KROHNE Marine

# **CARGOMASTER® V6**

C	Trim (aft): 0,00 m	List (port): 0,0 °/0,00	Max dra m 0,00	<sup>ft:</sup> 12:3	2:46 UTC	Alarms		0 Loca	ation: NO01NBTHE	eodao2 ca	RGOMAS Version: 1	- C TER <b>Kr</b> .2.0	DHNE
	Value Table	Bar Grap	ohs 🏾 🍾 C	argo 🍫	Ballast 🏾 🍾	Fuel Oil	Rep	ort	N History				$\bigcirc$
View:	Cargo [ALL]	▼ Filt	ering: Any tank	▼ Any t	ype 🔻	Any content	▼ Any	operatior	Clear all filter	s			
Name	e	Туре	Content	Operatio	n Vol %		Volume		Level	Weight	Ullage		▲ 🥿
CT1_P	P 🥻	Cargo		Dischargi	ng	0 % 🛕	0,0	)0 m³	0,00 m	0,00 MT	-	18,00 m	lues
CT1_S	s 🥻	Cargo		Dischargi	ng	0 % 🛕	0,0	00 m³	0,00 m	0,00 MT		18,00 m	A
CT2_P	P	Cargo	Coca Cola	Loading		47 %	8000,0	00 m³	Ø 8,00 m	7840,00 MT		10,00 m	larm
CT2_S	s 🥻	Cargo	Coca Cola	Loading		100 % 🛕	17000,0	00 m³	17,00 m	17000,00 MT		1,00 m	Lim
CT3_P	P 🥻	Cargo	Coca Cola	Loading		100 % 🛕	3070,	50 m³	16,04 m	3070,60 MT		1,96 m	its]
CT3_S	s 🛛	Cargo	Coca Cola	Loading		100 %	3077,	50 m³	16,04 m	3077,60 MT		1,96 m	L ≥
CT4_P	P 🖌	Cargo	Coca Cola	Loading		100 % 🛕	3083,2	20 m³	16,04 m	3083,20 MT		1,96 m	arm
CT4_S	s 🥻	Cargo	Coca Cola	Loading		100 % 🛕	3076,4	10 m³	16,04 m	3076,40 MT		1,96 m	[Enat
CT5_P	P 🥻	Cargo	Coca Cola	Loading		100 % 🛕	3076,4	10 m³	16,05 m	3076,40 MT		1,95 m	oled]
CT5_S	s 🥻	Cargo	Coca Cola	Loading		100 % 🛕	3083,2	20 m³	16,04 m	3083,20 MT		1,96 m	
CT6_P	P 🖌	Cargo		Dischargi	ng	0 % 🛕	0,0	00 m³	0,00 m	0,00 MT	-	18,00 m	
Sum/A	Avg:					<b>79</b> %	68441,0	0 m <sup>3</sup>	12,93 m	68281,00 MT		4,48 m	- -
4												Þ	
Ala	arm time	Priority	Area	Name	Туре	Descriptio	n	Limit	Current	State	State time	Opera	tor
> 25	.09.2019 12:27	High	Lines	VAP_5.PRESS_	State	Out of ra	inge	True	True	Active	25.09.2019	12	
25.	.09.2019 12:27:3	High	Lines	VAP_3.PRESS_S	State	Out of ra	nge	True	True	Active	25.09.2019	12:2	
20.	.09.2019 13:35:0	High	Tanks	CT2_S.Volume	Hi	Value abo	ove Hi limit	95 %	100 %	Active	20.09.2019	13::	
Ope	eration 🔹	View	▼ F	Report 🔹	System	•	Alarm	•	Silence Alarm	Ack Ala	rm	Help	•

# **User Manual**

#### **KROHNE Marine**

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# **Version List**

Version	Date	Changes	Changed	Approved
1.0	24.09.2019	Initial version	AT	
1.1	21.11.2019	Added more alarm details	AT	
1.2	20.01.2020	Fix typos, added tooltip info, added keyboard shortcuts	AT	
		and replaced wrong screenshots.		
1.3	17.06.2021	Updated text regarding density expansion coefficient	AT/MKN	
		and added chapter for testing of alarms.		
1.4	10.01.2022	Updated for version 1.2.11:	AT	
		Add information on Density and Weight in Vacuum		
		vs Air		
		Update report chapter		
		Auto zero tank sensors		
		Value Table setup		



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# **1 INTRODUCTION**

This document describes the Human Machine Interface (HMI) and run-time operation of the CARGOMASTER® system for tank gauging and valve remote control from KROHNE Marine.

