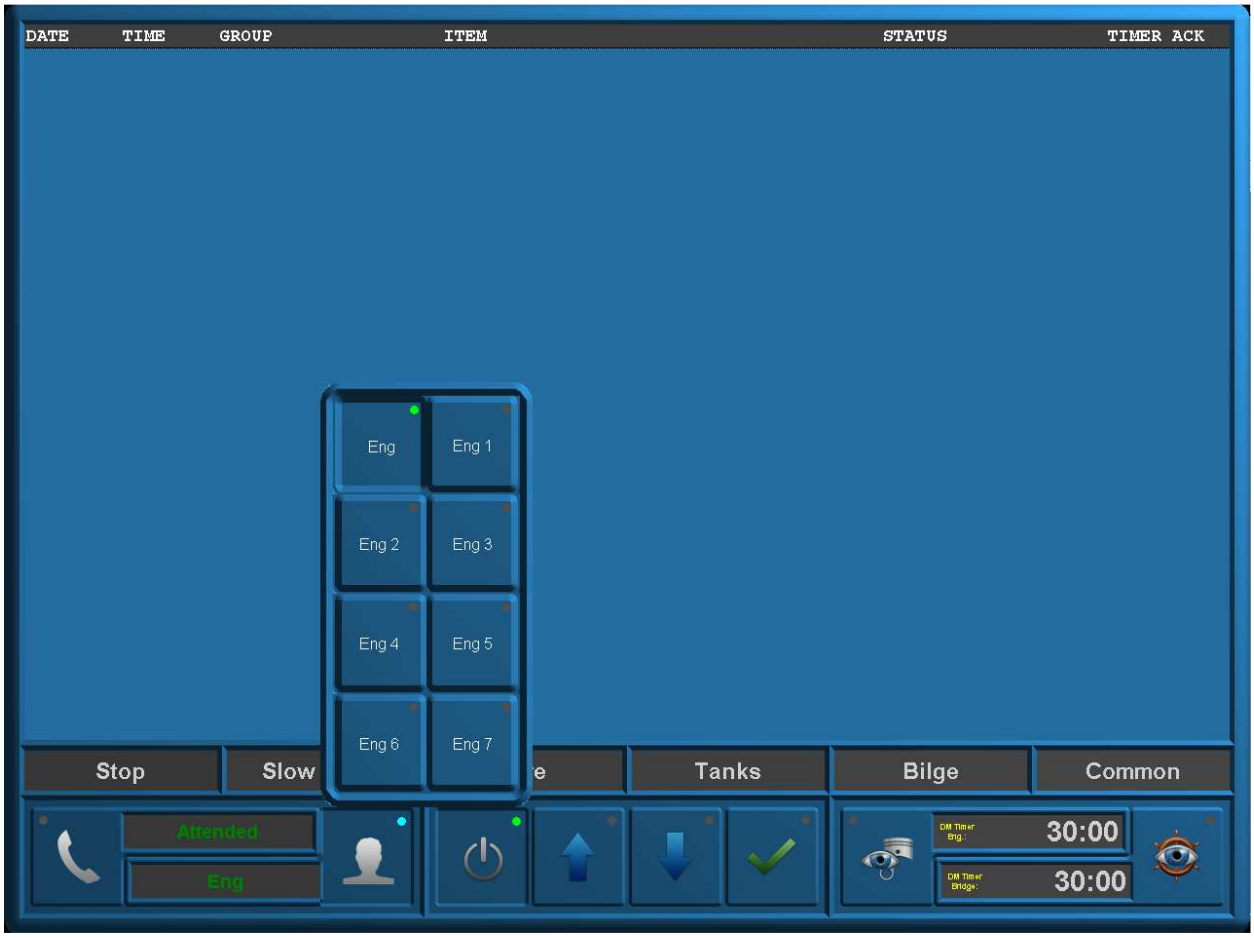


Figure 9-22 Duty Alarm Panel (on duty select)

9.7 Alarm acknowledge procedure

If during watch free operation an alarm occurs the normal procedure will be that the engineer on duty will receive an optical and acoustic alarm in his cabin. Accordingly he must Silence the alarm on his panel.
The alarm itself is still in the status not acknowledged. The engineer on duty must go to the ECR, to acknowledge the alarm and solve the problem in the control room.

When the engineer on duty ignores the alarm in his cabin, a repeat alarm function will be activated. This means, after a specific period of time the duty alarm system generates a General Engineer's Alarm (GEA) on all stations.

9.8 Call function

From the Duty Alarm Panel (DAP) it is possible to call for a specific engineer, bridge or all engineers (see Figure 9-23).

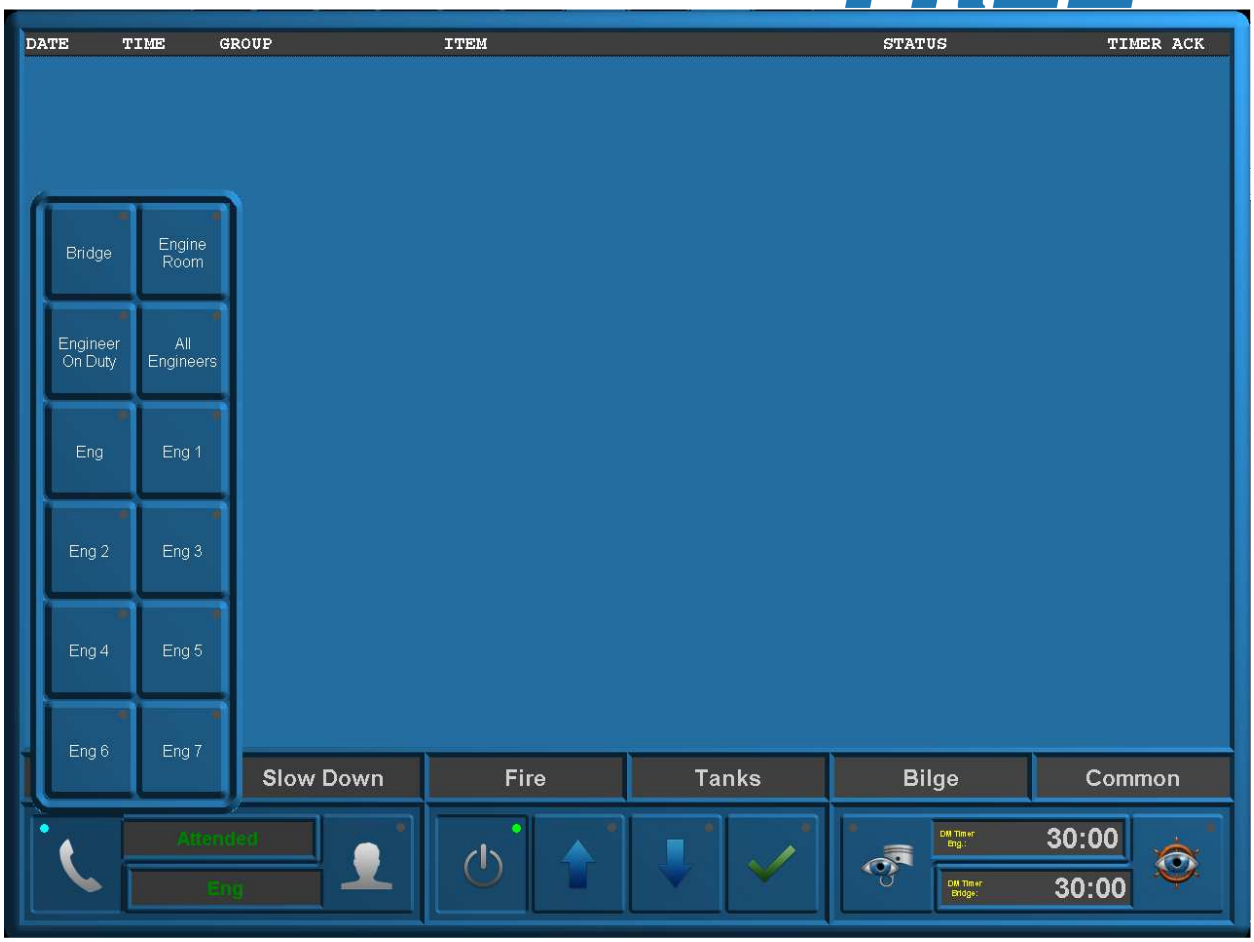


Figure 9-23 Duty Alarm Panel (call function)

10. Personnel alarm

10.1 General

A personnel alarm provides a safety timer (see Figure 9-18 and Figure 9-23) for personal protection, used when a single person works in an unattended area. The personnel alarm consists of:

- A release station
- Acknowledge stations

10.1.1 Release station

The release station is used to indicate whether a machinery space is “Attended” or “Unattended” and is preferably situated at the entrance of the machinery space. The release station consists of the following buttons i.e.:

- A “attended/unattended” push button
- A timer “active/inactive” button
- A alarm “active/silence” push button

Button	Detail
Attended	Press when entering the machinery space to activate and when leaving to deactivate.
Timer	The safety timer can be deactivated (disabled) by using the workstation in the machinery space in conjunction with the right Password (see Figure 10-1)
Alarm	Shows when the station is in alarm. Can be pressed to silence the alarm, which inheritably will reset the Timer.

Table 10-1: Release station buttons

Figure 10-1: Deadman Switch Password

Figure 10-2: Release station

10.1.2 Alarm Panel

In order to acknowledge alarms to persons on duty an Alarm Panel is used (this panel can also be used in public spaces and on the bridge).
The Alarm Panel consists of three buttons, the “Dim” button, the “Timer Button” and the “Alarm Button”. These buttons have a combined function i.e. button and lamp (see Figure 10-3).

Button	Detail
Dim	cycle through diverse states of brightness for all the LED’s
Timer	shows if the Deadman Timer is activated and has no push-function
Alarm	Shows with the LED if there is an active alarm. By pressing the button you can silence the panel’s buzzer for three minutes.

Table 10-2: Alarm Panel

The Alarm Panel consists of hardwired buttons with LED[8] lighting.

Figure 10-3: Alarm Panel

10.1.3 BNWAS

The BNWAS (Bridge Navigational Watch Alarm System) is also a personal safety system but then mend to be used on the bridge. You can use it the same way as the entrance module

[8] LED = Light Emitting Diode

(see Figure 9-13 and Figure 10-1). The BNWAS panel (see Figure 10-4) consists of the following buttons:

Figure 10-4: BNWAS Panel

Button	Detail
Dim	cycle through diverse states of brightness for all the LED's
Timer	shows if the Deadman Timer is activated and has no push-function
Alarm	Shows with the LED if there is an active alarm. By pressing the button you can silence the panel's buzzer for three minutes.

Table 10-3: BNWAS

10.2 Alarm monitoring and control process

Step	Detail
1	The Alarm, Monitoring and Control System (AMCS) detects when a person enters a machinery space via the switch on the "Release station" in or near the machinery space.
2	After 27 minutes an audible or visual alarm will be initiated by the system in the appropriate machinery space to prompt the engineer to reset the safety timer.
3	During each period of 30 minutes the person working alone in that space must reset the safety timer to confirm his presence/well-being. A "Reset" command must be given via the reset button on the "Timer reset station", the workstation or on one of the mushroom buttons in that particular machinery space. Each space has its own safety timer.
4	If the "Reset button" is still not pressed within 3 minutes after the warning, a general alarm will sound on all the workstations.

Table 10-4: Alarm monitoring and control process engineer

Step	Detail
1	The Alarm, Monitoring and Control System (AMCS) detects when a person is on watch in the wheelhouse via the switch on the "Release station".
2	After 12 minutes an audible or visual alarm will be initiated by the system in the Wheelhouse to prompt the officer to reset the safety timer.
3	During each period of 12 minutes the person working alone in that space must reset the safety timer to confirm his presence/well-being. A "Reset" command must be given via the reset button on the "Timer reset station", or at the workstation.

4	If the “Reset button” is still not pressed within 3 minutes after the warning, a general alarm will sound on all the workstations.

Table 10-5: Alarm monitoring and control process BNWAS

11. Setting and adjustment

11.1 Users [1]

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 Free Technics 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 11-1: Users

11.1.1 User name

This is a box that shows the active user and his rights.

11.1.2 Login at startup

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

11.1.3 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”.

11.1.4 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.

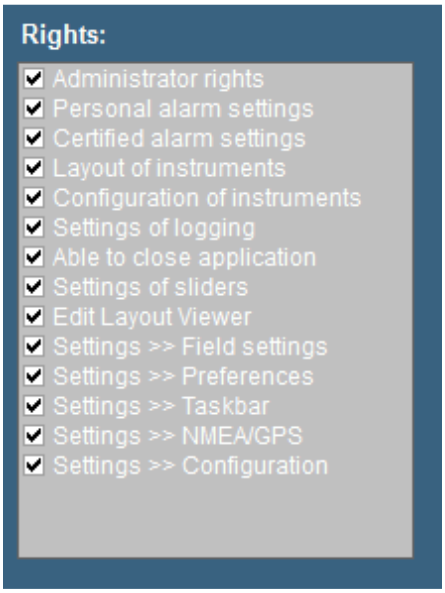


Figure 11-2: Rights

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**
  Via “Setting > Preferences”, you are allowed to change time and language, ships heading reference and SMS service.
  This can be extended with additional rights depending on what is needed.

 :

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

11.1.5 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.

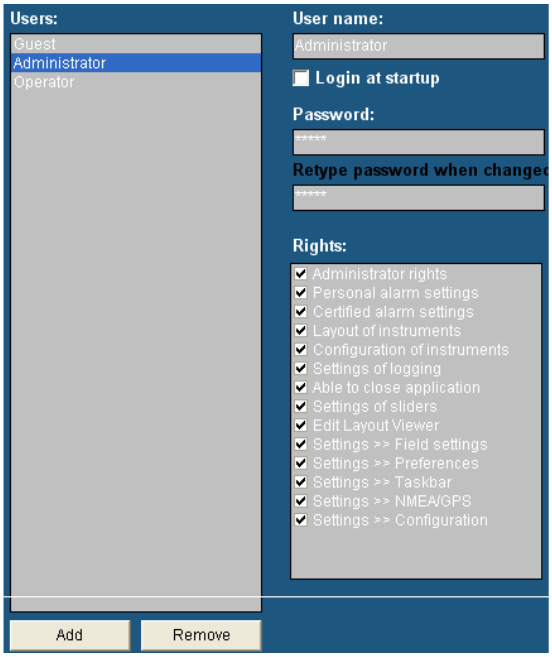


Figure 11-3: Add / Remove

 :

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”.

[1] Due to improvements and changes, this article will become obsolete. It will be removed as soon as the new changes take effect.

11.2 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 11-4: 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.

11.2.1 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:

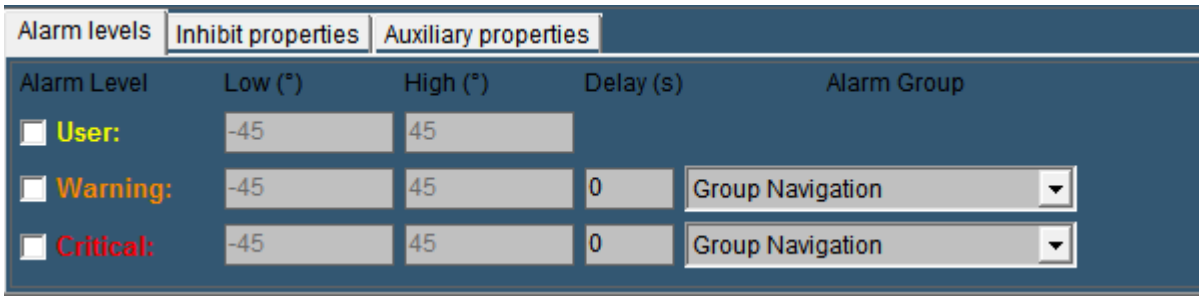


Figure 11-5: Alarm settings

An alarm field as 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:

11.2.1.1 Alarm levels

- **User**
  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
- **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).

- **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. For more detailed information please refer to chapter “Alarm stations”.

By example it will look like this (see Figure 11-6).

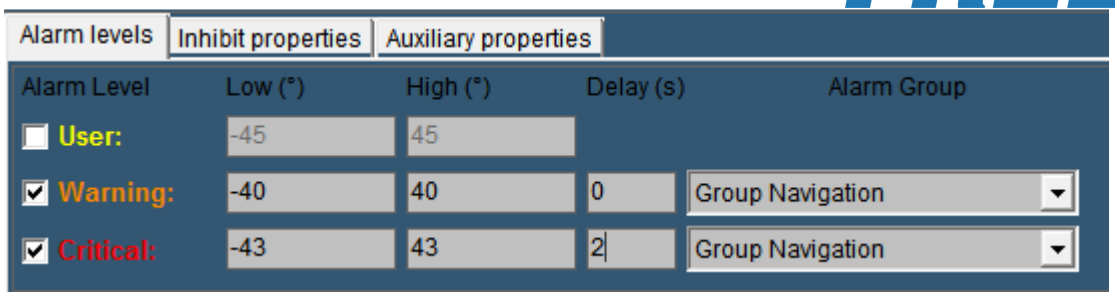


Figure 11-6: Alarm example

The next tab is for the inhibit properties.

11.2.1.2 Inhibit Properties

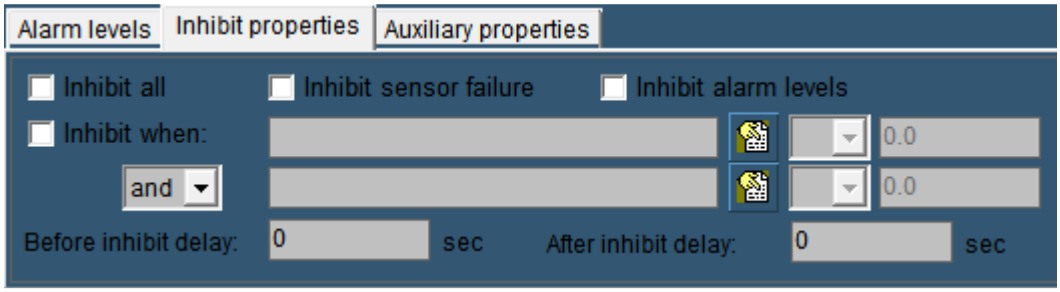


Figure 11-7: Inhibit Properties

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 alarmpage (See Alarmpage) 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, FT 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 out 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 11-8). 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 11-9).

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

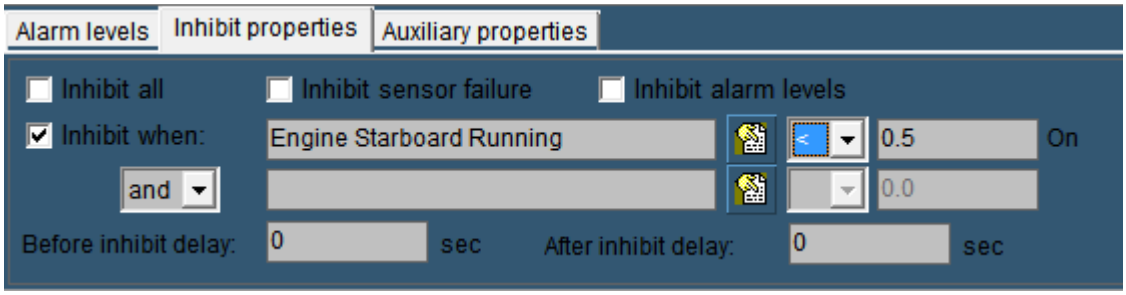


Figure 11-8: Inhibit When

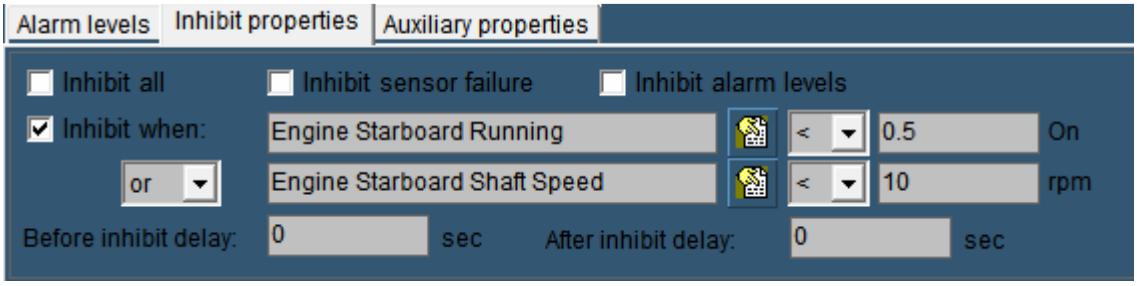


Figure 11-9: Inhibit When 2

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

11.2.1.3 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.

11.2.2 Min/Max

Under “Tools > Field Settings > Min/Max” (see Figure 11-10) the instrument boundaries can be set. For example the “Engine 1 Oil Pressure” instrument can be set as follows:

Figure 11-10: Min/Max settings

11.2.2.1 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 30 bar.

Figure 11-11: Engine 1 oil pressure indicator (0 - 30 bar)

In order to detect and identify a deviating function, make sure that all instrument (in a column or row) pointers are aligned to the same position (default mode).
Check the default values of each instrument and set the instrument range accordingly.

Figure 11-12: Instrument pointers

By aligning the instrument pointers to the same position (see Figure 11-12) it will be easier to detect a deviating function.

11.2.2.2 Zone marking

If the sensor values and their working ranges are known is working, 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 11-13: Zone marking

11.2.2.3 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 11-14).

Figure 11-14: Default unity

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

11.2.2.4 Filter

If an instrument reading seems to be a little erratic, you can select a higher number (see Figure 11-14) to dampen the movement of the instrument pointer.

11.2.3 Tune

11.2.3.1 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 second 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.

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.
For threshold values you can change the first input value. If the pressure indication has to start later than given, you can put in “Input value = 0.2 → Real value = 0”
This will make the instrument starts displaying as soon as the threshold of 0.2 bar has been reached. This can be accomplished the other way around.