Start the application by clicking the "Monitoring System Client" icon on the desktop.

### 1.1 System Overview

A complete CARGOMASTER® system includes quite a few components. There are both mechanical and electrical parts, as well as computer programs involved in the process of monitoring the various tanks on your vessel. (See Figure 1-1) presents the most common parts of such a system and indicates a few different options. CARGOMASTER® is a modular system so all these options may not be configured and installed on your vessel.



Figure 1-1: CARGOMASTER® system overview

A few words on some of the various system parts:

CCU	Short for CARGOMASTER® Computer Unit. Ordinary PC type computers, however configured and type approved for maritime use. Normally, these computers are powered via an UPS – Uninterruptable Power Supply. A laser printer is also handy and is needed for printed reports. The CCU is connected to the SCU to retrieve measurement data.
SCU	Short for Signal Control Unit. This is where all data is collected from the various transmitters or instruments and forwarded to the CCU.
Other systems:	CARGOMASTER® supports an array of protocols to communicate with other vessel systems, usually trough a RS232 or RS485 serial interface.
Sensors:	CARGOMASTER® can utilize a variety of sensors/transmitters, primarily the native CARGOMASTER® types. The range includes ballast/line pressure sensors, radar transmitters, various temperature transmitters, and various 4-20 mA transmitters. CARGOMASTER® can also retrieve data from 3rd party systems.



- **Junction boxes:** Some of the CARGOMASTER® junction boxes, normally the ones fitted on cargo tanks, host electronic equipment like AD cards. The boxes are designed to withstand rough weather conditions and should not be opened except for required servicing. Also, boxes placed inside trunks, engine room etc. may have electronics inside. Please consult the electrical drawings for the system installed on your vessel for further details.
- AD/TI cards: The Analogue/Digital cards, commonly placed in the various junction boxes, converts analogue signals from the cargo and ballast sensors into digital data and transmits these to the TI (Tank Input) cards placed inside the SCU. The TI card receives the data, and feeds them through Zener-barriers, necessary for safe electrical connection between Safe and Hazardous areas.
- **PLC IO:** A PLC (Programmable Logic Controller) with several intrinsically safe IO modules. Used for interfacing radars and pressure sensors.

### 1.2 Precautions

Although the mechanical and electrical parts of CARGOMASTER® are virtually free of maintenance, they are vulnerable to certain physical impacts. So, even though it may seem obvious- please:

- Do NOT expose sensors/transmitters to sandblasting!
- Do NOT overpaint sensors/transmitters!
- Please take care when cleaning tanks even small strokes or impacts on the sensor diaphragms may alter the sensors characteristics in such a way that it will become unusable!
- Do NOT replace any seals, O-rings or gaskets with parts that are not clearly specified for this equipment!

#### 1.3 Weight & Density in vacuum vs air

The system normally presents all weight and density values in vacuum. Depending on the user preferences this can be changed in the following way:

- Density:
  - Density unit without any suffix (such as kg/m3) means density in vacuum
  - To display density in air select a different unit (2.5) such as kg/m3 (air)
- Weight:
  - Weight in vacuum and air uses the same unit (MT, kg, etc) but weight in air are shown with the text *Weight (air)* (Weight in vacuum is shown as just *Weight*)
  - For the reports the user can select Weight in air
  - o In the value table the user can select Weight or Weight (air) (or both) column(s)
  - For the Tank faceplate both *Weight* and *Weight (air)* are displayed.

# **2 OVERVIEW & NAVIGATION**

### 2.1 User Interface layout

The main user interface of the CARGOMASTER® program consists of four areas (Figure 2-1):

1. Top area

Shows key data such as: trim/list, number of active alarms in each category and the name of the CCU.

2. Main navigation area

Shows various views of the application such as: value table, bar graphs, mimics, etc.

- 3. Alarm overview
  - If alarms are present, the 3 most important are shown here (See Chapter 5).
- 4. Menu

Used to navigate to various views and operate the system.

1	ل Trim (aft): ۱ 0,00 m	List (port): 0,0 ° / 0,00 m	Max draf 0,00 n	t: n 12:32	2:46 UTC	Alarms	: 17 <b>①</b> 0 ①	0 Loc	ation: N	001NBTHE	CA	RGOMAS Version: 1	- C TER <b>Kr</b> .2.0 M	OHNE
	Value Table	Bar Graph	s 🍄 Ca	rgo 🍄 B	allast 🍄	Fuel Oil	Re	port	N His	story				$\odot$
	View: Cargo [ALL]	▼ Filter	ring: Any tank	▼ Any ty	rpe 🔻	Any content	▼ Ang	y operatio	on 🔻	Clear all filters	5			
	Name	Туре	Content	Operation	Vol %		Volume		Level		Weight	Ullage		▲ 🔬
	CT1_P	Cargo		Dischargir	ig	0 % 🛕	0,	00 m³		0,00 m	0,00 MT		18,00 m	alues
	CT1_S	Cargo		Dischargir	ig	0 % 🛕	0,	00 m³		0,00 m	0,00 MT		18,00 m	×
	CT2_P 🦞	Cargo	Coca Cola	Loading	$\square$	47 %	Ø 8000,	00 m³	Ø	8,00 m	7840,00 MT	Ø	10,00 m	larm
	CT2_S	Cargo	Coca Cola	Loading		100 % 🛕	17000,	00 m³		17,00 m	17000,00 MT		1,00 m	Lim
1211	СТЗ_Р	Cargo	Coca Cola	Loading		100 % 🛕	3070,	60 m³		16,04 m	3070,60 MT		1,96 m	its]
	CT3_S 🤍	Cargo	Coca Cola	Loading		100 %	3077,	60 m³		16,04 m	3077,60 MT		1,96 m	- A
	CT4_P	Cargo	Coca Cola	Loading		100 % 🛕	3083,	20 m³		16,04 m	3083,20 MT		1,96 m	arm
	CT4_S	Cargo	Coca Cola	Loading		100 % 🛕	3076,	40 m³		16,04 m	3076,40 MT		1,96 m	[Enab
	CT5_P	Cargo	Coca Cola	Loading		100 % 🛕	3076,	40 m³		16,05 m	3076,40 MT		1,95 m	oled]
	CT5_S	Cargo	Coca Cola	Loading		100 % 🛕	3083,	20 m³		16,04 m	3083,20 MT		1,96 m	
	СТ6_Р	Cargo		Dischargir	g	0 % 🛕	0,	00 m³		0,00 m	0,00 MT		18,00 m	
	Sum/Avg:					<b>79</b> %	68441,0	00 m <sup>3</sup>		12,93 m	68281,00 MT		4,48 m	•
	•												Þ	
	Alarm time	Priority /	\rea	Name	Туре	Description	n	Limit	c	Current	State	State time	Operat	or
2	> 25.09.2019 12:27	High L	ines.	VAP_5.PRESS_	State	Out of ra	nge	True	Т	True	Active	25.09.2019	12	
<b>D</b>	25.09.2019 12:27:3	High L	ines	VAP_3.PRESS_S	State	Out of rar	nge	True	T	rue	Active	25.09.2019	12:2	
	20.09.2019 13:35:0	High 1	anks	CT2_S.Volume	Hi	Value abo	ve Hi limit	95 %	1	00 %	Active	20.09.2019	13::	
4	Operation 🔻	View	• Re	eport •	System	•	Alarm	•	Siler	nce Alarm	Ack Alar	m	Help	•

Figure 2-1: User interface layout

### 2.2 Navigation

Navigating the user interface can be done using mouse/trackball or keyboard shortcuts. Using the keyboard is the fastest way to navigate the CARGOMASTER® program, utilizing the keyboard shortcuts built into the program. The keyboard shortcuts are listed in the Reference chapter. When pressing the Alt key all menu buttons that have an underscored letter are accessed by pressing that letter while holding down the Alt key. E.g. the Operation menu is accessed by pressing and holding the Alt key, then press and release the O key.

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Navigating between views can be done using the 'View' menu options, or the following keyboard shortcuts:

Shortcut key	View
Alt+F3	Value Table – Numerical spreadsheet display
Ctrl+F3	Bar graph – Vertical bars displaying key tank values
Shift+F3	Layout – Custom layout views depending on configuration. If multiple views are configured pressing the shortcut keys will cycle thru the layout views.