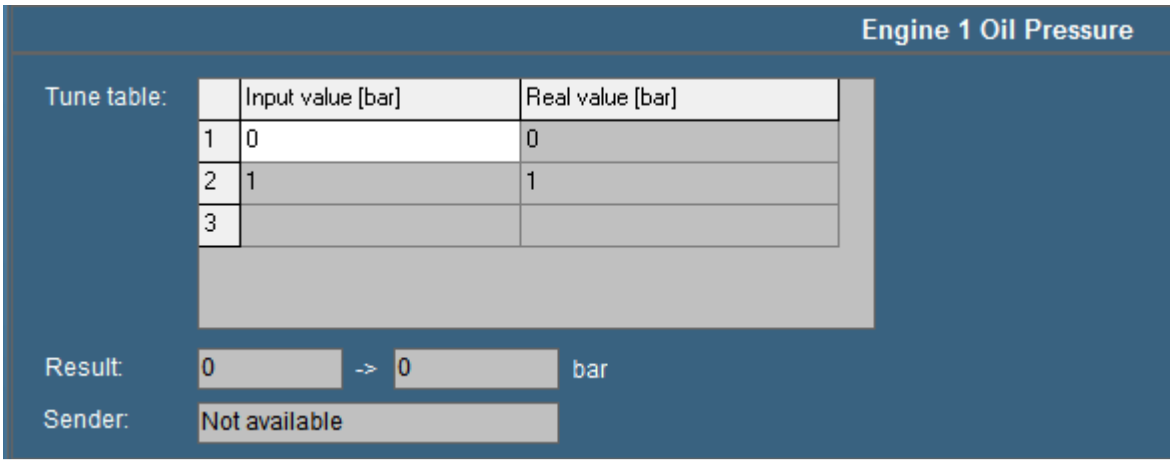


Figure 11-15: Tune table

11.2.3.2 Result

The “Result” box displays the exact incoming measuring data. The second box displays this data via the respective instrument that is connected to the sensor.
If for example the sensor gives a pressure (bar) output for every 20 mV, the real time result may read “100 → 5 bar” (see Figure 11-15). As a result the sensor reads “100 mV” and indicated as “5 bar” on the instrument.

:
Values may differ per sensor type.

11.2.3.3 Sender

The “Sender” box (see Figure 11-16) displays the device name where the data is coming from. If the sender field shows “Not available” indicates that that the sensor isn’t giving any data (for a reason why it is not giving data, check the troubleshooting section).
Other 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.

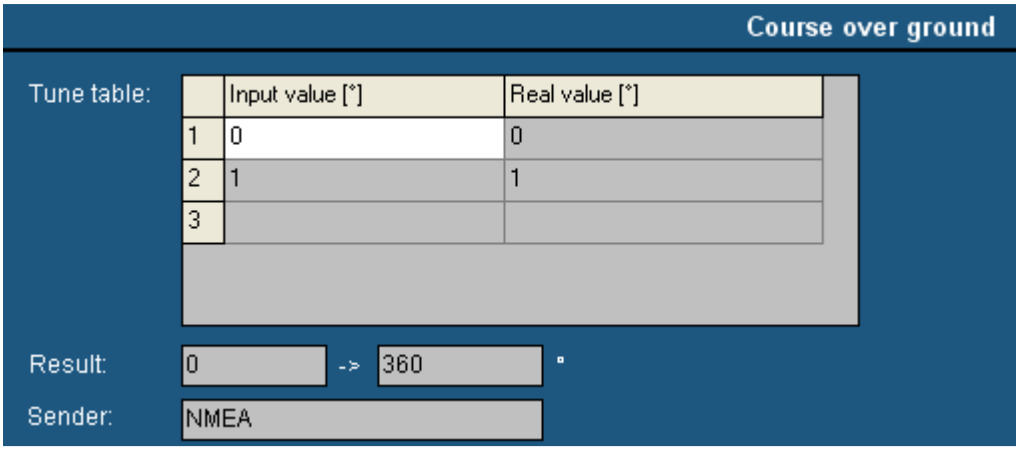


Figure 11-16: Sender box

11.2.4 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.

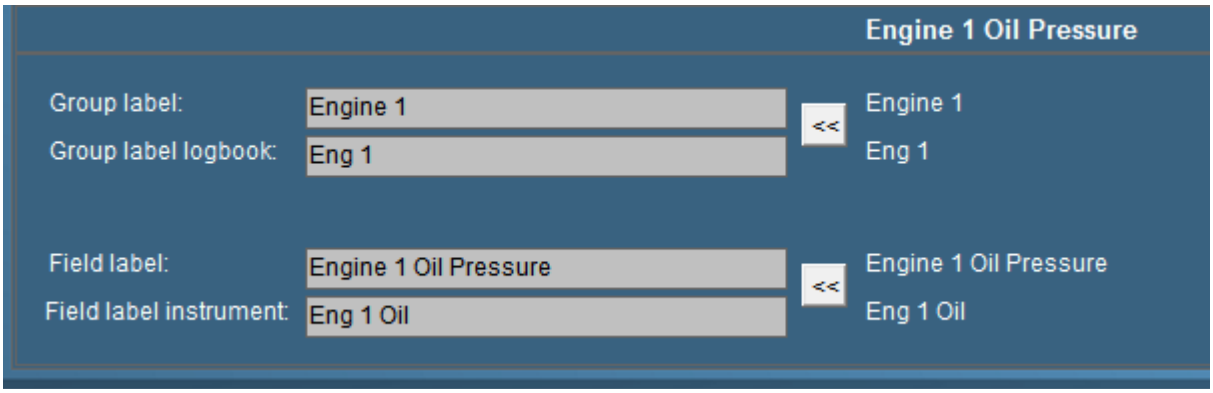


Figure 11-17: Comment

11.2.4.1 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”. For more detailed information concerning alarm groups please refer to chapter “Alarm stations”.

11.2.4.2 Group label logbook

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.

11.2.4.3 Field label

The field label is the exact indication of the sensor. For every sensor in FT 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 (see Wago), but it is possible you find it in other, programming or calibration files.

11.2.4.4 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.

11.2.5 Auto Switch

11.2.5.1 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.

11.2.5.2 Autoswitch Method

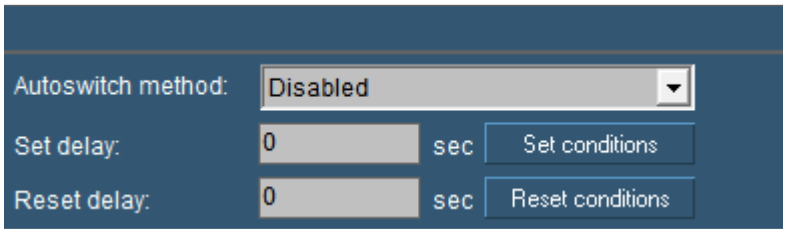


Figure 11-18: Autoswitch

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 11-19)
Reset conditions	Set conditions on how to react (see Figure 11-19)

Figure 11-19: 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 11-20)

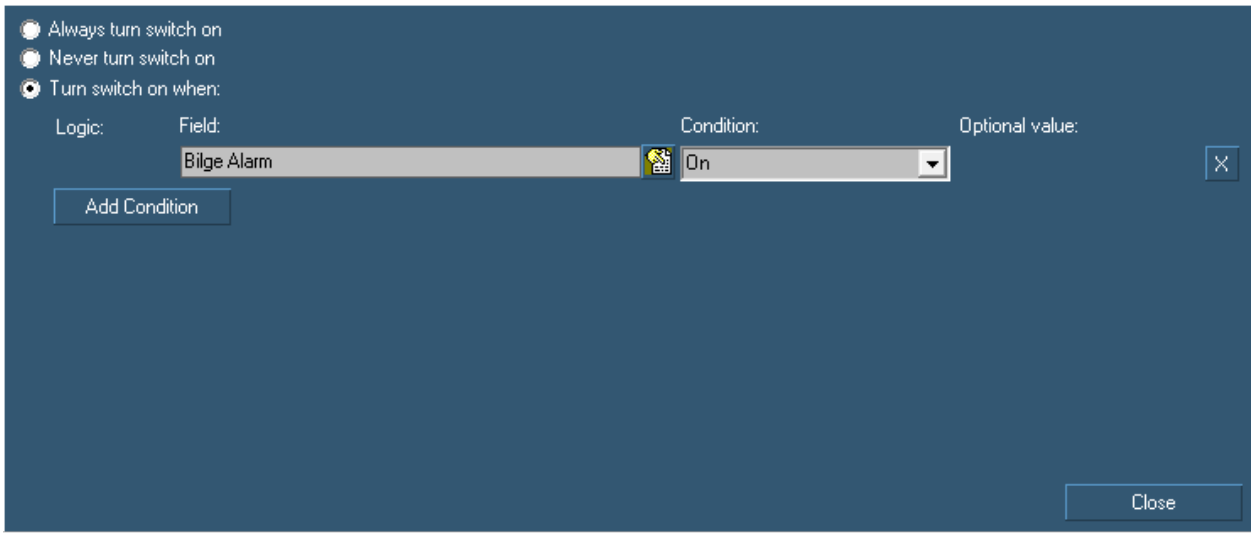


Figure 11-20: Auto Switch condition

: under conditions you find a lot of possibilities where you can experiment to get the right adjustments you need. For some of those you can refer to chapter 11.10.3.

11.2.6 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).

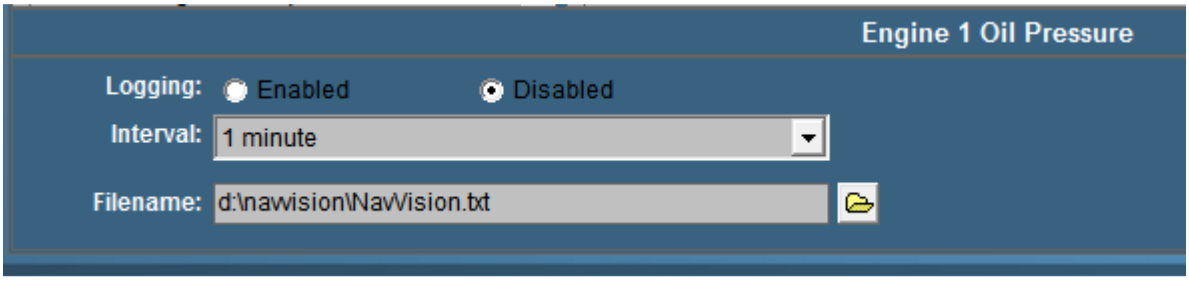


Figure 11-21: Logging

11.2.6.1 Logging

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

11.2.6.2 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.

11.2.6.3 Filename

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


:
Save the log file to D: or any other disk that FT NavVision® ® is running on. If you save the log file on to c: (the embedded disk) you lose the log every time the system starts up again.

11.3 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.

11.3.1 Station Matrix

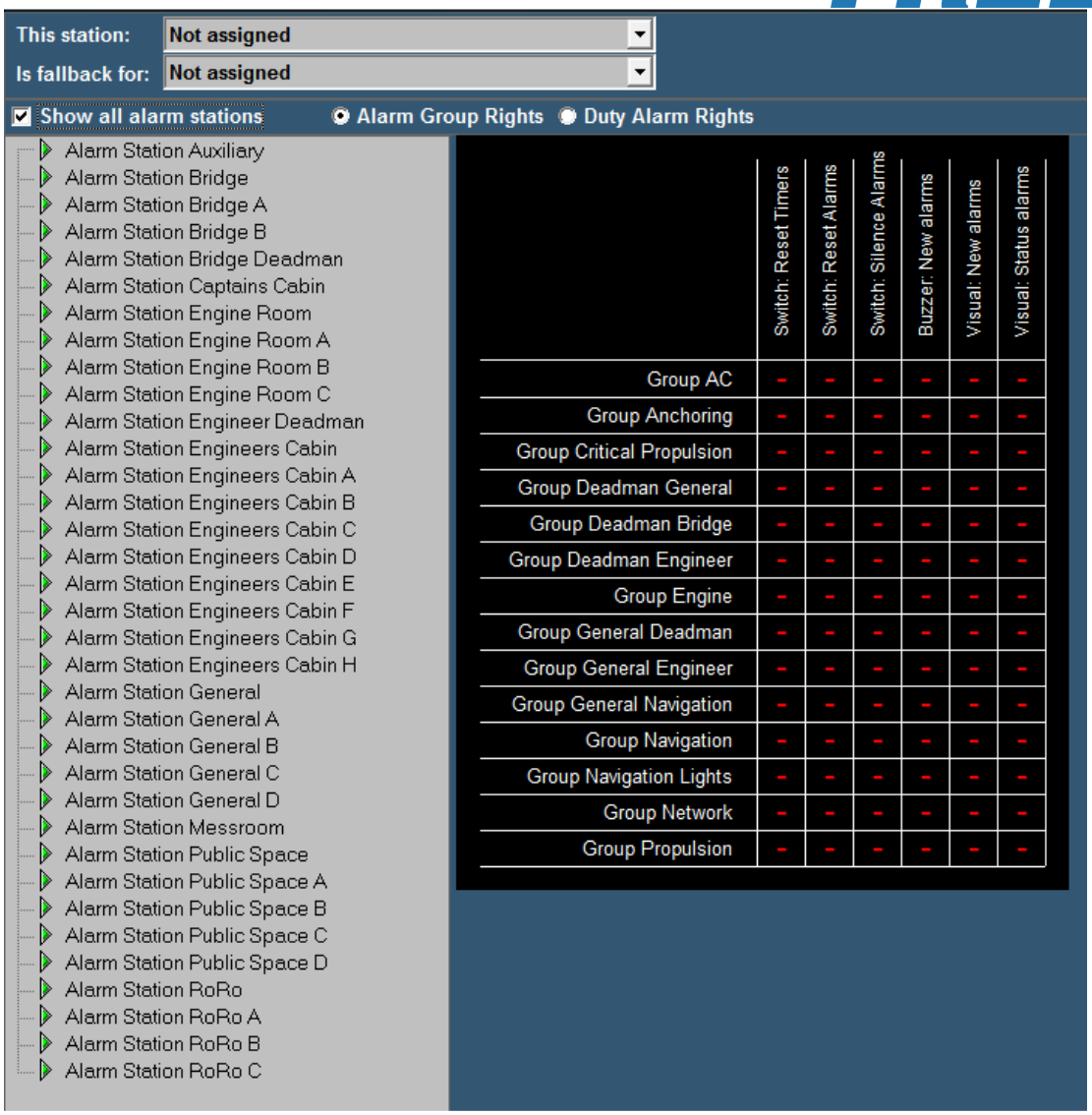


Figure 11-22: Alarm stations

11.3.1.1 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.

11.3.1.2 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.

: in future releases this feature will be obsolete. By making all the stations a server that can work independently, there will be no need for this function.

11.3.1.3 Show all alarm stations
Ticking this box switches between showing all, or all available Alarmstations.

11.3.1.4 Alarm group rights/Duty alarm rights
Choose either of these two to switch between changing alarm group rights or duty alarm rights.

11.3.1.5 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 PCs 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:

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)

11.3.1.6 How to set
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.

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 (seeFigure 11-23).

Figure 11-23: 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 11-24).

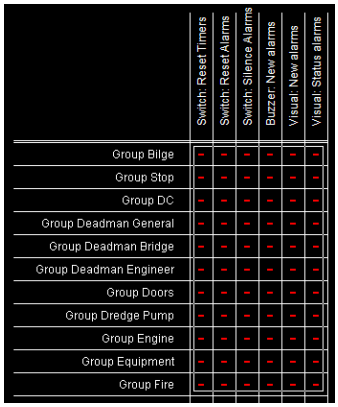


Figure 11-24: Select by dragging

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

11.3.1.7 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 Alarmstation 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.

We have developed a lot of standardized settings for different variations. Please refer to the troubleshooting manual for these examples.

11.3.2 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 11-25).

See chapter **Fout! Verwijzingsbron niet gevonden.**

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

 *: after changing these settings choose " accept and restart communication" to activate the changes.*

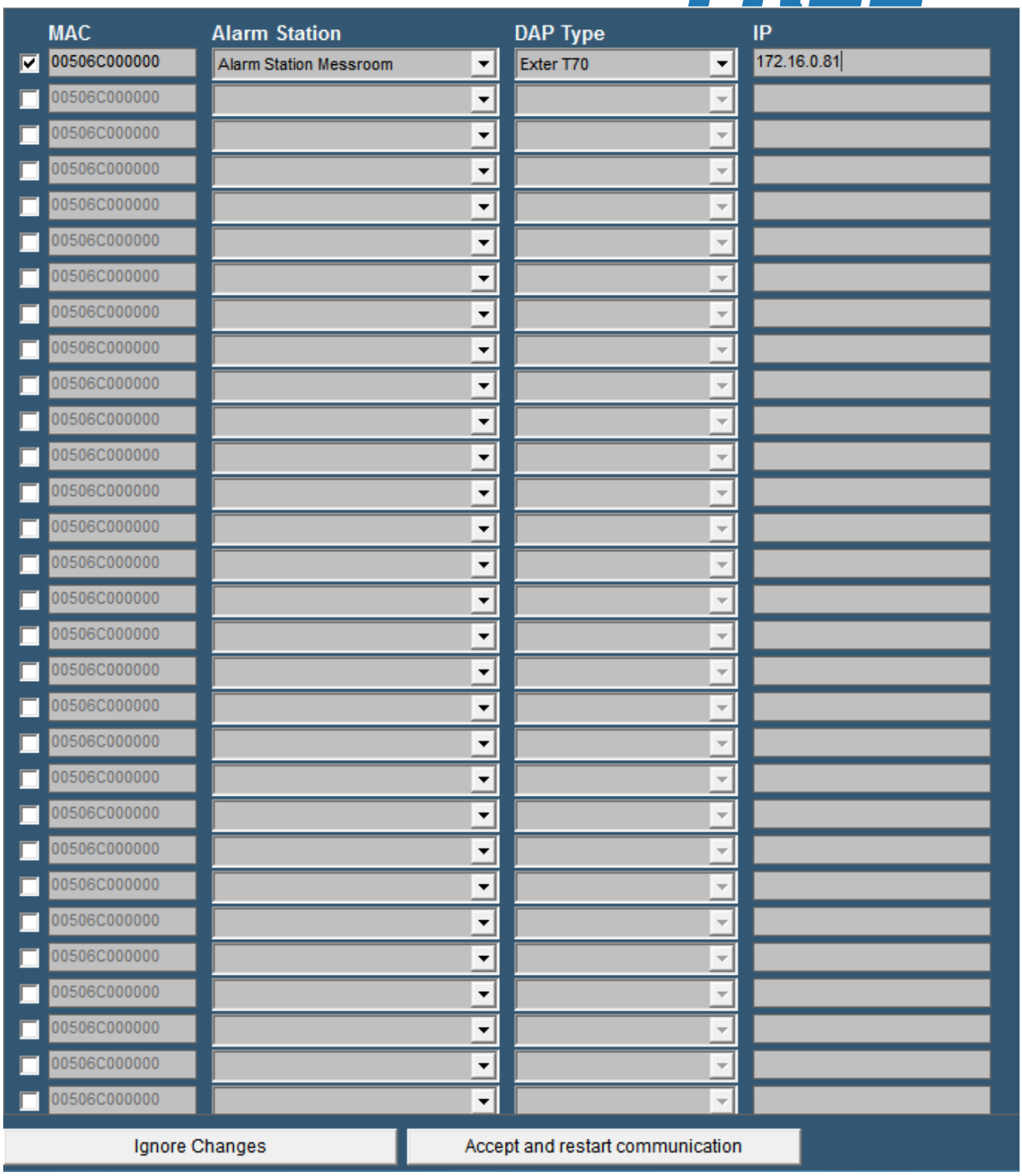


Figure 11-25: Alarm Panels

11.3.3 Alarm groups

In Alarm Groups you can define the looks of the DAP's (see Figure 11-26).

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.

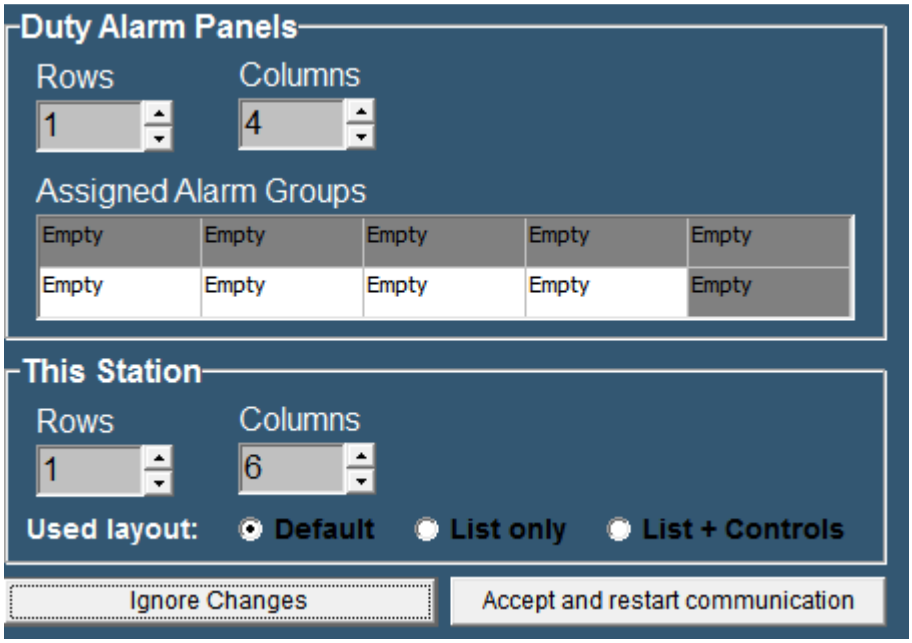


Figure 11-26: Alarm Groups

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

11.3.4 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 Settings” you can choose if the deadman timer starts again with every new alarm.

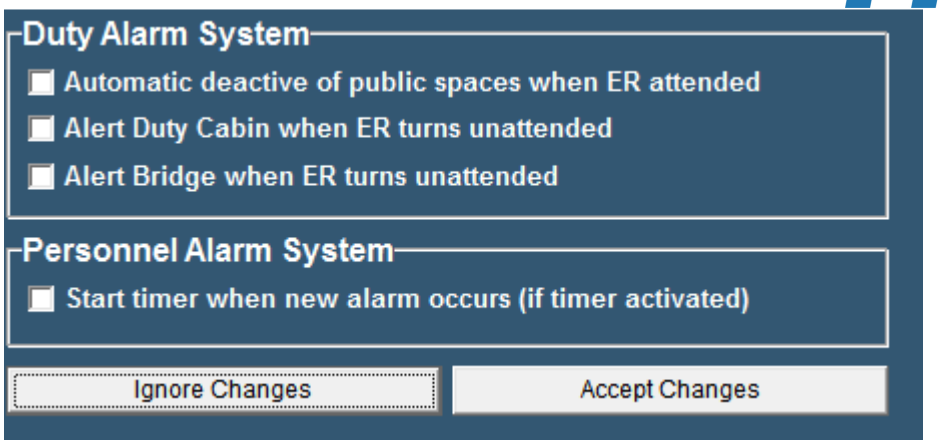


Figure 11-27: Alarm Settings

11.4 Preferences

11.4.1 General

With the field “Preferences” (see Figure 11-28), you can set several personal preferences. For example, you can set the software language, set the ships heading references as well as configure the SMS service.