### 2.3 Mouse Over (Tooltips)

In general, the user interface provides additional information by placing the mouse over icons, values, etc. Figure 2-2 shows the tooltip for an alarm icon.

C Trim (for	Trim (fore): <b>0,00 m</b>		List (stbd): <b>0,0 ° / 0,00 m</b>				
Value Table	Bar Graphs	s 🍫 Cargo	P🐟 Ballast	Fuel Oil			
View: Cargo [ALL]	•	Filtering: Any tar	nk 🔻 Ar	iy type 🔻 Any			
Name	Туре	Content	Operation	Vol %			
CT1_P	Cargo		None	100 %			
CT1_S	Cargo	Saft	Loading	100 % 🛕			
CT2_P	Marms (2)			90 %			
CT2_S	Critical			100 % 🛕			
стз_р	CT1_S.Volume H	iHi Value above HiH	li limit Active	100 % 🛕			
CT3_S	CT1_S.Volume H	i Value above Hi I	imit Active	100 % 🛕			
CT4_P	Cargo		None	100 %			

Figure 2-2: Alarm icon tooltip

### 2.4 Main Views

This chapter gives a brief overview of the available main views.

### 2.4.1 Value Table

The value table view is shown by pressing **Alt-F3**, **View->Value Table** menu or by clicking the **Value Table** tab. It shows the tank data in a spreadsheet like format (Figure 2-3). Different tanks can be viewed by using the various filtering functions. See chapter 4.1 for detailed description of this view.

	bar Gr	apris 🔷 Carg			Report	History			
View: Cargo [ALL]	▼ F	iltering: Any tank	▼ Any type	<ul> <li>Any content</li> </ul>	<ul> <li>Any operatio</li> </ul>	n 🔻 Clear all filte	rs		
Name	Туре	Content	Operation	Vol %	Volume	Level	Weight	Ullage	Temperati
CT4_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3076,40 m <sup>3</sup>	16,04 m	3076,40 MT	1,96 m	1
CT5_P	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3076,40 m <sup>3</sup>	16,05 m	3076,40 MT	1,95 m	1
CT5_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3083,20 m <sup>3</sup>	16,04 m	3083,20 MT	1,96 m	1
CT6_P	🛕 Cargo		Discharging	0 % 🛕	0,00 m <sup>3</sup>	0,00 m	0,00 MT	18,00 m	1
CT6_S	Cargo		None	100 %	3075,70 m <sup>3</sup>	16,04 m	3075,70 MT	1,96 m	1
CT7_P	Cargo		None	100 %	3075,70 m <sup>3</sup>	16,04 m	3075,70 MT	1,96 m	1
CT7_S	Cargo		None	100 %	3082,60 m <sup>3</sup>	16,04 m	3082,60 MT	1,96 m	1
CT8_P	Cargo		None	100 %	3080,10 m <sup>3</sup>	16,04 m	3080,10 MT	1,97 m	2
CT8_S	Cargo		None	100 %	3073,20 m <sup>3</sup>	16,04 m	3073,20 MT	1,96 m	1
CT9_P	Cargo		None	100 %	2920,80 m <sup>3</sup>	16,03 m	2920,80 MT	1,97 m	1
CT9 S	Cargo		None	100 %	2927 70 m <sup>3</sup>	16.04 m	2927 70 MT	1 96 m	1
Sum/Avg:				79 %	68441,00 m <sup>3</sup>	12,93 m	68281,00 MT	4,48 m	1

Figure 2-3: Tank Value table view

### 2.4.2 Bar Graph

The bar graph view is shown by pressing **Ctrl-F3**, **View->Bar Graphs** menu or by clicking the **Bar Graphs** tab. It shows the tank data as graphical bars (Figure 2-4). Different tanks can be viewed by using the various filtering functions. See chapter 0 for detailed description of this view.



Figure 2-4: Tank Bar graph view

#### 2.4.3 Layout Views

Layout view(s) are shown by pressing **Shift-F3**, **View->[Actual View]** or by clicking the actual view tab (Named Cargo, Ballast and Fuel Oil in Figure 2-5).

Layout views are custom views created specifically for each vessel, and depending on the installed equipment, type of vessel, etc. can vary greatly. An example of a layout view is shown below in Figure 2-5. See chapter 4.3 for detailed description of the layout view.