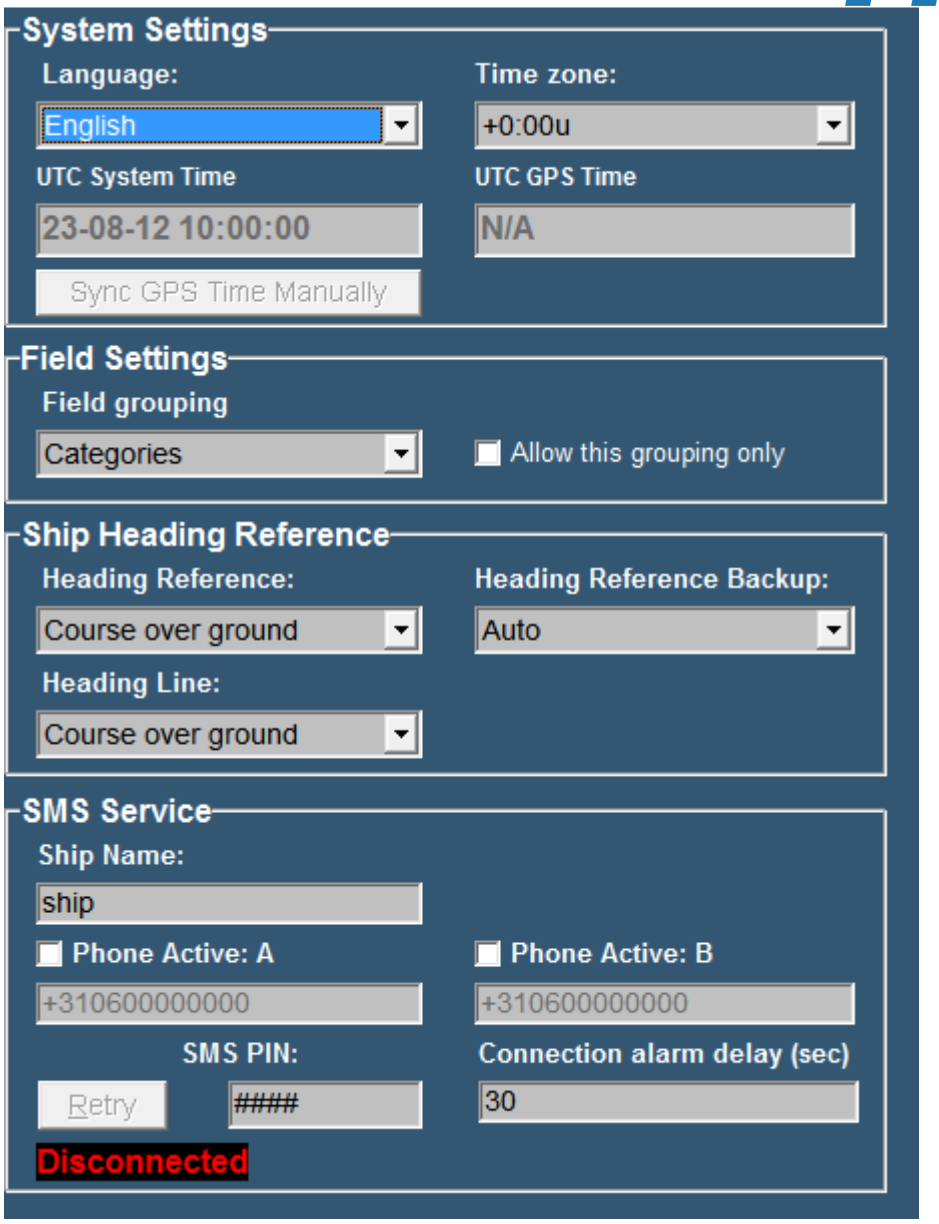


Figure 11-28: Preferences

11.4.2 System Settings

By clicking the “Language” arrow, all supported software languages appear.
Simply click on one of these languages to set the default language for all software modules.
By clicking the “Time zone” arrow allows you to set the relevant UTC[9] time zone.
As soon as a GPS is connected to the system FT NavVision® will use this GPS to set the time. In this case you won’t have to alter the “Time Zone” while it will be taken care of by the GPS. If you think the time is not right, you can click “ Sync GPS time manually”.

11.4.3 Field Settings

Under “Field Grouping” you can choose in which order you want to see all the fields in “field settings”. You can change the order to “Categories” or to “ Alarm Groups” The last one will come in handy when you are checking whether all the fields are in the right Alarm Group.

[9] UTC = Universal Time Coordinated

11.4.4 Ship heading reference

This option allows you to choose the default references for heading, heading backup and heading line. The options range from Auto to Course over ground, Gyro compass, true compass and magnetic compass.

11.4.5 SMS service (ship name)

Ship name is used to enter your ship's name into the software. Of course, the name is entirely your own choice and has no influence on the software's functions.

11.4.6 SMS service (phone active A & B)

When entering a phone number always include your country code.

Phone activate A/B are used to store the telephone numbers of one or two mobile phones you want to receive text-messages with. First, tick off the checkbox for each phone in use and enter the phone-number of your choice.

11.4.7 SMS service (SMS PIN)[10]

Via the field SMS PIN, enter a personal code (any combination), used to establish a connection in between your phone and the system. The black box below shows whether a connection is established or not.

Detail	Description
Connected	Indicates that a connection is made. Alarm messages are allowed to be sent to your mobile phone.
Disconnected	Indicates that no connection is made. No alarm messages to be allowed.

11.5 Taskbar

11.5.1 General

To open the FT NavVision® ® taskbar menu, select "Tools > Taskbar".
The taskbar menu is used to configure the taskbar.

[10] Functionality only applicable with SMS hardware module + license

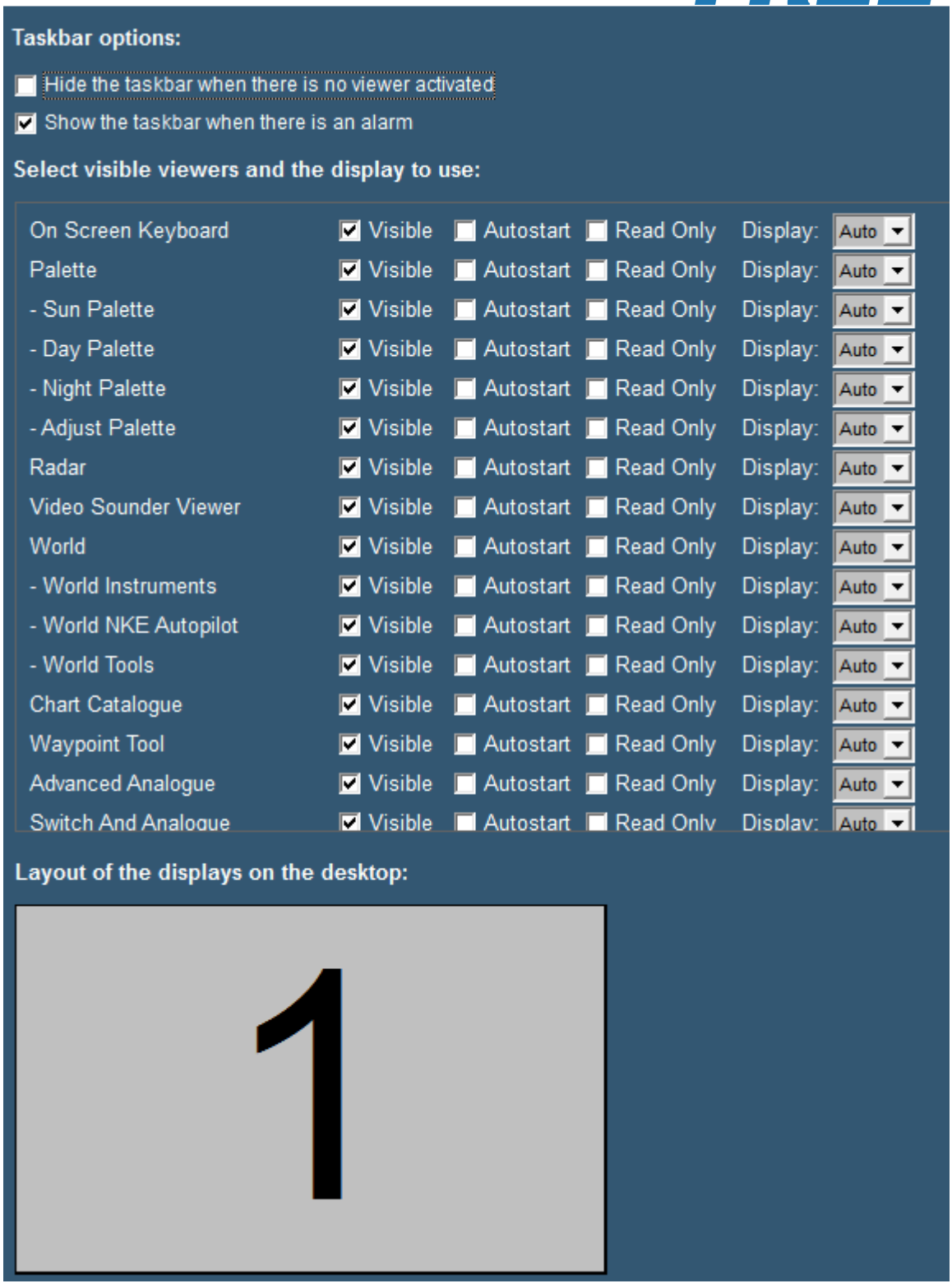


Figure 11-29: Taskbar menu

The following taskbar settings are available:

Setting	Description
Hide the taskbar when	This option allows you to hide the taskbar, in case all viewers are

there is no viewer activated	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.

11.5.1.1

11.6 GPS/NMEA

11.6.1 General

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.

11.6.2 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.

11.6.3 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 FT 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 FT NavVision® .

 *: While FT 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.*

11.7 Configuration

11.7.1 General

Under configuration you will find all the tabs that you can use to configure and fine-tune the FT NavVision® system. Some of them are still in progress and will be available soon. You do not need them know. All the other features we will discuss here.

11.8 License

To give rights to use a specific part of the software, FT 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 11-30).

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 11-30: License

11.9 Serial

11.9.1 General

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

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

11.9.2 COM ports

Under “Tools > Configuration > Serial > COM ports” (see Figure 11-31) all COM ports as found by FT 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).

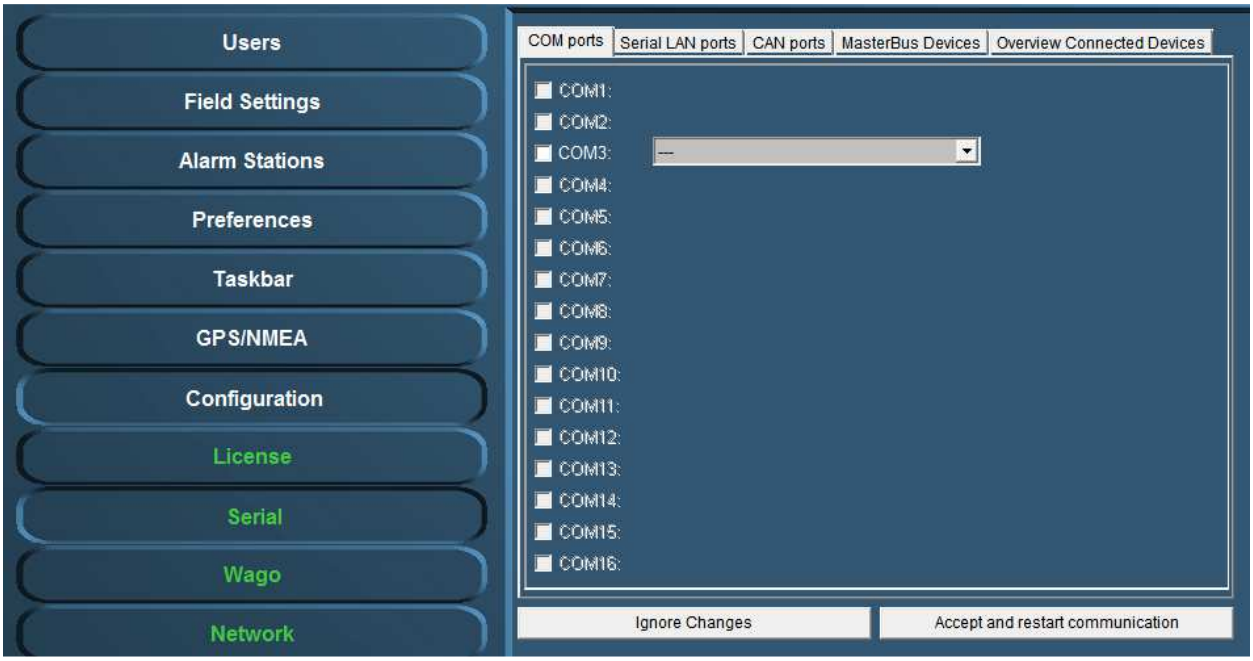


Figure 11-31: COM ports

11.9.2.1 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 11-32).

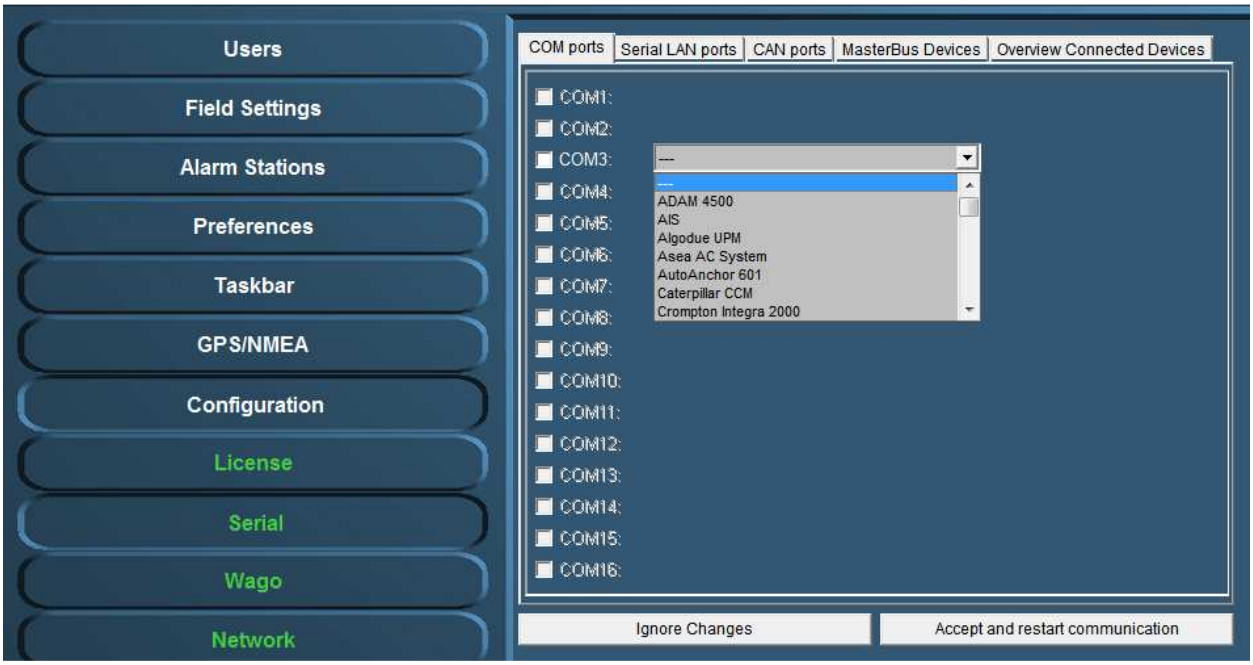


Figure 11-32: Drop-down menu (device interfaces)

At completion, confirm the settings by clicking “Accept and restart communication” (see Figure 11-32).

Check the appropriate FT NavVision® ® viewer to verify if the COM-port is correct and if there is any data communication. For example: select the “Video Sounder” viewer (see Figure 11-33) to verify that the device interface (protocol) on “COM1” is correct. Repeat this procedure for all other listed COM ports.

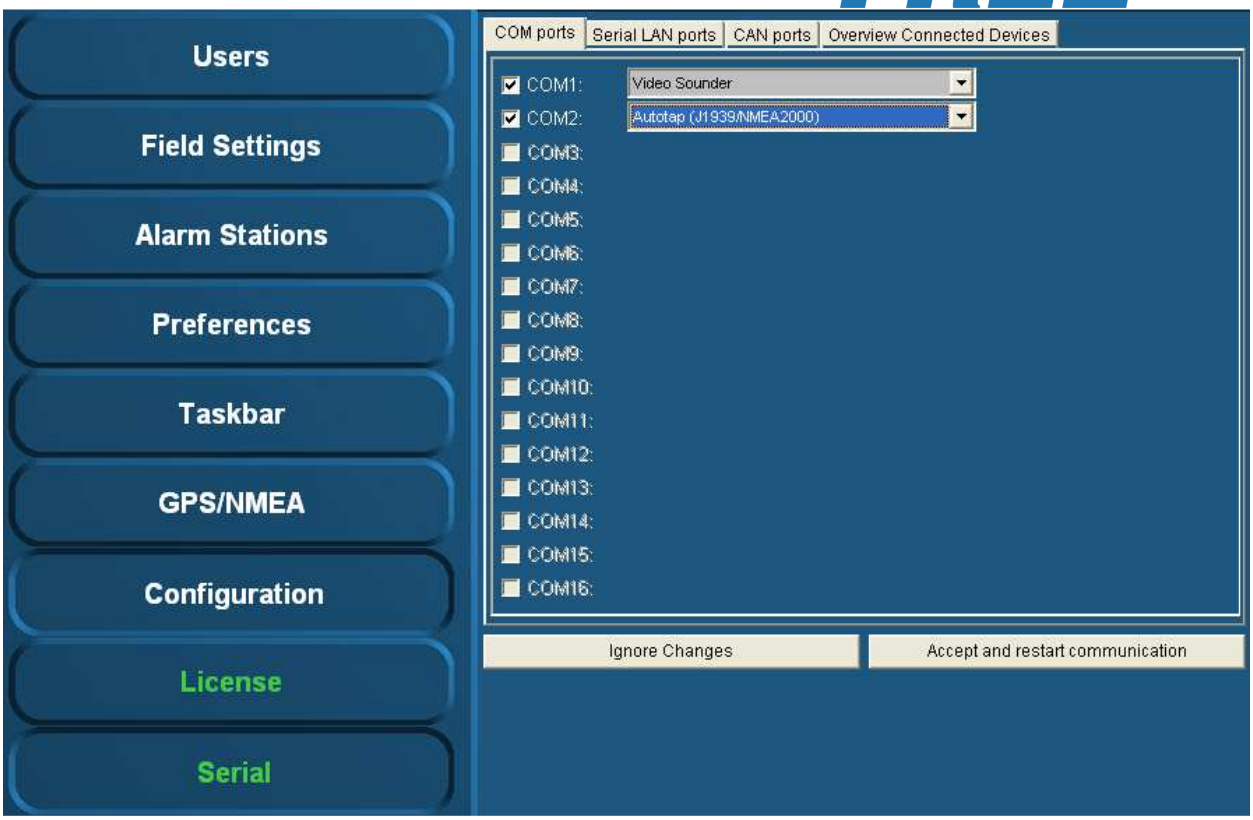


Figure 11-33: COM port assignment

Additional information on the selected port can be configured by clicking on the sign behind the drop-down menu (see Figure 11-34). A new box will open.

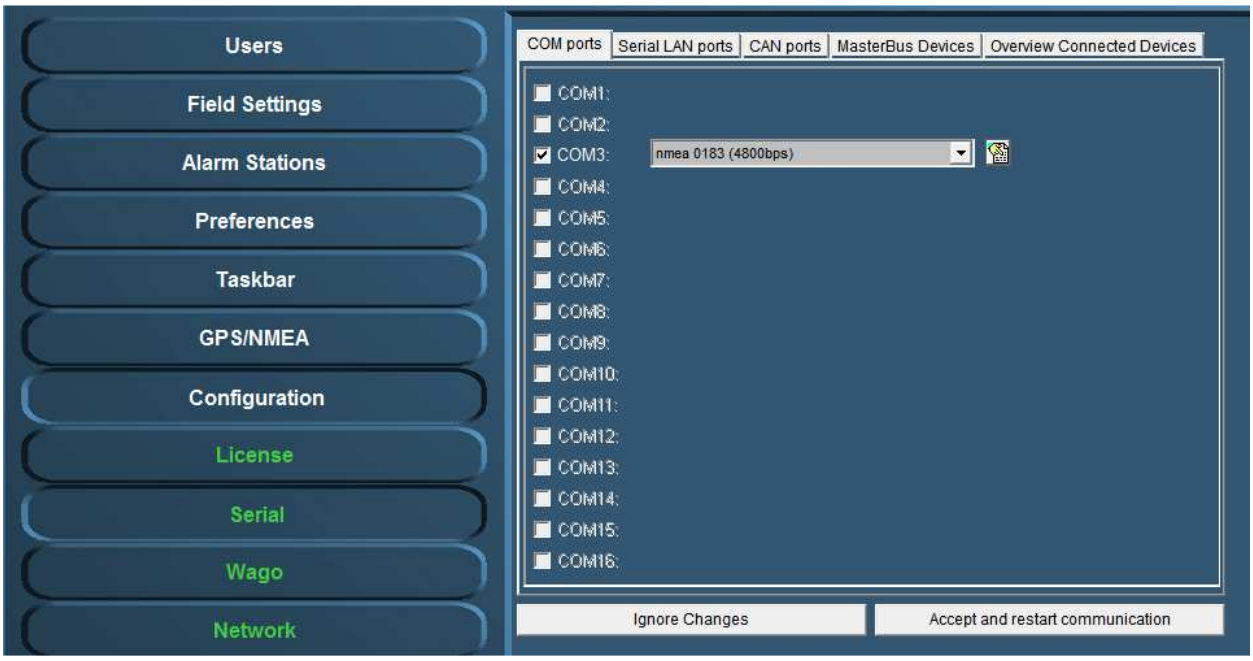


Figure 11-34: additional configuration

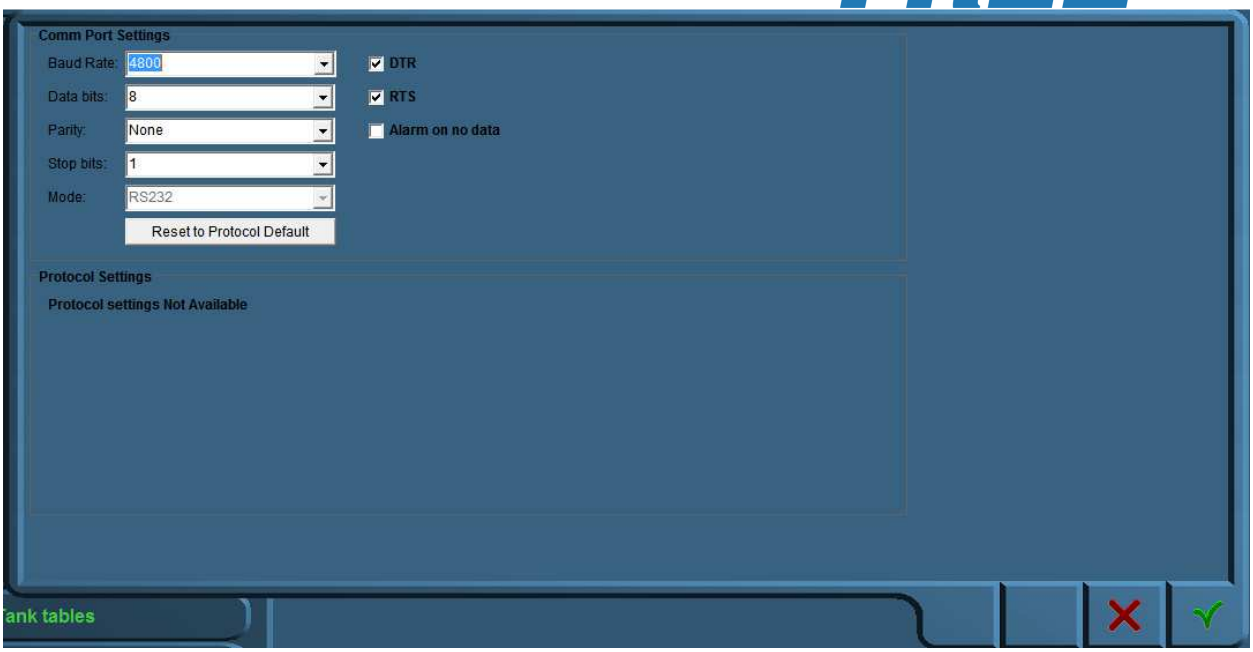


Figure 11-35: Comm Port Settings

In this additional configuration menu (see Figure 11-35) you can force all the settings for the regarding Comm 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 cause 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

11.9.3 Serial LAN ports

Under "Serial LAN ports" (see Figure 11-36) 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 11-36: Serial LAN ports

11.9.3.1 Serial LAN server

Under “Serial LAN ports > Serial LAN server” (see Figure 11-37) the server to be assigned can be selected. In addition under “Type” the LAN server type can be selected.

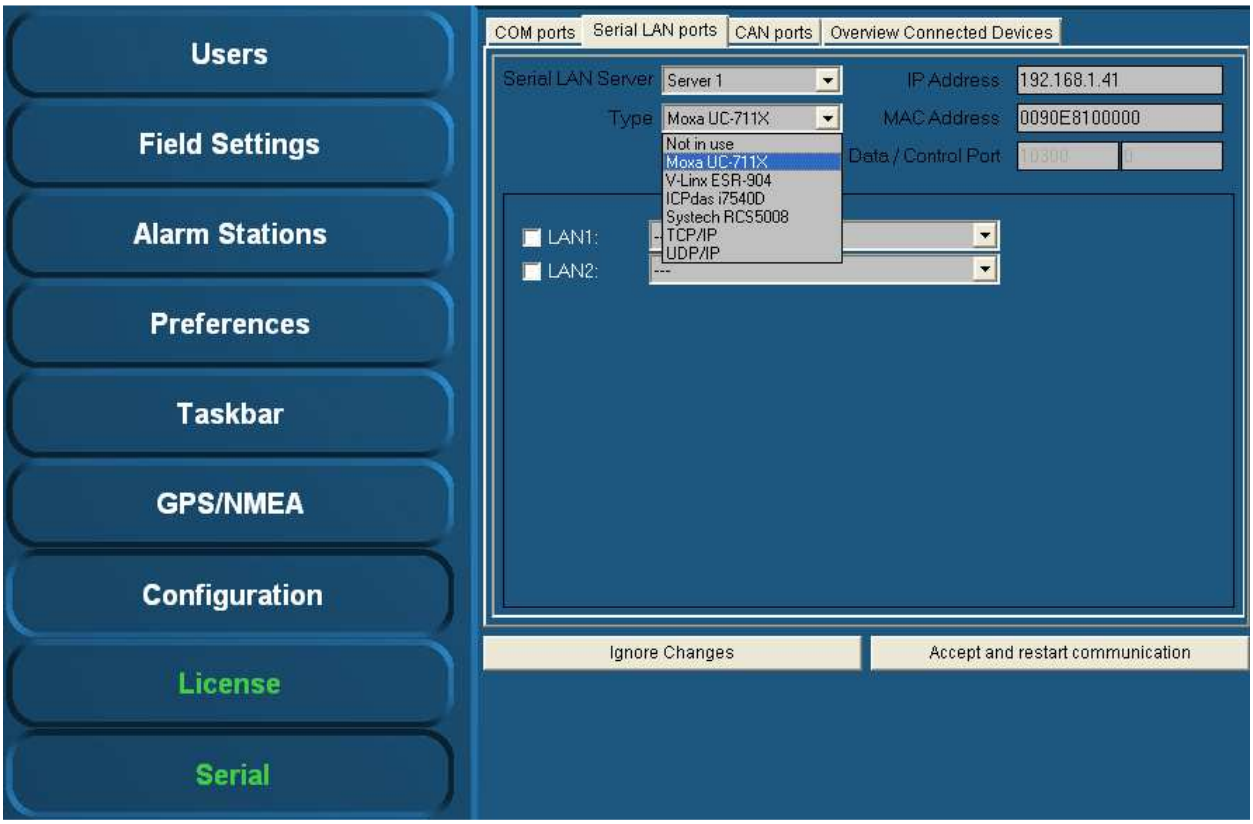


Figure 11-37: Type (Moxa)

11.9.3.2 Type (Moxa UC-711X)

The Moxa is found under “Type” > “Moxa UC-711X” (see Figure 11-37).
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 (see chapter 11.9.2.1).
To confirm the settings, click “Accept and restart communication” and verify if the serial data is working within FT NavVision® ®.

11.9.3.3 Type (V-Linx ESR-904) *Obsolete*

The V-Linx is found under “Type” > “V-Linx ESR-904” (see Figure 11-38).
Fill in the IP address of the V-Linx unit under “IP Address” (use same range as the PC i.e. 172.16.x.x, for V-Linx the last digits are in the 40 range).
The very first connected V-Linx unit is set to IP address 172.16.1.41 and the next available to 172.16.1.42 etc.

Please be aware that multiple units (i.e the Moxa’s) will operate within the same IP address range (172.16.1.4x). Use different IP addresses, otherwise the system may not function properly.

Verify the LAN1 - LAN4 settings (if available) and select the appropriate device interface / protocol (see 11.9.2.1).
To confirm the settings, click “Accept and restart communication” and verify if the serial data is working within FT NavVision® ®.

Figure 11-38: Type (V-Linx ESR-904)

11.9.3.4 Type (ICPdas i7540D)

The ICPdas is found under “Type” “ICPdas i7540D” (see Figure 11-39).
Fill in the IP address of the ICPdas server under “IP Address” (same range as the PC i.e. 172.168.x.x, for ICP the last digits are in the 30 range).
The very first connected ICP is set to IP address 172.16.1.31 and the next available to 172.16.1.32 etc.

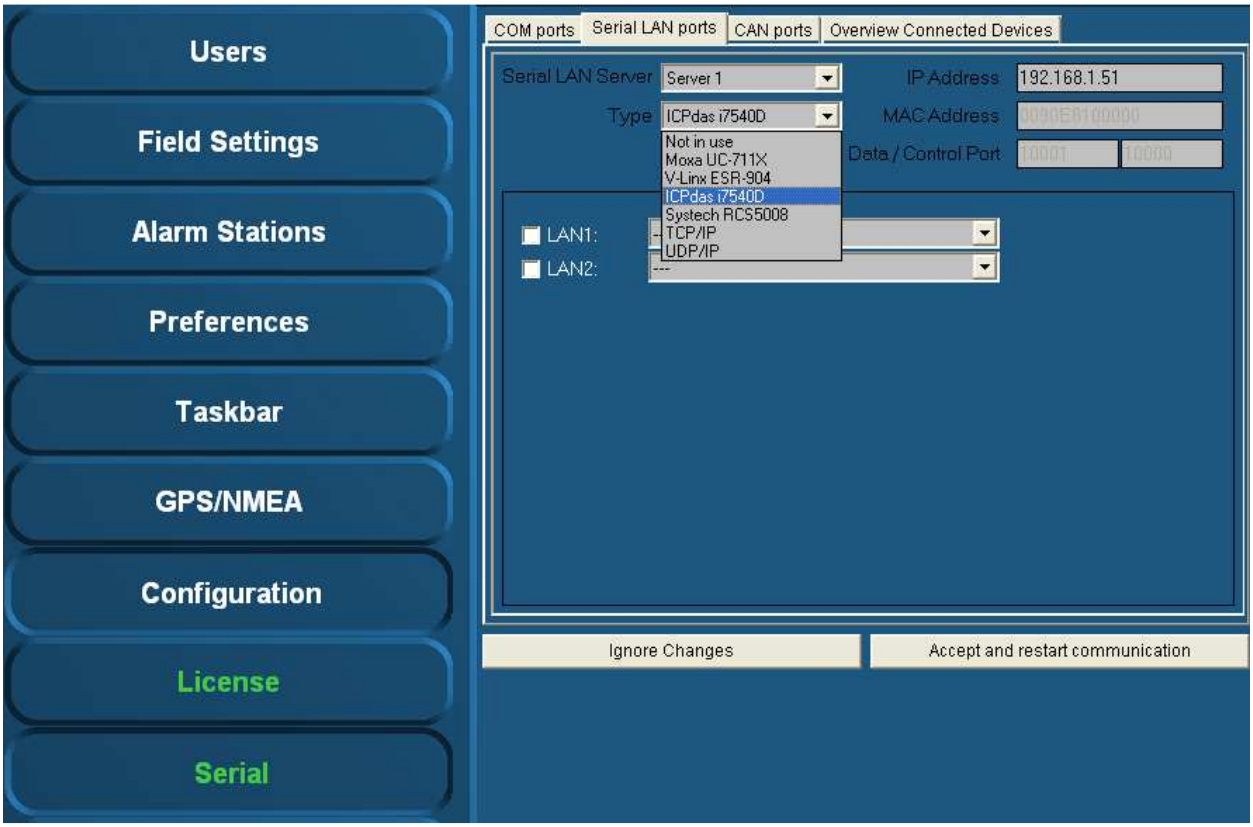


Figure 11-39: Type (ICPdas i7540D)

Verify the LAN1 and LAN2 settings (if available) and select the appropriate protocol (see 11.9.2.1).
To confirm the settings, click “Accept and restart communication” and verify if the serial data is working within FT NavVision® ®.

11.9.4 CAN ports

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

- Interface
- Standard
- IP
- Group.

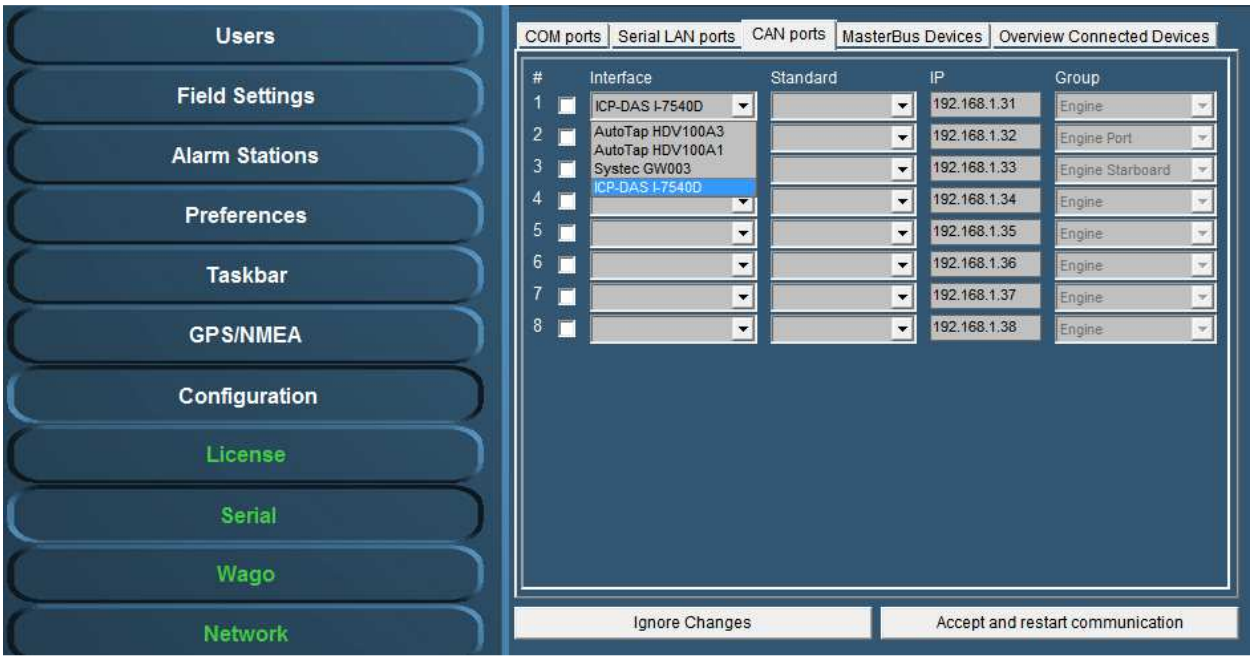


Figure 11-40: Interface

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 11-40).

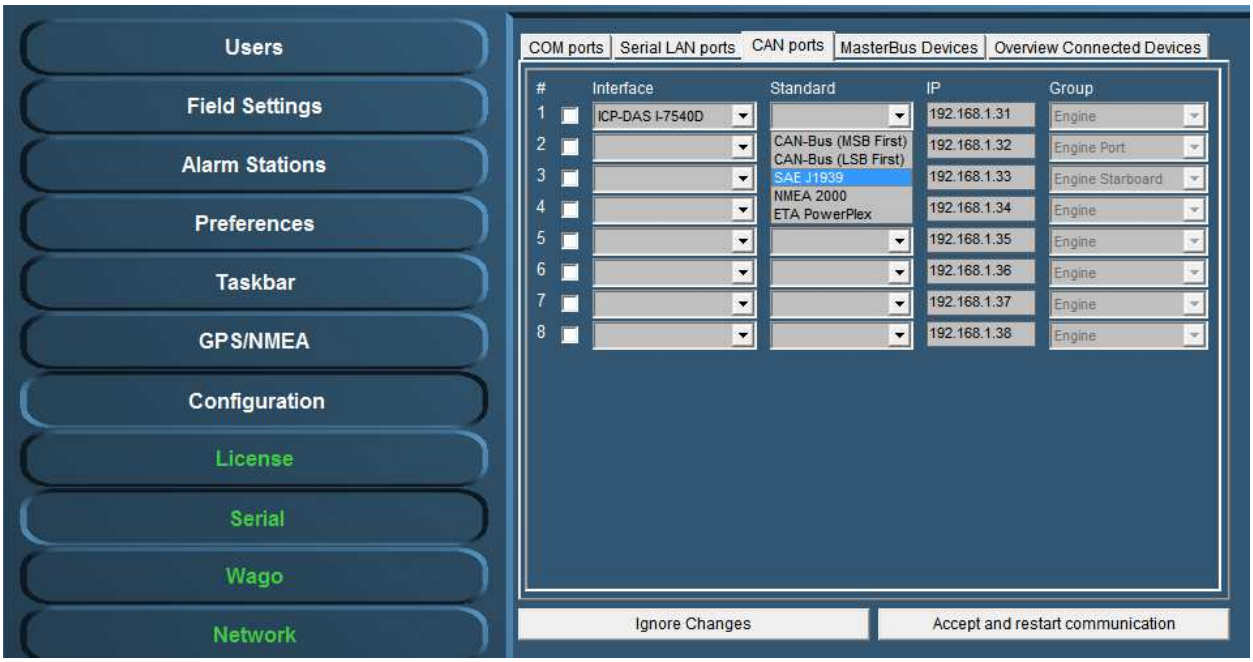


Figure 11-41: Standard

Under Standard you choose the protocol you want to use with the interface (see Figure 11-41). 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 11-41).

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

11.9.5 Overview connected devices

The installation of serial devices may require some calibration. For example, it may be possible that you need to make some adjustments in the "INI-files". For more detailed information on this subject please refer to Free Technics .

Under "Serial > Overview Connected Devices" (see Figure 11-42) an overview of the connected devices is shown.

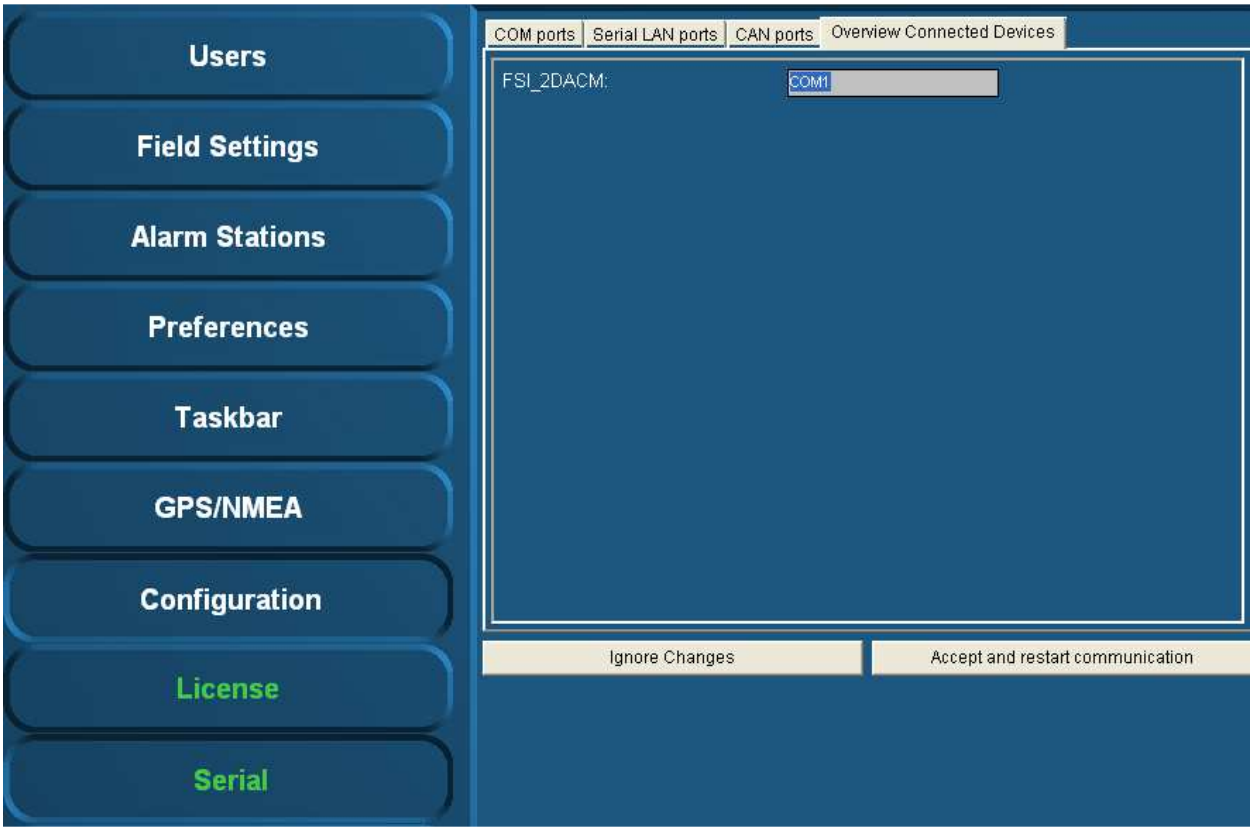


Figure 11-42: Overview connected devices

11.9.6 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

11.10 Wago

11.10.1 General

Under "Tools > Configuration > Wago" (see Figure 11-43) 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.

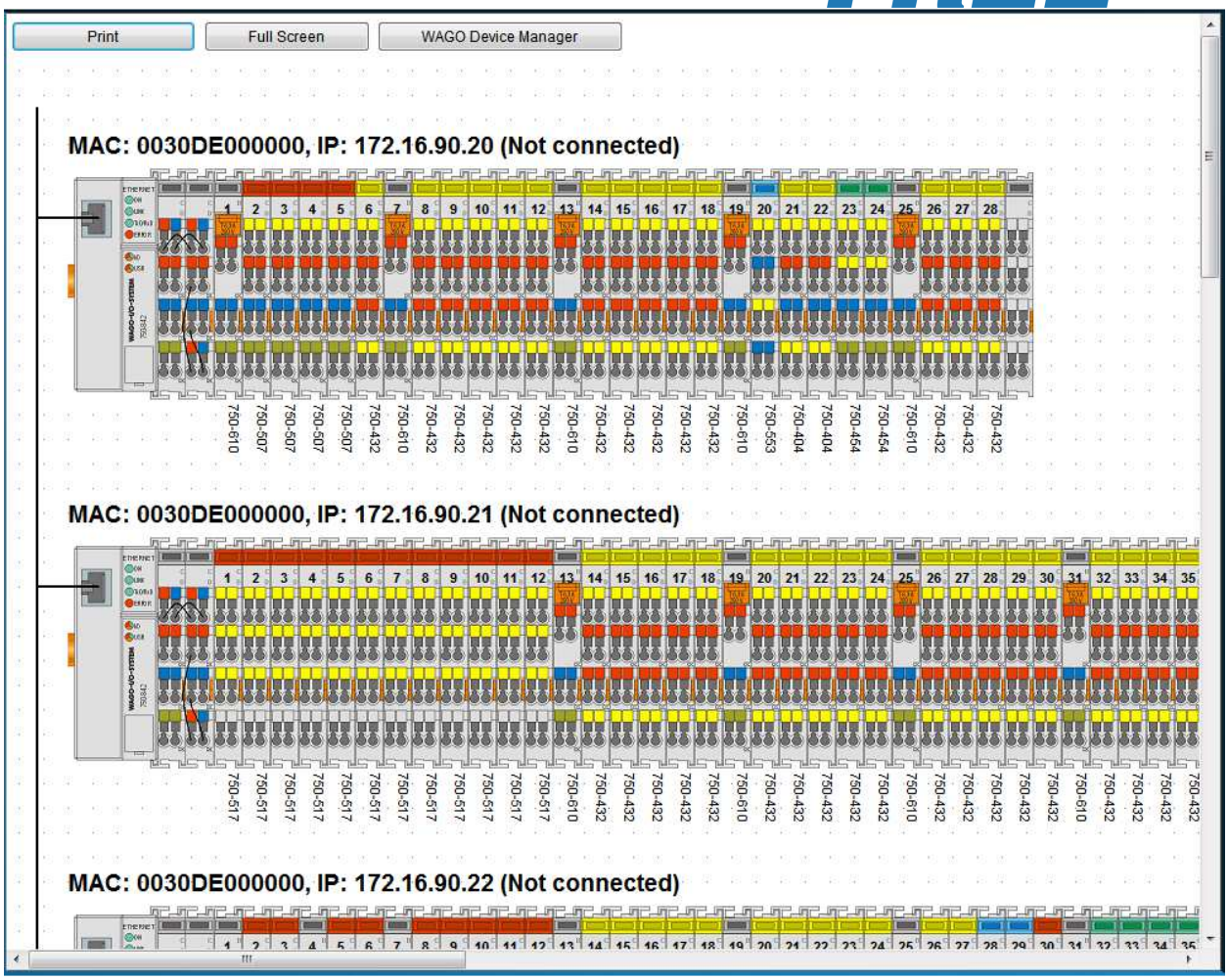


Figure 11-43: Wago configuration

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 11-44). Here you can fine-tune the selection, troubleshoot problems and calibrate sensors.

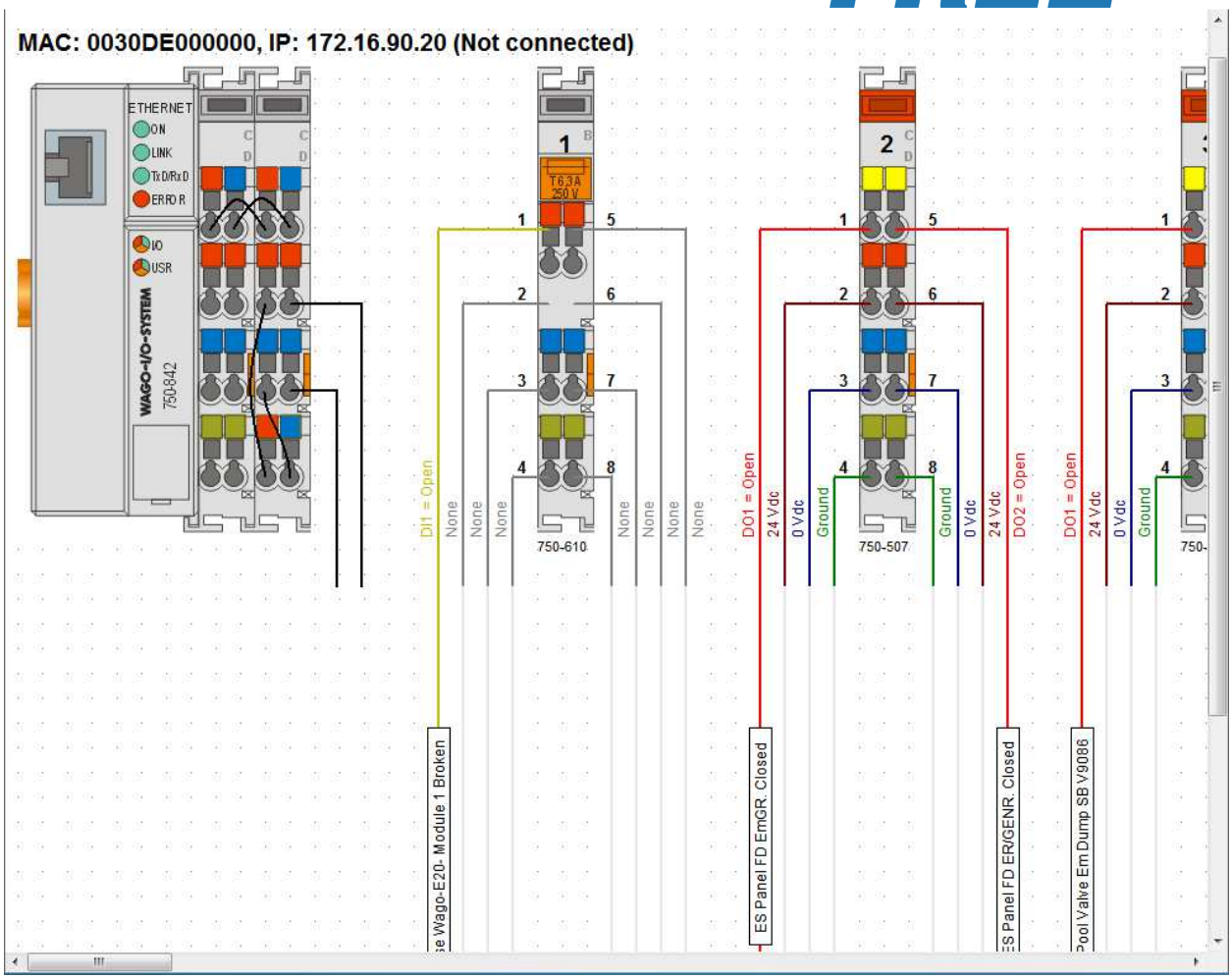


Figure 11-44: Wago expanded view

11.10.2 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 FT NavVision® (see Figure 11-45)

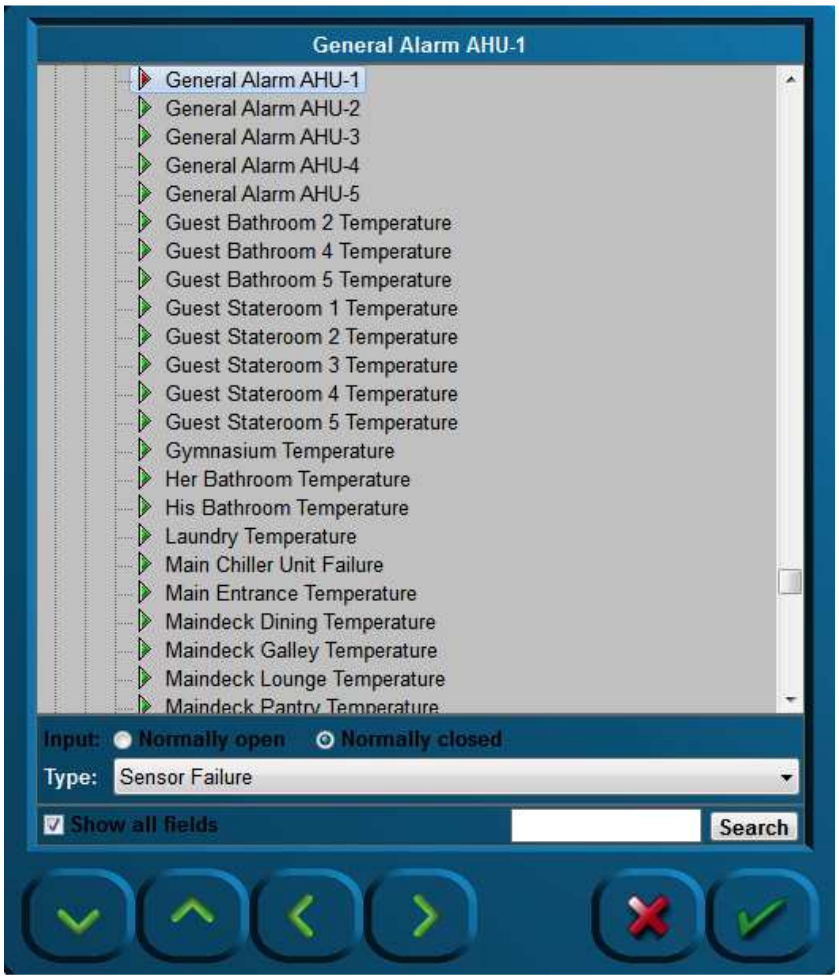


Figure 11-45: Sensor-window

The following choices are possible:

Detail	Description
Input	NO or NC
Type	The behavior of the field (see 11.10.3)
Show all fields	Toggling between all fields and fields available
Search	Search for a specific field

11.10.3 Wago “Type” explanation

The Type architecture needs some extra explanation. Each field in FT NavVision® has its own behaviour. 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.

11.10.4 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 11-46).

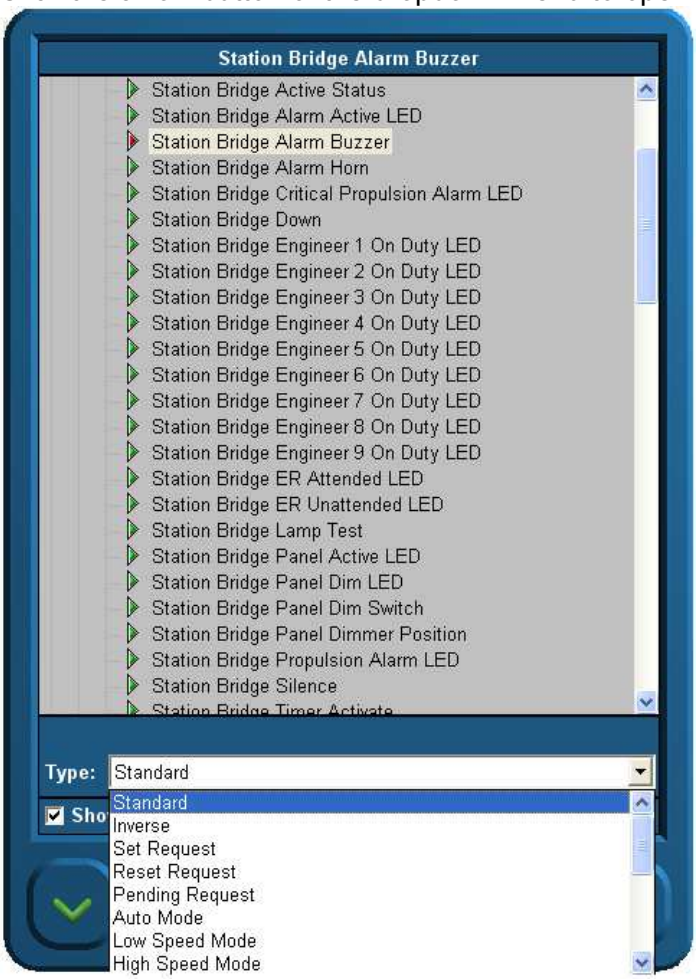


Figure 11-46: Sensor type list

11.10.4.1 Alarm

If the connected field isn’t a specific alarm field (see “Field Settings > Alarm”) it is possible you still like it to act as an alarm. Just set the type to Alarm.

11.10.4.2 Alarm Buzzer

If a field has to react at the same pace as an alarm buzzer, you can choose this type. If you, for example, put it on an output, You can let a lamp blink as the alarm goes off.

11.10.4.3 Alarm Status

Sometimes you need to feed a led-board to show all the alarms on a separate place. With type Alarm Status, you can set a field to set high if this field is in alarm. This way you can feed a led-lamp.

11.10.4.4 Auto

Auto is used in the combination Auto/Manual. If you choose this type, you can see when a sensor is ready to be controlled through FT NavVision® .

11.10.4.5 Closed

Does the same as the set/reset request but then on the DI. Look at a specific sensor to find out that it is functioning. When on is detected it knows the position is closed.

11.10.4.6 Failure

It is the same as status, but in this case mostly used as a setting to check whether the sensor is in failure. It is used to set failure status on bulb failure or as general alarm from attached devices.

11.10.4.7 High

See low alarm.

11.10.4.8 High Level

See low alarm.

11.10.4.9 Impulse

If an impuls relay is connected to a DO you don't want to generate a constant voltage. Put the status on "Impuls Relay" and the DO will give a short pulse when triggered.

11.10.4.10 Lamp

If, in addition to FT NavVision® , you also need to show the lights on an analogue panel, it is wise to give all the lights the type "Lamp". This way it will be possible to use the lamp test function. By using this function, all the fields with "Lamp" as type will lit up once the lamp test is pressed. Also you can use it to test the real lights. When pressing the lamp-test button you can check all the bulbs.

11.10.4.11 Low

If the connected FT-field isn't a specific alarm field (see "Field Settings > Alarm") it is possible you still like it to act upon an alarm. For example if you have the field "Fresh water level" you could like to have an alarm when the tank is almost empty. Here is where you can put the

status to “low alarm”. The system will identify it as an alarm field and will consequently show the alarm on the alarm panel and logbook. Note that it states “ext.” on the alarm panel to indicate that it is an external alarm.

11.10.4.12 Low Level

See low alarm.

11.10.4.13 Off Lamp

See Lamp.

11.10.4.14 On Lamp

See Lamp.

11.10.4.15 Open

Does the same as the set/reset request but then on the DI. Look at a specific sensor to find out it is off. When off is detected it knows the position is opened.

11.10.4.16 Pending

Used on a DO. Once selected it gives a signal as long as the particular task is not fulfilled. I.e. in a mimic you can show by a blinking icon that the action is still taking place.

11.10.4.17 Pulse

When a sensor needs a short pulse instead of a steady signal, use Type “Pulse”.

11.10.4.18 Push

Same as Switch, but then used as a second type for the same sensor. Also used to control the sensor through a mimic button.

11.10.4.19 Ready

When the sensor is ready for use, “ready” will get high.

11.10.4.20 Remote

Used in conjunction with Local. To see if the sensor can be controlled locally or remote.

 : local is at the sensor and remote is in FT NavVision® .

11.10.4.21 Request

See Switch.

11.10.4.22 Reset (Request)

 :
Does not function without Digital In (DI) status.

The “Reset request” signal output in general is a Digital Output (DO).
Once selected, a request will be set to the attached sensor (e.g. a valve or other device that can be steered to open), and it will stay set until it gets a status back that the request is fulfilled. Needs to be combined with a DI where the status of the sensor will be connected to (i.e. open/close).

11.10.4.23 Running

DI that is coming from the sensor to show that it is running. Used to measure the total time etc.

11.10.4.24 Running Hours

Internal calculation. Once the sensor is high, this field will start the count for running hours based upon the time that the sensor is high (also when switched on but not running, so less accurate).

11.10.4.25 Set (Request)

 :
Does not function without Digital In (DI) status.

The “Set request” signal output generally is a digital output.
Once selected, a request will be set to the attached sensor (e.g. a valve or other device that can be steered to open), and it will stay set until it gets a status back that the request is fulfilled. Needs to be combined with a DI where the status of the sensor will be connected to (i.e. open/close).

11.10.4.26 Standard

This is the standard setting. Via this setting nothing extra will be added to the field. Leave it on standard if nothing else is required or if you don’t know.

11.10.4.27 Standby

See Ready.

11.10.4.28 Status

Is general used on DI. If you need to know the status on an attached sensor but that sensor is in use by the PLC-program, you can use status in the Wago configuration. Now it reads the status of the sensor without interfering with the PLC-program.

11.10.4.29 Switch

When a switch is connected to a DI (i.e. an external pushbutton) you must set the status to switch. A box will appear which reads “request”. Now Wago will know that it has a switch connected and will act accordingly. If this status isn’t set upon a hardwired button, this button will not work.

11.10.4.30 Timeout

Some sensors, i.e. valves, have a separate connection to show that the action has timed out. When not available use Timeout as type. If no signal is coming back (DI) within a certain amount of time, it will give a timeout.

11.10.4.31 Too High

See low alarm.

11.10.4.32 Too High Level

See low alarm.

11.10.4.33 Too Low

See low alarm.

11.10.4.34 Too Low Level

See low alarm.

11.10.5 Wago Device Manager

Under “Configuration > Wago > Wago Device Manager” the following window appears:

Figure 11-47: 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. (see Figure 11-48)

Figure 11-48: Device Manager

If the MAC addresses does not show, 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 11-49).

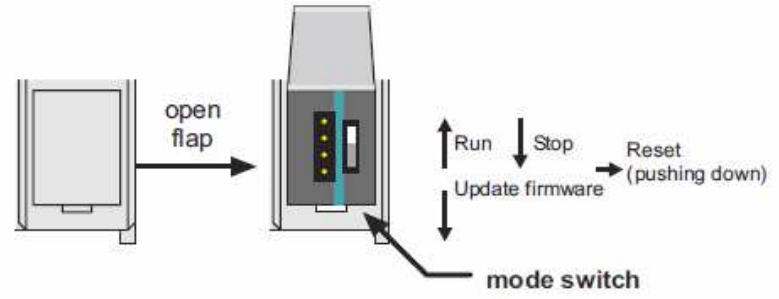


Figure 11-49: Operating mode switch (Wago)

The operating mode switch (see Figure 11-49) 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.

11.10.6 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 11-50)

4) You now see the old calibration or the standard linear one. Be aware of the measuring unit used.
   The graph (see Figure 11-51) 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.

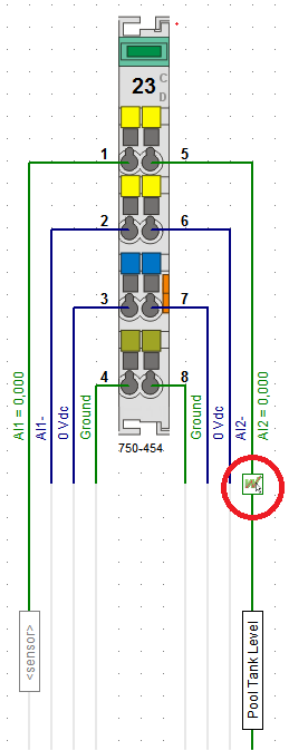


Figure 11-50: Calibration

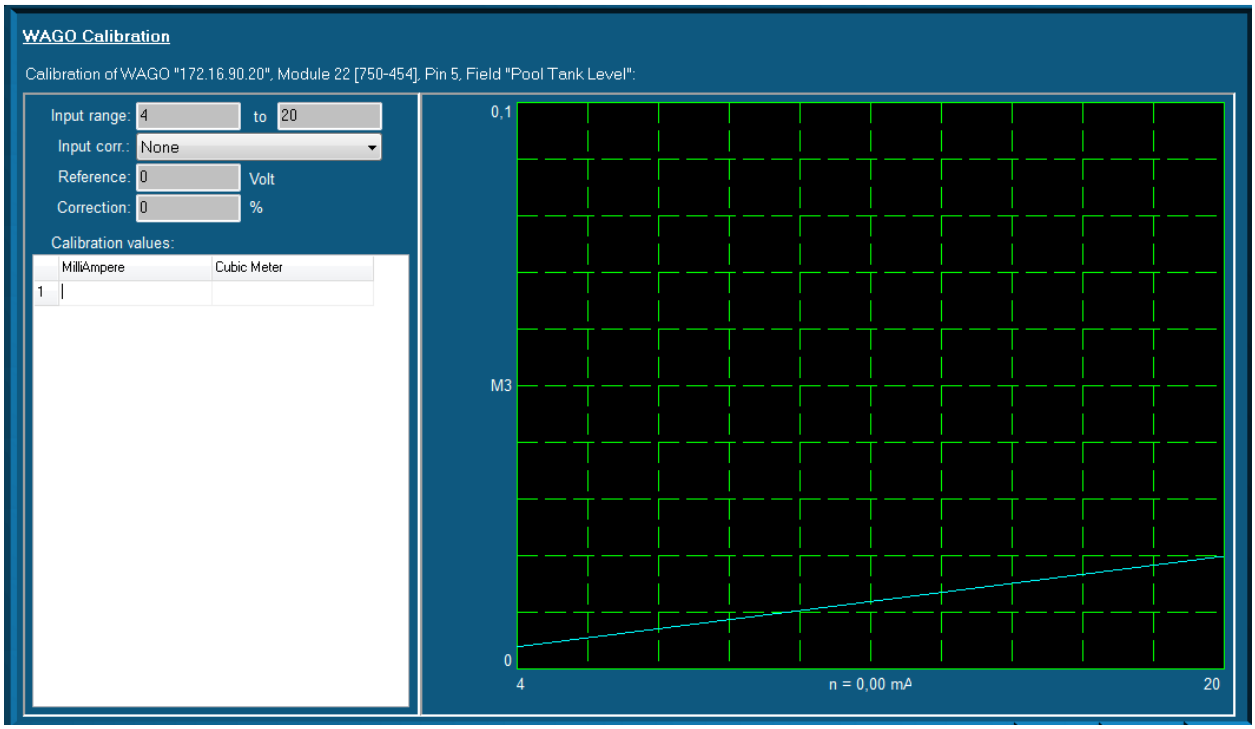


Figure 11-51: Graph (WAGO calibration)

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 11-52)
10) Repeat step 3 t/m 9 for every tank sensor available on the ship
11) Shut down FT 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.

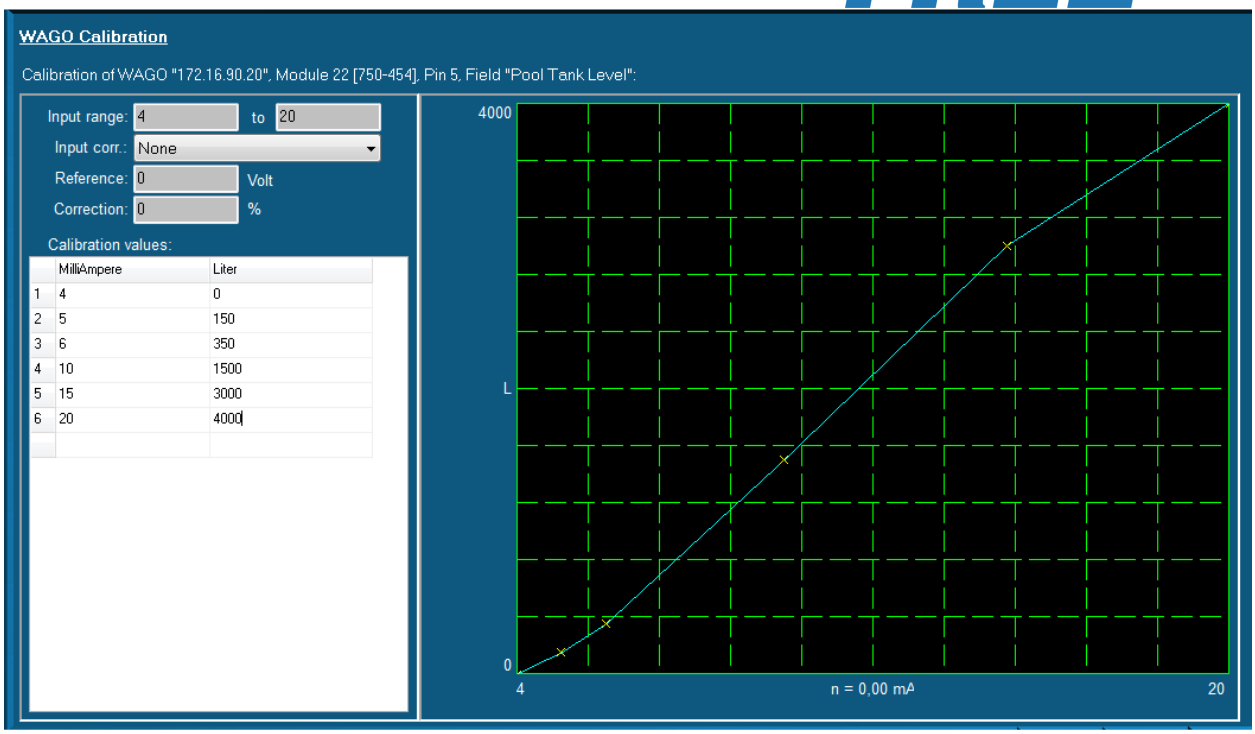


Figure 11-52: Graph Calibrated

11.11 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 11-53: 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”.

11.12 System Layout

Will be implemented shortly.

11.13 Soft PLC

11.13.1 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 FT 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.

11.13.1.1 Basics

When you open Soft PLC for the first time you get an empty screen (see Figure 11-54)

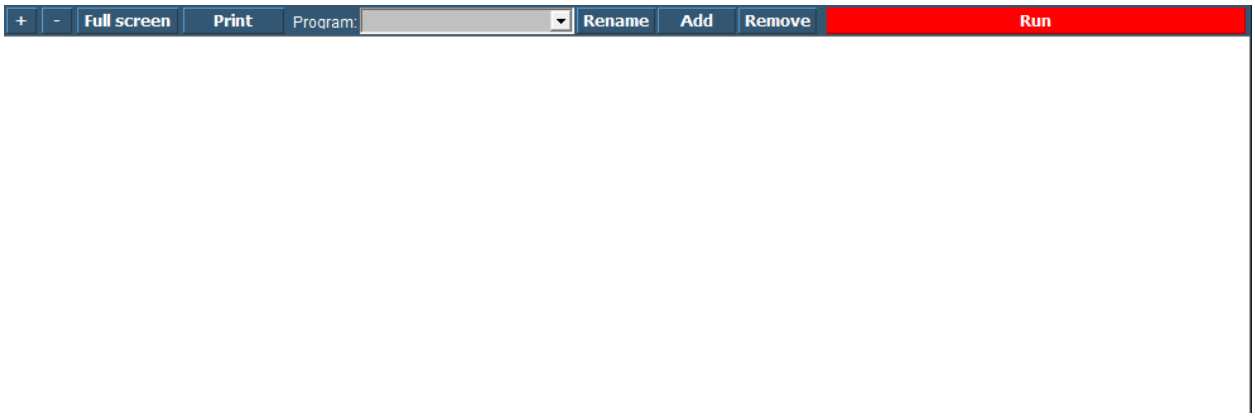


Figure 11-54: Soft PLC

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

11.13.2 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.

11.13.2.1 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 11-55).

Figure 11-55: 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 11-56). These are beyond the scope of this manual to discuss, but if you know PLC programming, you will know what they are.

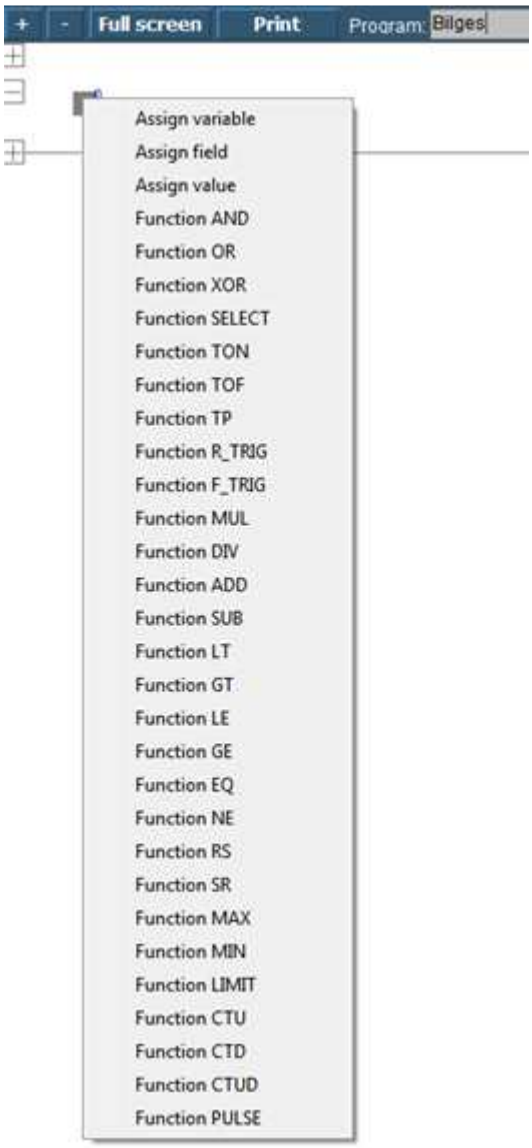


Figure 11-56: SoftPLC pop-up

We choose for “Assign Field” to assign the Bilge Alarm as a trigger (see Figure 11-57). Now we get into the FT part of the SoftPLC and we can work with this as we saw earlier in Chapter 11.2. After choosing this field the PLC line will look as in Figure 11-58

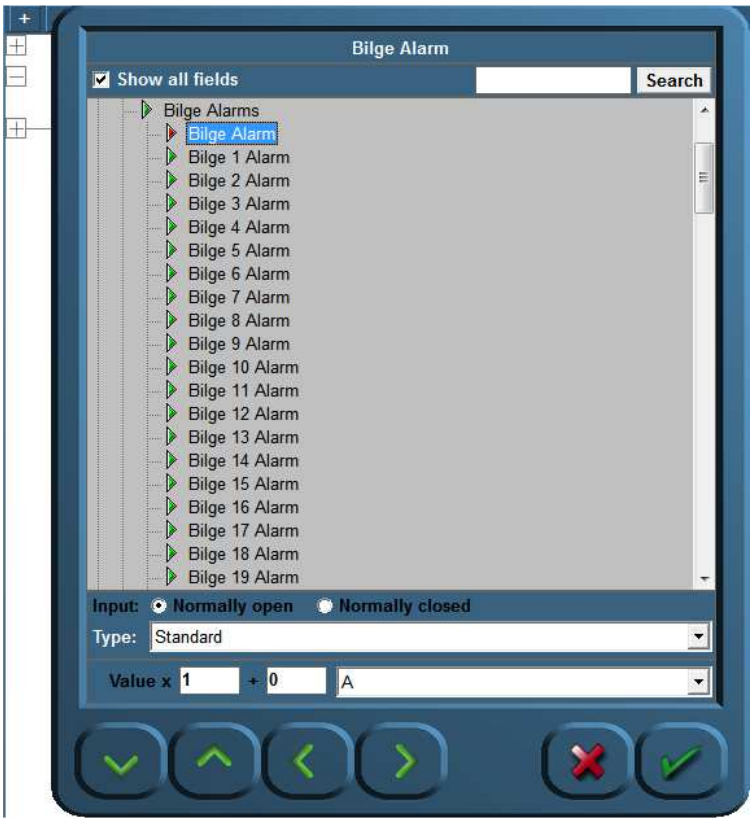


Figure 11-57: SoftPLC Assign Field

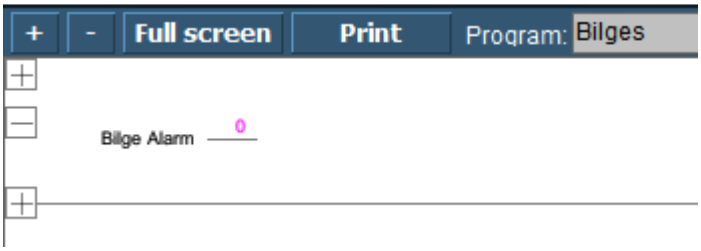


Figure 11-58: SoftPLC first Line

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 11-59.

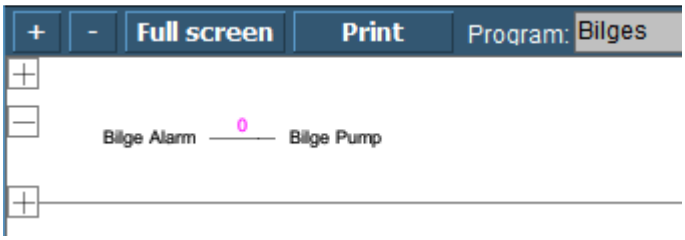


Figure 11-59: SoftPLC First Line_2

So now when you press “Run” the program wll 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.

11.13.2.2 Control

You can understand that you can control the FT NavVision® installation much more once you use SoftPLC. You can make all kind of interactive switches and much more. If you want to know more about it, please contact Free Technics.

11.14 Tank Tables

11.14.1 General,

Each ship must have some kind of device to show the content of the divers 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.

11.14.2 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

11.14.2.1 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. For calibrating this device, please refer to Chapter 11.10.6.

11.14.2.2 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 it can be calibrated as told in Chapter 11.10.6.

11.14.2.3 Pressure sensor

The pressure sensor is not a level indicator. It measures the liquid pressure (PI) 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 FT NavVision © system all this calculations are done automatically once you provided one of the variables. (see Figure 11-60)

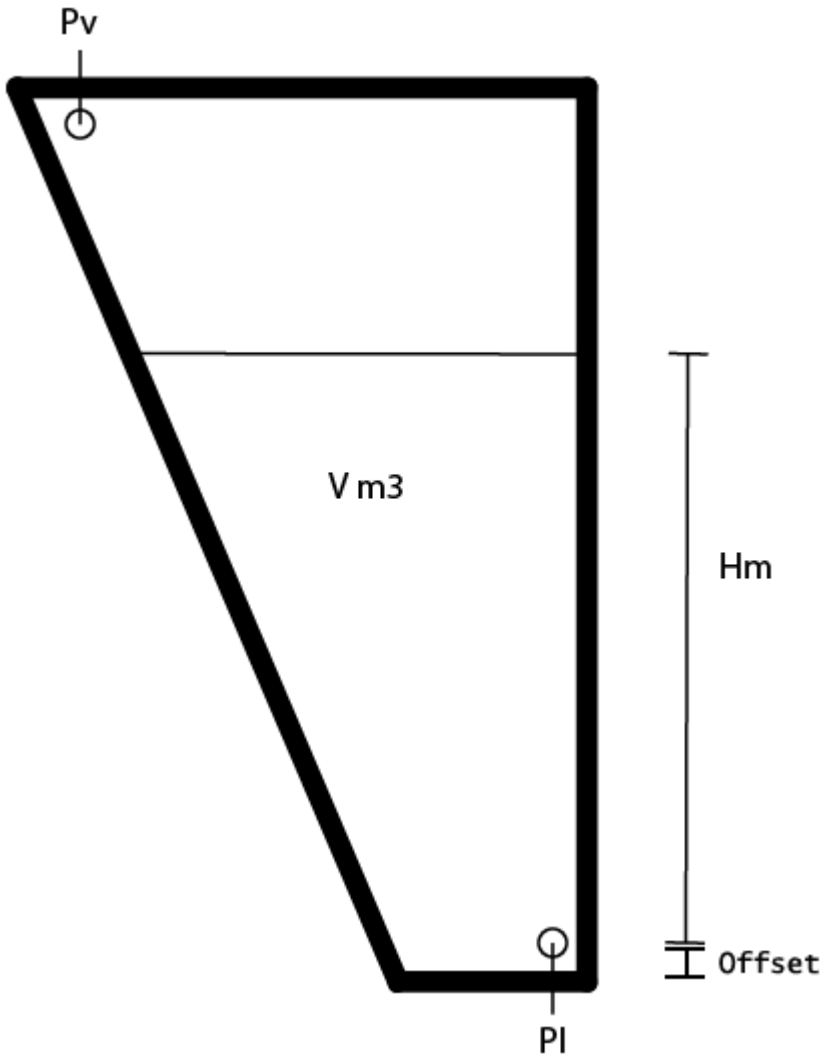


Figure 11-60: Tank Pressure Sensor

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

Table 11-1: 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 ©.*

11.14.3 Calculations

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

11.14.4 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:

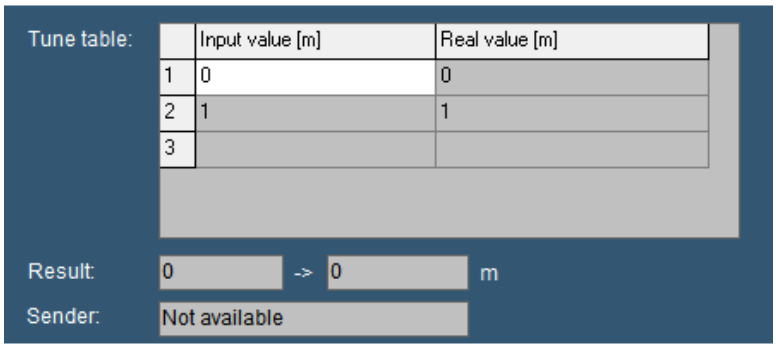


Figure 11-61: Tune table

Now let's say that your sensor has an offset of 20cm. This means that if the sensor reads 1 meter of height it is actually 1.2 meter.

You can adjust that by changing the input value and the real value accordingly. So now we know that if the sensor has an input value of 0m it is actually 0.2m and if the sensor has an input value of 1m it is actually 1.2m

If you change that in the tune table (see Figure 11-62) FT NavVision® will calculate with the right values.

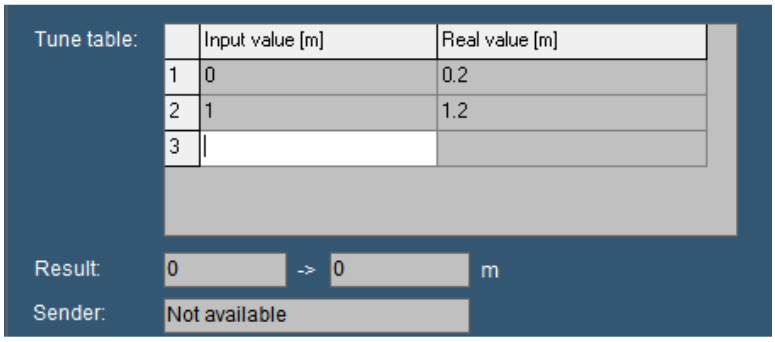


Figure 11-62: adjusted tune table

11.14.5 Inserting sounding tables

Under Configuration>Tank Tables you can find all the tanks. (see Figure 11-63).

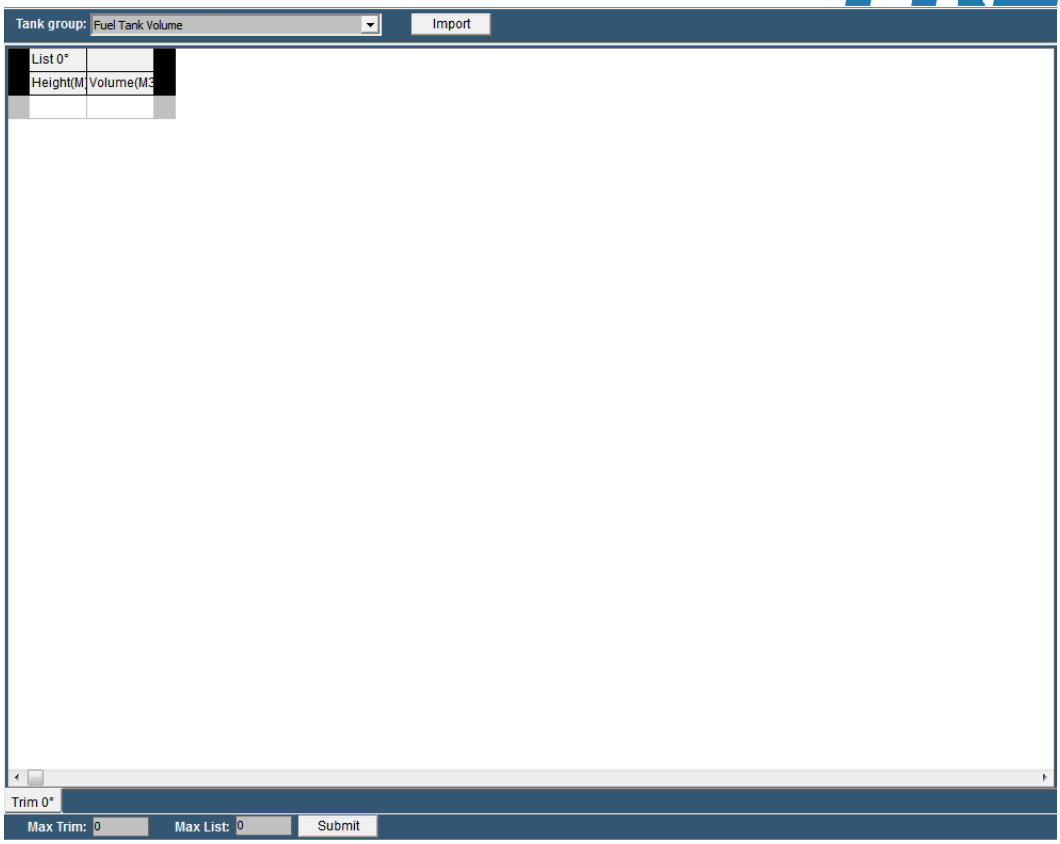


Figure 11-63: Tank Tables

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 11-2: Tank Tables

11.14.5.1 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 11-64).

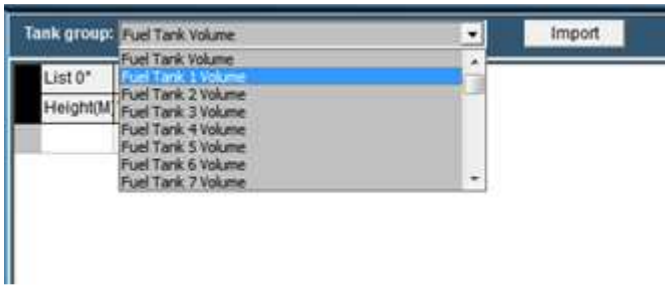


Figure 11-64: Tank Group Drop Down

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.

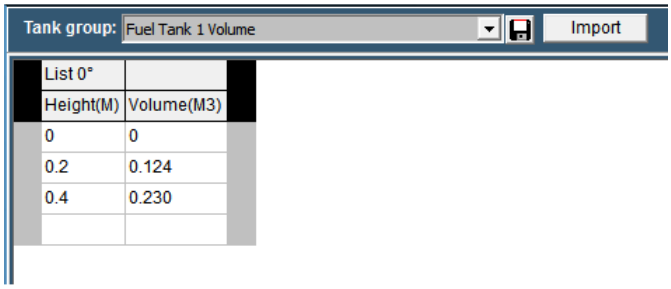


Figure 11-65: Filling in tank tables

As soon as you start filling in the numbers you will see a "save button" appear next to the drop down menu (see Figure 11-65). With this button you can save the calibration table to the specific tank. FT 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.

11.14.5.2 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 11-66).

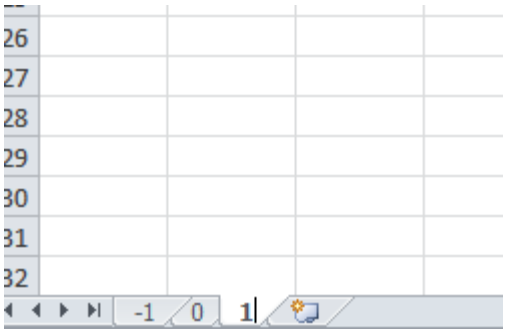


Figure 11-66: Excel tabs

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 11-67: 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 11-68).

 *: 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 11-68: 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 11-69).

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 11-69: Excel list sorted

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

11.14.5.3 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 11-70).

At this time you can save the table and it will be used within the calculation of FT 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 11-70: Imported Table

11.14.6 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 11-71). 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.

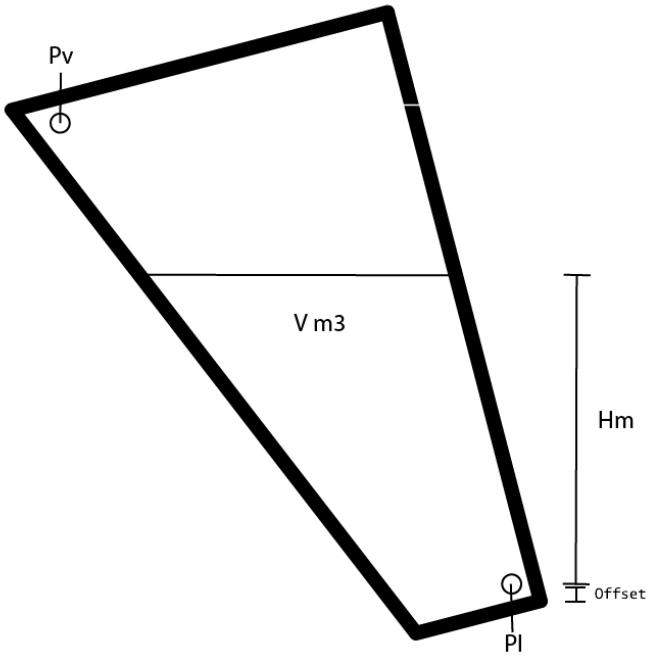


Figure 11-71: Roll and Pitch

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.

11.14.6.1 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 11-72). For this you need to have 7 different sounding tables from the architect.

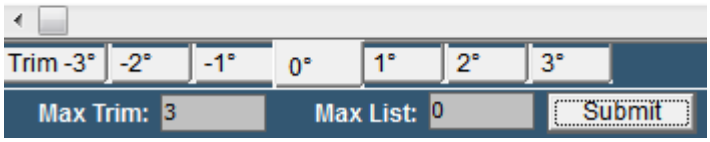
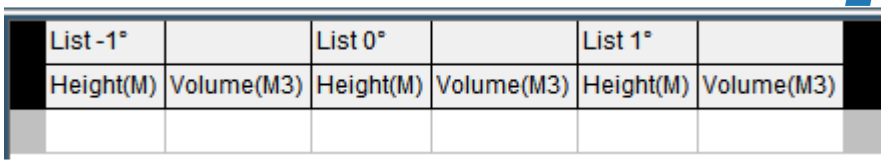


Figure 11-72: Max Trim

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 11-73).



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

Figure 11-73: Max List

This way you'll have 3 different "list" columns for 7 different "trim" tabs so 21 different calibration points (see Figure 11-74). 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		

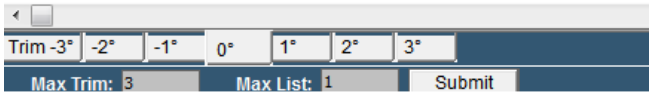


Figure 11-74: Trim/List example

11.14.6.2 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 11-75).

	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 11-75: 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 FT NavVision © (see Figure 11-76)

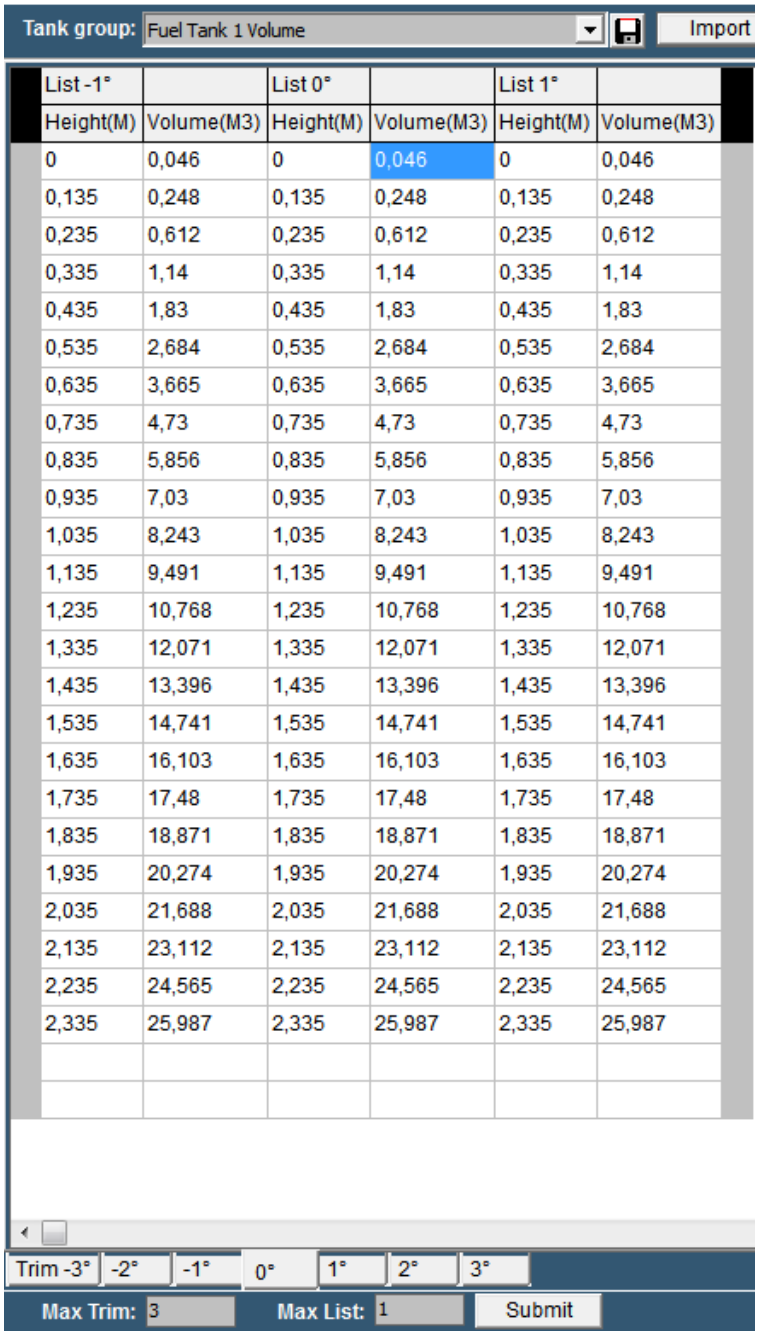


Figure 11-76: Tank Table excel Trim and List import

11.15 WatchIO

Will be implemented shortly.

11.16 Logbook

Figure 11-77: Logbook button

11.16.1 General

During normal operation all system events will be registered chronologically. By clicking the “Logbook” button (see Figure 11-77) these registered system events can be displayed.
In order to easily distinguish the displayed information, logbook reports are divided into colours. These colours are explained as follows:

11.16.1.1 Logbook colours

- **White**
  Reports to indicate the system is busy processing data
- **Green**
  Reports to confirm a certain system task is successfully completed
- **Red**
  Reports to indicate a system error has occurred or an alarm is set off
- **Orange**
  Reports to indicate a red report has been confirmed or that a white or green report has been interrupted
- **Blue**
  Reports to indicate that parts of the system have been initialized.

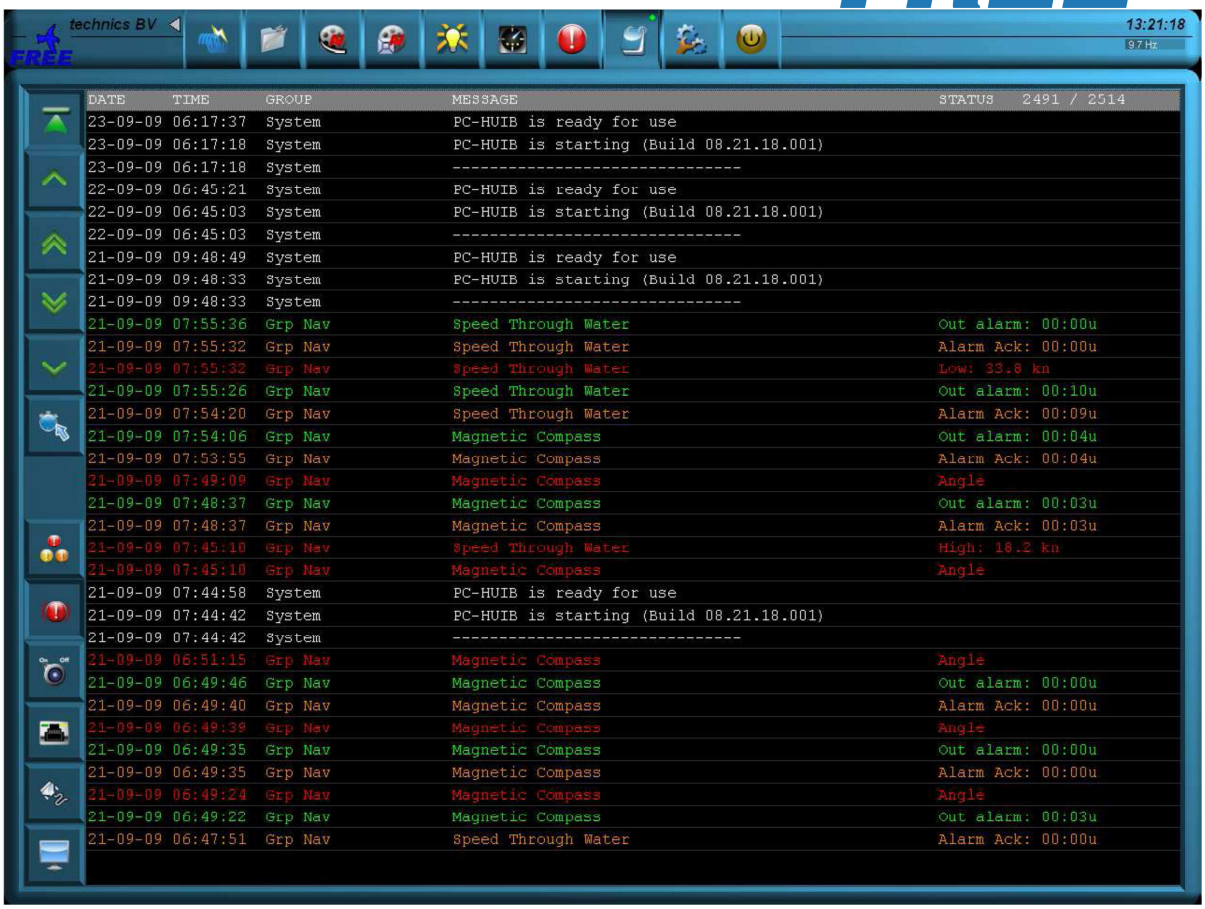


Figure 11-78: Logbook colours

11.16.2 Logbook functionalities

The logbook has the following functionalities:

- Navigation/scroll buttons
- Time period
- Alarms from all stations
- Alarms
- Switching
- Network
- Serial communication
- System.

11.16.3 Buttons

11.16.3.1 Scroll buttons

The scroll buttons are used to navigate through the logbook. The scroll buttons are explained as follows:

Figure 11-79: Scroll buttons

Button	Description
Scroll up/down (single)	To scroll up or down (one line at the time) the report list
Scroll up/down (double)	To scroll up or down (per page) the report list
Auto scroll	• ON The system event list is automatically scrolled with every new incoming event. • OFF The system event list freezes.

11.16.3.2 Time period button

The “Time period” button allows you to define the view period (time frame) of all entries to be displayed.

Figure 11-80: Time period button

11.16.3.3 Alarms from all stations button

By selecting the “Alarm from all stations” button all alarm messages are shown, that are monitored by FT NavVision® ® including the alarm messages not related to this alarm station.

Figure 11-81: Alarms from all stations button

11.16.3.4 Alarm button

By selecting the “Alarm” button all assigned alarm station messages are shown.

Figure 11-82: Alarm button

11.16.3.5 Switching button

By means of the “Switching” button all fields that are being switched by FT NavVision® ® are displayed (i.e. hard/soft wired I/O or the switching of viewers).

Figure 11-83: Switching button

A typical logbook entry is shown below (column “Message”):

21-09-09 13:57:48	Grp Network	Viewer: Close (Master)	ON
21-09-09 10:39:21	Grp Network	Viewer: Adjust Palette (Master)	OFF
21-09-09 10:37:45	Grp Network	Viewer: Logbook (Master)	ON

- Field name e.g. “Viewer: Adjust Palette (Master)”
- Process name e.g. “Master” that switches the field
- “ON” or “OFF” status of the field being switched to.

11.16.3.6 Network button

Each Ethernet network connection will be logged under network entries.
The following is shown:

Figure 11-84: Network button

- **White**
  When a system tries to connect to a device
- **Green**
  When the system successfully establishes a connection with a device
- **Red**
  System fails to connect to a device or
  Connection with a device has been interrupted or
  General network error has occurred.

11.16.3.7 Serial communication button

By selecting the button “Serial communication” the history of all serial communication systems is shown.

Figure 11-85: Serial communication button

- **White**
  The system tries to create a (local) serial connection or initializes a serial protocol instance
- **Green**
  The system successfully created a serial connection
- **Red**
  A serial connection error has occurred.

11.16.3.8 System button

Via the “System” button system information messages in general are shown.

Figure 11-86: System button

- **Green**
  Successful process start
- **Red**
  A serious problem has occurred in the process.

12. Performance

12.1.1 Modules

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

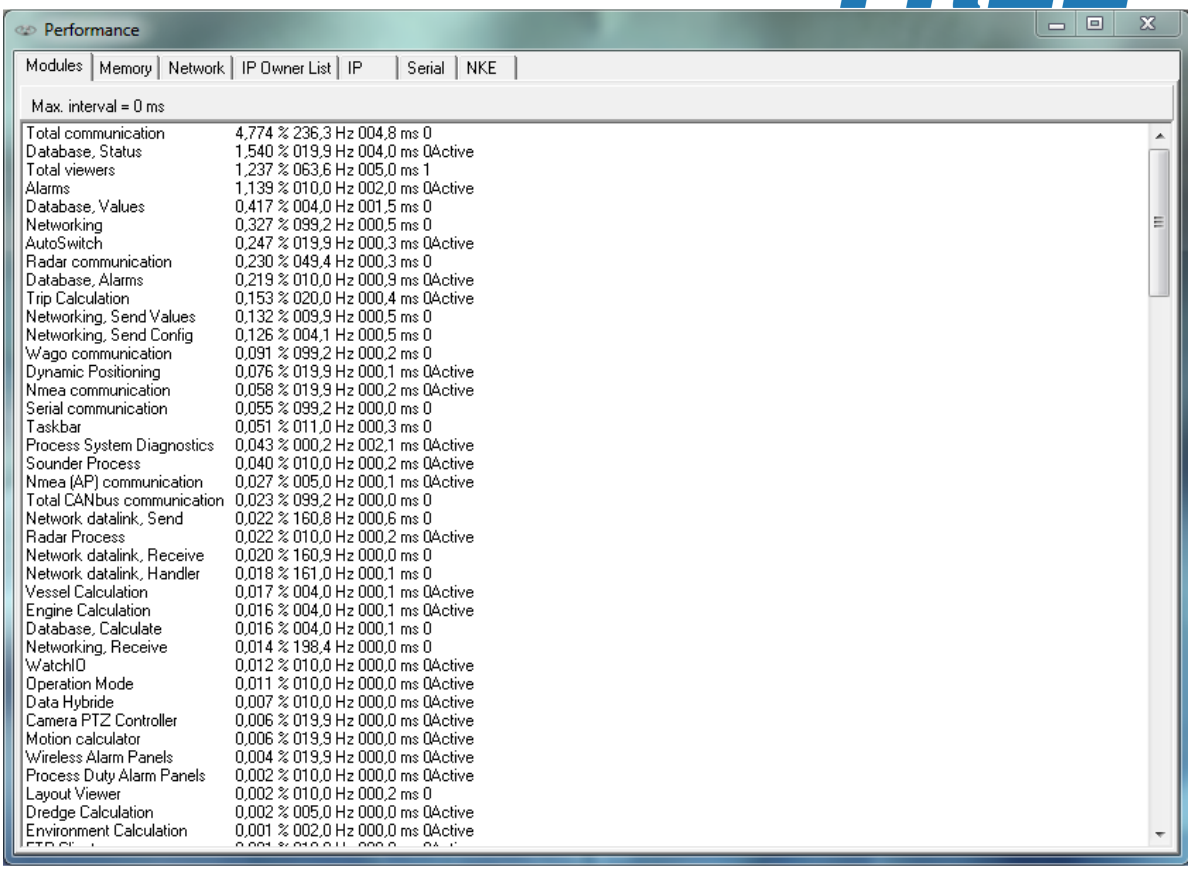


Figure 12-1: Performance

The columns are arranged as follows:

Detail	Description
Module Name	Internal name used by FT NavVision® ® to describe the module
Percentage	Percentage of processing time, where total FT 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

12.1.2 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.

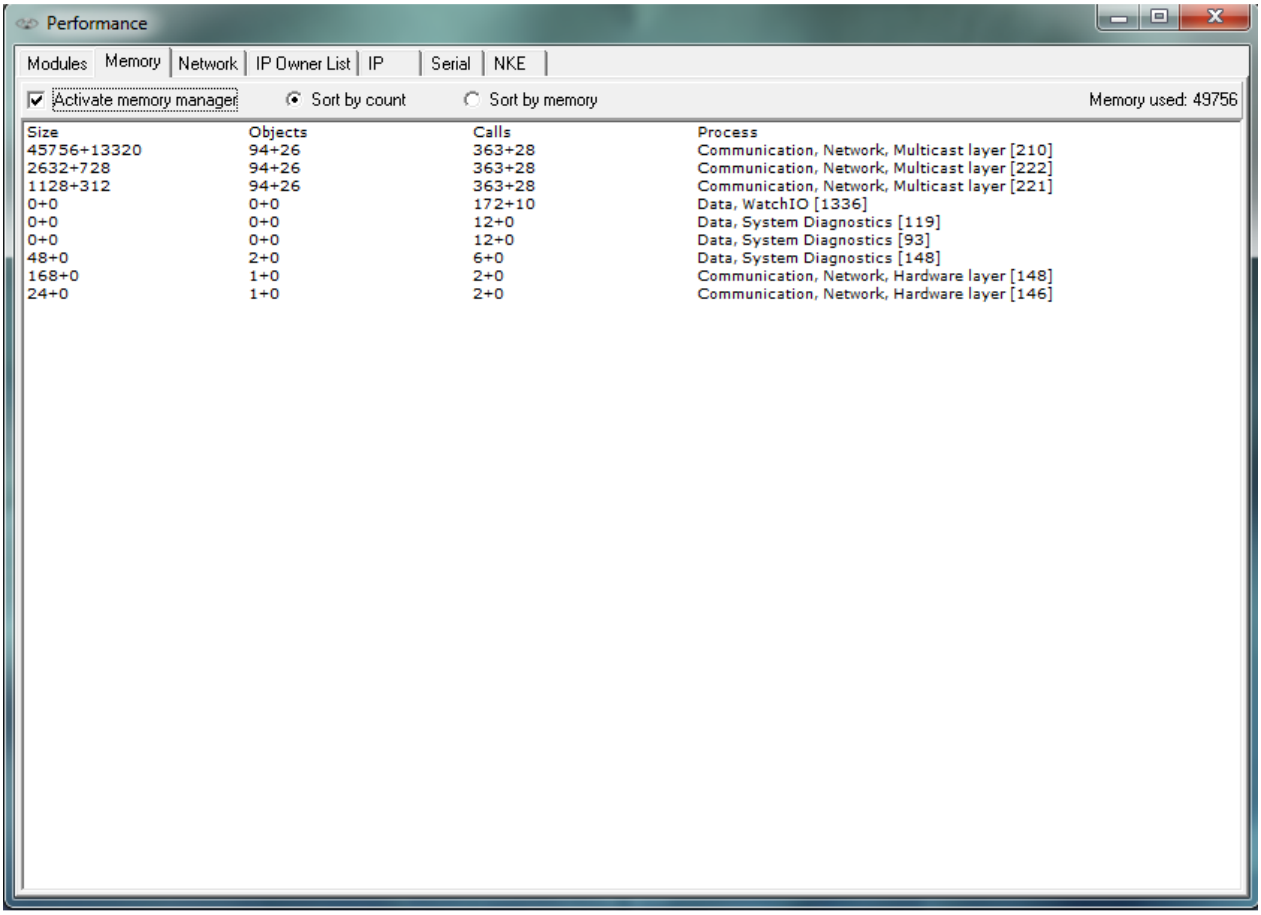


Figure 12-2: Memory

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.

12.1.3 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.

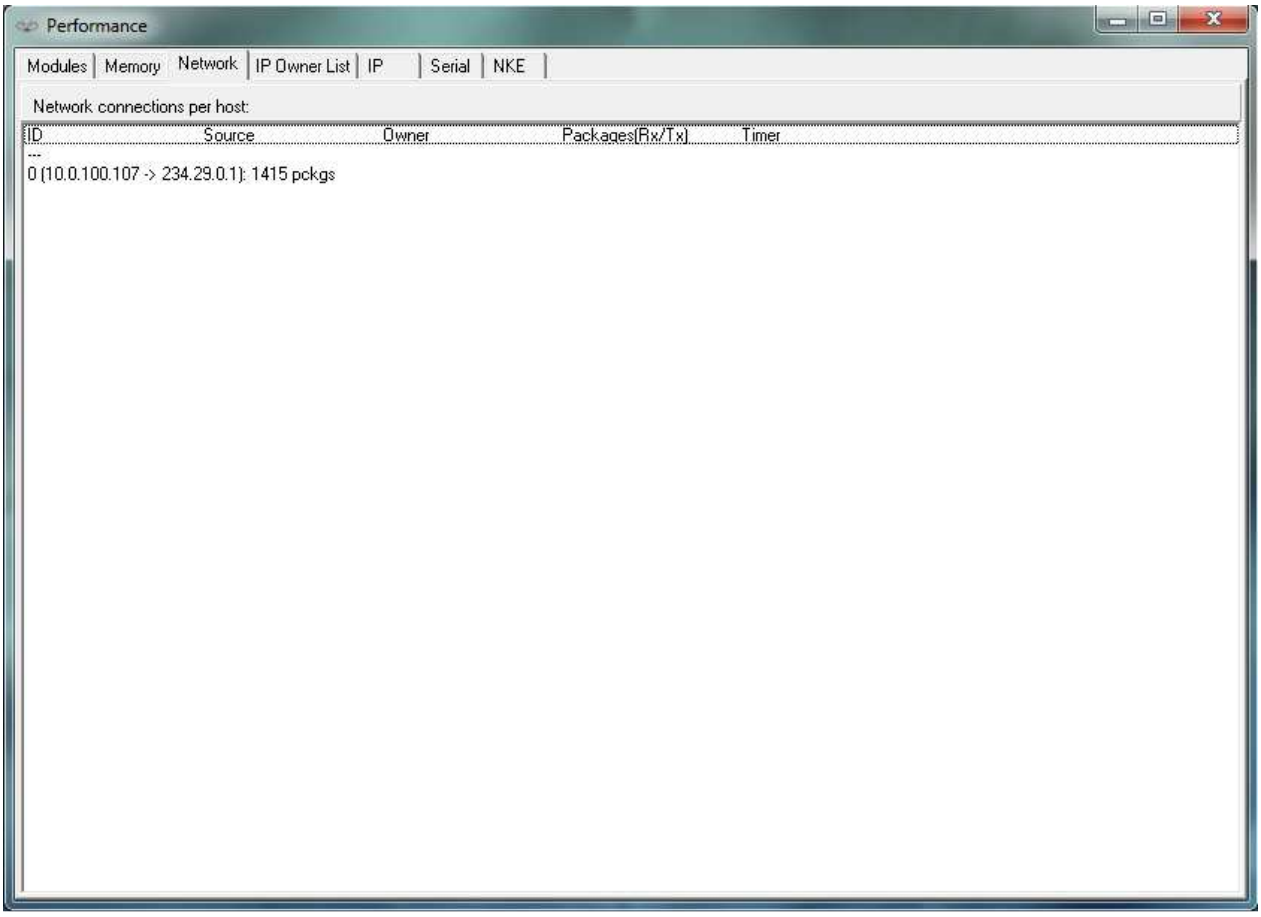


Figure 12-3: Network

The columns are arranged as follows:

Detail	Description
ID	Internal index used by FT 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

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

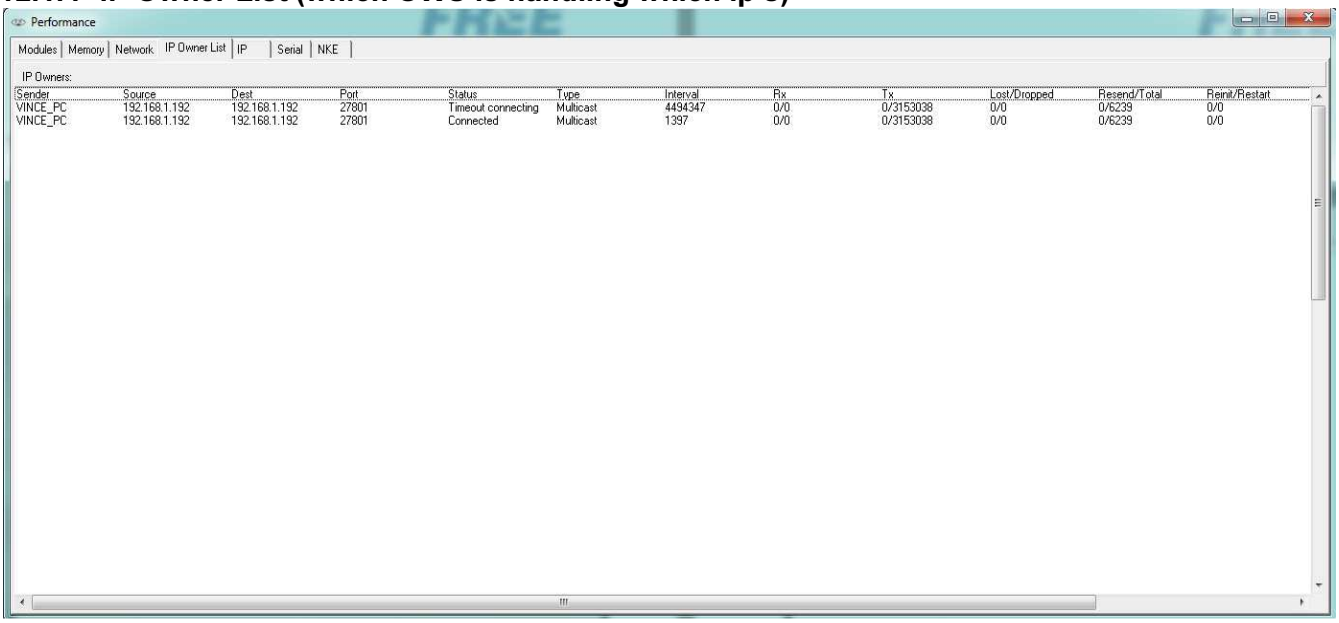


Figure 12-4: IP Owners List

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

12.1.5 IP

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

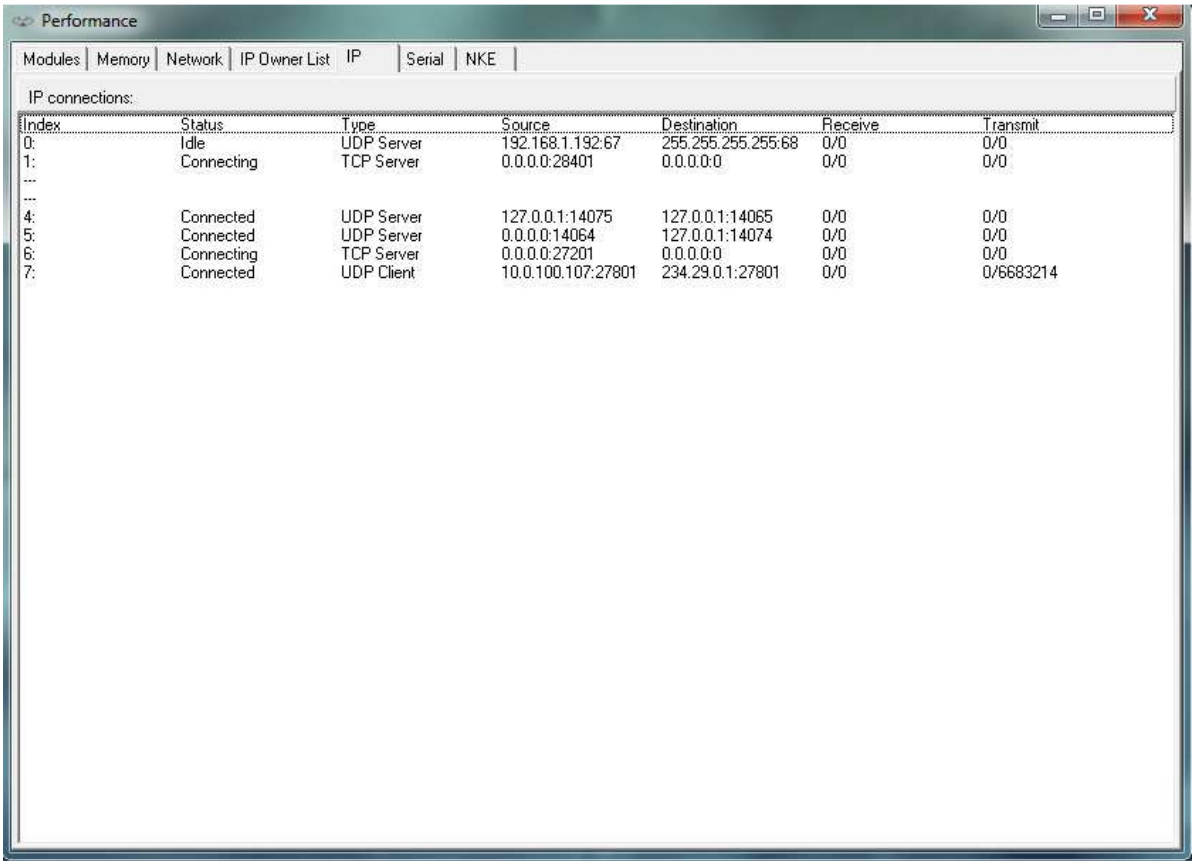


Figure 12-5: Performance > IP

The columns are arranged as follows:

Detail	Description
Index	Internal index used by FT 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

12.1.6 Serial

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

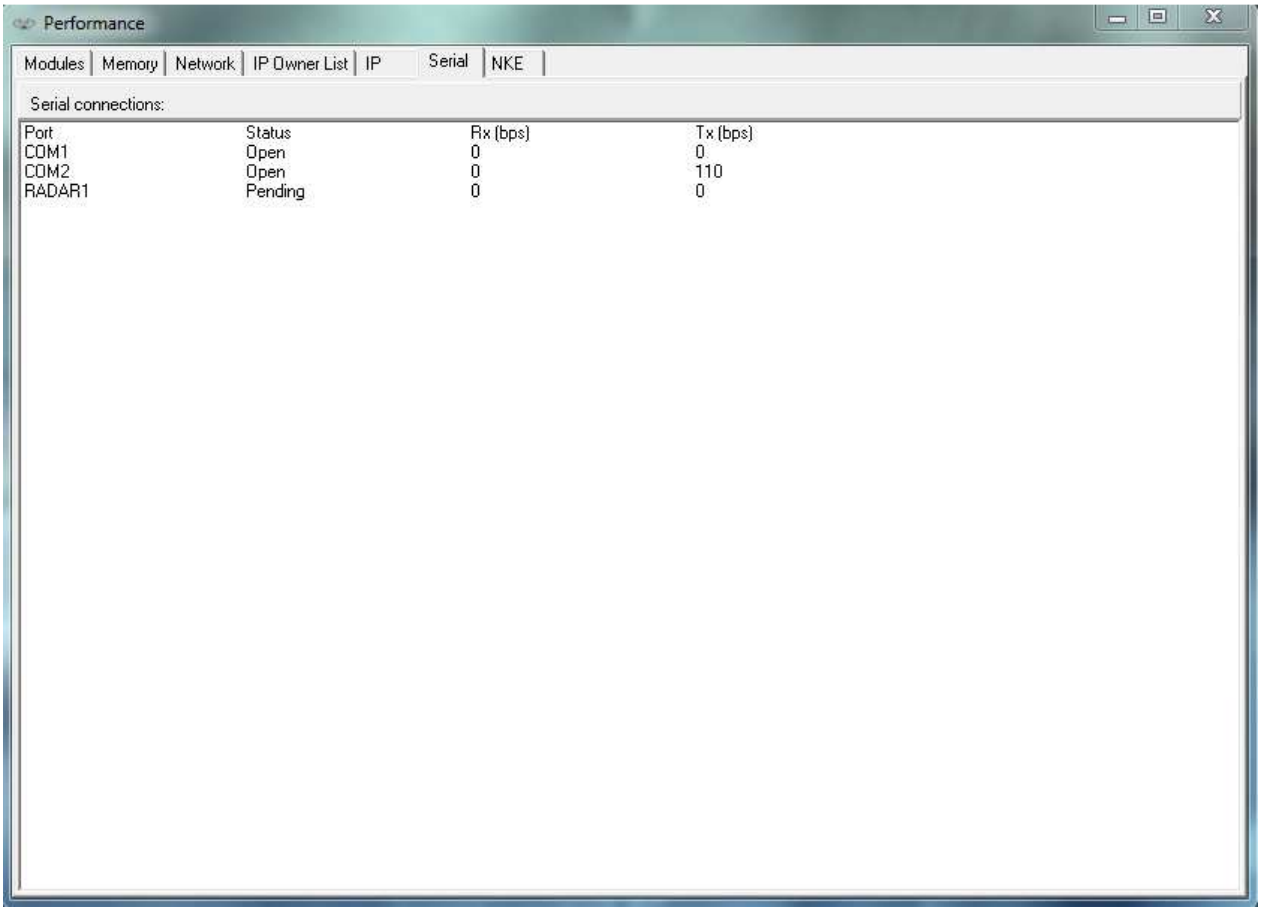


Figure 12-6: Serial

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 12-7)

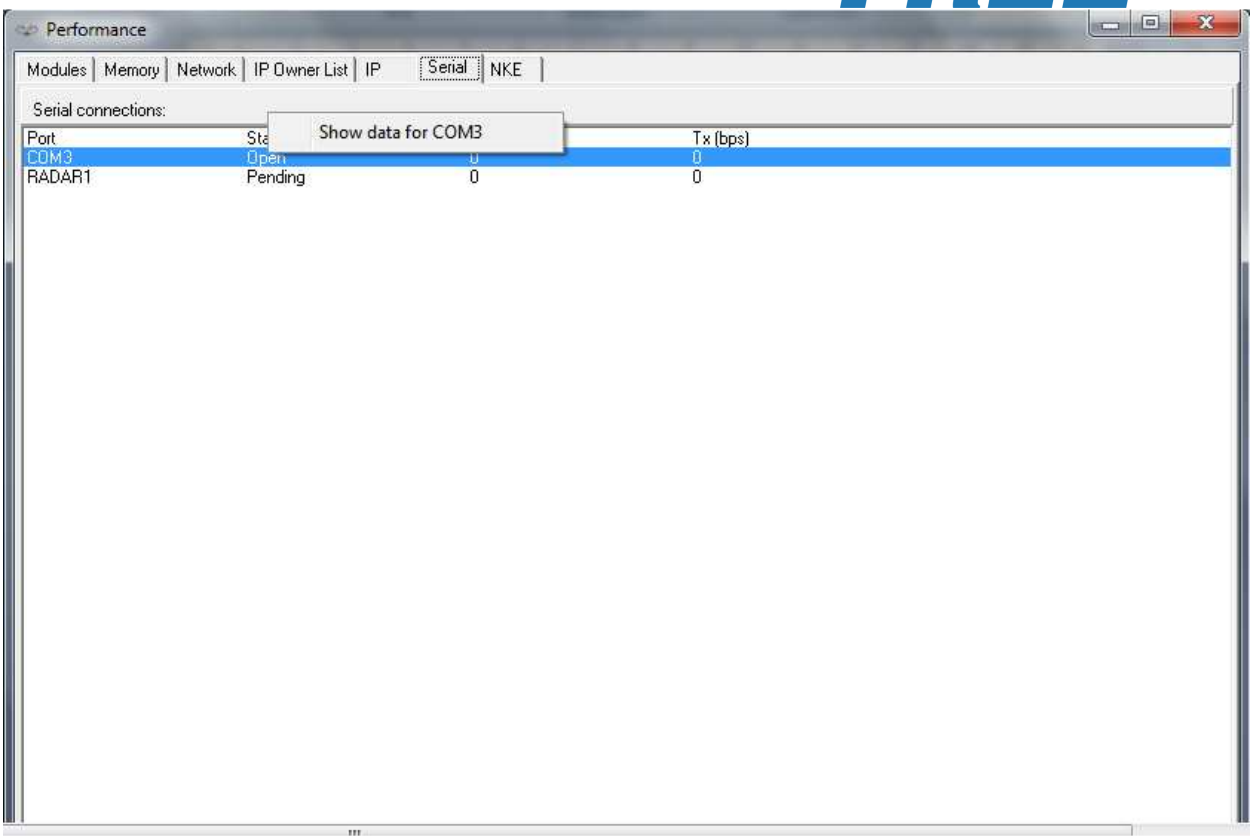


Figure 12-7: Additional Serial Data

After clicking “show data for x” where x is the appropriate port, you will get a new pop-up field Communication Diagnostics. (see Figure 12-9 and Figure 12-9)

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

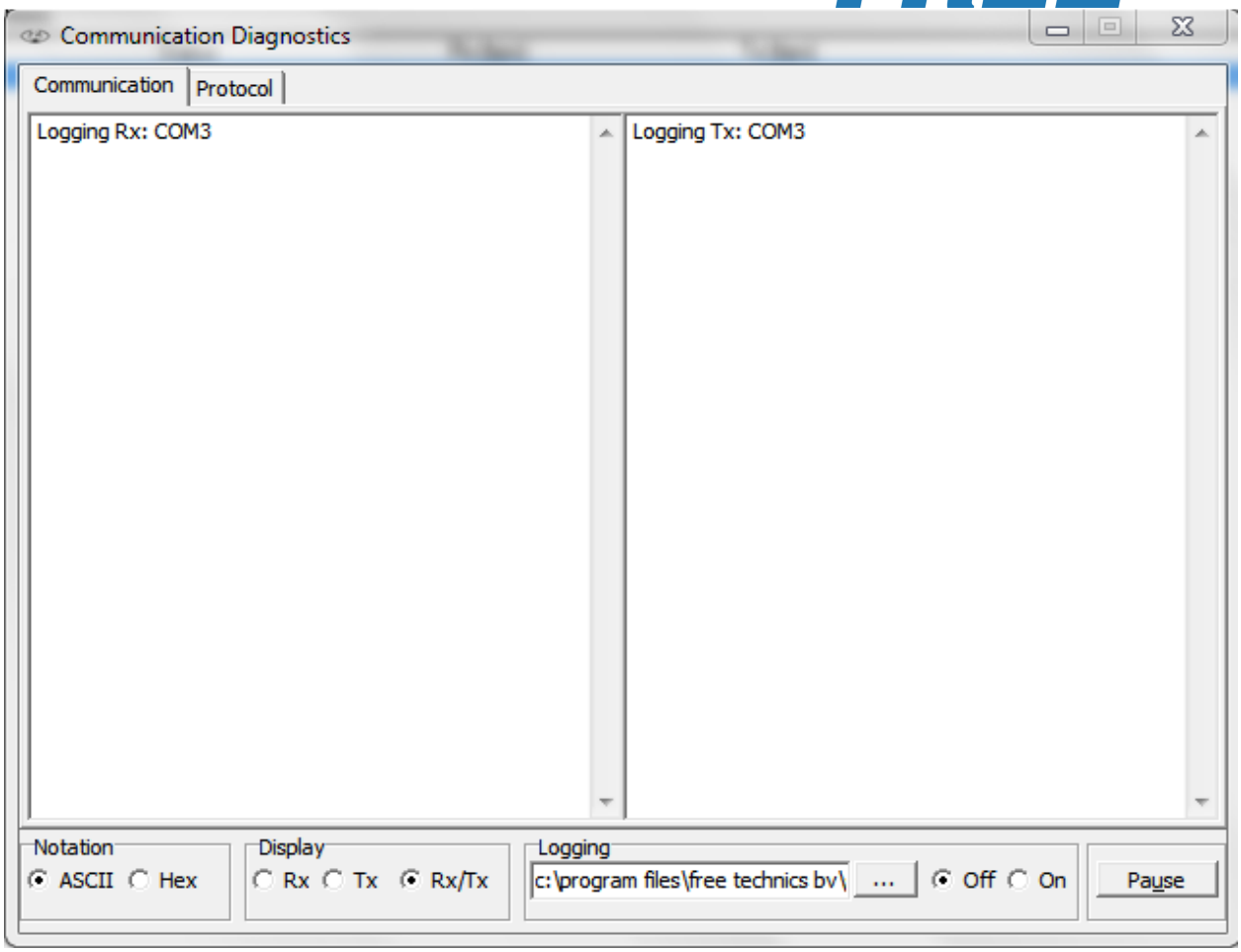


Figure 12-8: Communication Diagnostics 1

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

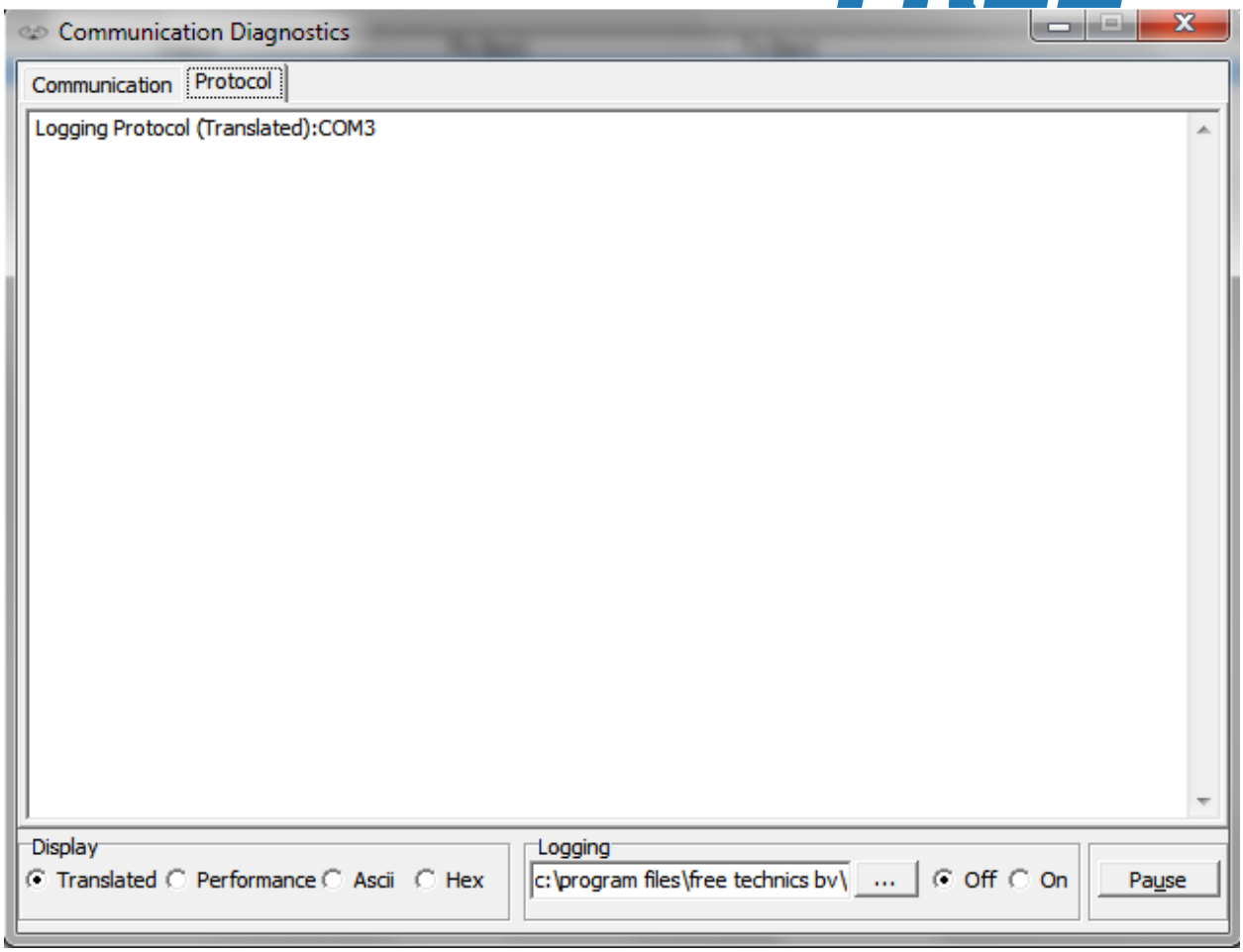


Figure 12-9: Communication Diagnostics 2

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

13. Commissioning

13.1 Purpose

This chapter contains the information about the commissioning of FT NavVision® ® onboard of the vessel.

13.2 Preconditions

- All FT 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 FT 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
- The remote service unit must be connected and installed with a working GPRS Sim-cart
- Engines, generators, radar and all other equipment within the FT 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.

13.3 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

- **FT 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.**

13.4 Commissioning steps

13.4.1 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		

13.4.2 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		

13.4.3 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		

13.4.4 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		

13.4.5 FT NavVision® software

Check	Contents of check	Passed
FT 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		

13.4.6 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.	
FT NavVision®	Check the current firmware version.	
	If necessary, upgrade the system with the latest version.	
Remarks		

13.4.7 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 FT 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		

13.4.8 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		

13.4.9 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		

13.4.10 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		

13.4.11 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 FT 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 FT NavVision® ® viewer to verify that data gets in.	
Remarks		

13.4.12 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		

13.4.13 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 FT 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		

13.4.14 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		

13.4.15 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		

13.4.16 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		

13.4.17 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		

13.4.18 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		

13.4.19 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.)

Free Technics

Technical & customer support
The Netherlands

Free Technics B.V.
Eikenlaan 259J
2404 BP, Alphen aan den Rijn
The Netherlands

Telephone: +31 172418 890
Fax: +31 172418 899
www.freetechnics.eu