Figure 2-5: Cargo tanks layout view

### 2.5 Unit Settings

Open the **System->Unit Settings** menu (Figure 2-6) to configure the desired units used for displaying volume, mass, etc. The selected units will be reflected in all the user interface views and reports.

Units		×
Units		
Temperature	°C	•
Mass	MT	•
Volume	m <sup>3</sup>	•
Length	m	•
Liquid Pressure	mmH2O	•
Inert Pressure	mBar	•
Atm. Pressure	mBar	•
Line Pressure	Bar	•
Vapor Pressure	mmH2O	•
Massflow	kg/h	•
Density	MT/m³ (air)	•
	Save	ancel

Figure 2-6: Unit settings



### 2.6 Quality & Alarm indications

Values in the system can have an alarm, e.g. when the value is above a given limit. This is indicated by an alarm icon next to the number, like this (See Chapter 5 for alarm system details):

10 m Par \Lambda
- TU mbar 🗛
-10 mBar 💛

Figure 2-7: Alarm indication

In addition, values have an associated quality. When the quality of a value is bad this is indicated by another icon next to the value:

Inert Pressure
300 mBar 😣
300 mBar 😣

Figure 2-8: Bad value indication

Note: The bad value indication means that this value cannot be trusted. The reason is due to IO error, sensor failure, etc indicated by an associated alarm

### **3 TANK OPERATIONS**

This chapter describes the functions related to setting up tanks prior to loading, discharge, etc. Tanks has a property called 'Operation' which is used to denote the current operation for this tank. The various operations are:

- Loading: Indicates that this tank is being loaded
- Discharging: Indicates that this tank is being discharged
- None: Indicates that there is currently no operation performed on this tank

In addition to this, each tank has a 'Content' property used to indicate the current content of the tank. The contents are user defined and the operator can add any number of contents.

### 3.1 Tank Contents

The edit and/or view the list of tank contents, go to menu: **Operation->Edit Content settings**. This opens a popup window showing the defined contents in the system (Figure 3-1). The density settings for the contents are shown in the units set in the *Unit Settings* window (Section 2.5).

New	Delete

Figure 3-1: Tank contents list

Use the **New** and **Delete** button to add new or delete contents, to edit name or color for a content click in the desired cell. Each content can have density setting defined, which is set on the tanks when loading that content. Once done, click **Save** to save any changes and close the window or **Cancel** to close and ignore any changes entered.

To edit the density settings, click the ... button in the **Density Settings** column, which opens a popup to edit the settings (Figure 3-2):

Density settings for Sulfuric a	cid	×
Density Mode	OD1/RT1	& ExpCoeff 🔹
Density Unit	MT/m³ (ai	r) 🔻
Operator Density 1	1,8412	MT/m³ (air)
Operator Temperature 1	15,0	°C
Expansion Coefficient	0,00097	1/°C
	Ok	Cancel

Figure 3-2: Content density settings

# Tip: To enter density in another unit than the configured unit, use the 'Density Unit' setting (See Figure 3-2).

The following density settings are available:

Density Mode	Description
OD1/RT1 & ExpCoeff	Density is entered for a specific temperature, with an expansion coefficient describing the volumetric change with temperature.
OD1/RT1 & OD2/RT2	Densities at two different temperatures are entered.
ASTM54B	Uses ASTM54B table to calculate actual density based on the entered reference density.
API	Enter API type (Crude, Product, Lubrication or Ballast) and the API
Fixed	Enter a fixed density.
All modes, except Fixed,	calculates actual density based on the temperature of the liquid in the tanks.

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### 3.2 Prepare Tanks for Loading

To open the prepare tanks for loading dialog (Figure 3-3), press F2 or Operation->Prepare tanks for loading menu:

elect	lanks											Content Settings		
Any typ	e	▼ Any c	ontent	<ul> <li>Any operation</li> </ul>	n 🔻							Content	Cola Z	ero
vailabl	9						Selected	(3)				Volume to load	0,00	m³
Name	Туре	Content	Operation	Capacity	<b>^</b>		Name	Туре	Content	Operation	Capacity	Density Mode	OD1/RT1	& OD2/RT2
CT1_P	Cargo	Cola Zero	Loading	17000,00 m <sup>3</sup>			CT7_P	Cargo		None	3075,70 m <sup>3</sup>	Density Unit	kg/m <sup>3</sup> (air	r)
CT1_S	Cargo	Cola Zero	Loading	17000,00 m <sup>3</sup>			CT7_S	Cargo		None	3082,60 m <sup>3</sup>	Operator Density 1	1008,9	kg/m³ (air)
CT2_P	Cargo	Cola Zero	Loading	17000,00 m <sup>3</sup>			CT8_P	Cargo		None	3080,10 m <sup>3</sup>	Operator Temperature 1	15,0	°C
CT2_S	Cargo	Cola Zero	Loading	17000,00 m <sup>3</sup>		>>						Operator Density 2	1003,9	kg/m³ (air)
CT3_P	Cargo	Cola Zero	Loading	3070,60 m <sup>3</sup>		>						Operator Temperature 2	25,0	°C
CT3_S	Cargo	Cola Zero	Loading	3077,60 m <sup>3</sup>		<						Alarm Settings	100	D
CT4_P	Cargo	Cola Zero	Loading	3083,20 m <sup>3</sup>	_	< <						✓Hi Inert Pressure	300	mBar
CT4_S	Cargo	Cola Zero	Loading	3076,40 m <sup>3</sup>	_							✓HiHi Volume	98	%
CT5_P	Cargo		None	3076,40 m <sup>3</sup>	_							Volume	95	%
CT5 S	Cargo		None	3083,20 m <sup>3</sup>	_							Additional Alarm Settin	igs	Select alarms
-	Cargo		None	3083.20 m <sup>3</sup>	•									

Figure 3-3: Prepare tanks for loading

To prepare tanks for loading follow these steps:

#### 1. Select the desired tanks

This is done by moving the tanks from the list of available tanks to the list of selected tanks using the arrow buttons. The list of available tanks can be filtered by type, content and/or operation.

#### 2. Select content & density settings

Select the desired content from the **Content** drop down list, which will update the density mode/settings to that of the selected content. Optionally the density mode and settings can be overridden/set directly. If desired, the **Volume to load** can be set which is shown below the selected tanks together with the total volume of the selected tanks to ensure enough tank capacity is selected.

#### 3. Set alarm settings

Here the desired alarm limits can be adjusted. By default, Hi & HiHi limit alarms for Volume & Inert Pressure is enabled. In addition, more alarm settings can be set under Additional Alarm Settings using the Select alarms drop down menu. The set limits and alarms are remembered and used as a default for the next time.

#### 4. Review settings & Complete

When the desired settings are correct, click the **Ok** button, which will set the operation, content, density and alarm settings on all selected tanks. Clicking **Cancel** will close the window without applying any changes.

### 3.3 Prepare Tanks for Discharge

To open the prepare tanks for discharge dialog (Figure 3-4), press **Shift-F2** or **Operation->Prepare tanks for discharging** menu:

													-		1	×
							Prepa	are ta	ank discha	arge on						
Select Ta	nks										Alarm Setti	ings				
Any type		<ul> <li>Any conte</li> </ul>	nt 🔻	Any operation	٣						🗸 Lo	Inert Pressure	-300	n	nBar	
Available							Selected (3)	)			✓ LoLo	Inert Pressure	-400	n	nBar	
Name	Туре	Content	Operation				Name 🔻	Туре	Content	Operation	Lo LoLo	Volume Volume	10 5	9	5	
CT2_S	Cargo	Coca Cola	Loading				CT7_S	Cargo	Sulfuric acid	None	Additional	Alarm Settings	9	Select a	larms	۳
CT3_P	Cargo	Coca Cola	Loading				CT7_P	Cargo	Sulfuric acid	None						
CT3_S	Cargo	Coca Cola	Loading				CT6_S	Cargo	Sulfuric acid	None						
CT4_P	Cargo	Coca Cola	Loading													
CT4_S	Cargo	Coca Cola	Loading													
CT5_P	Cargo	Coca Cola	Loading													
CT5_S	Cargo	Coca Cola	Loading			님										
CT6_P	Cargo		Dischargin	9		<<										
CT8_P	Cargo		None													
CT8_S	Cargo		None													
CT9_P	Cargo		None													
CT9_S	Cargo		None		Ŧ											
												(	Dk		Cancel	

Figure 3-4: Prepare tanks for discharge

To prepare tanks for discharging follow these steps:

#### 1. Select the desired tanks

This is done by moving the tanks from the list of available tanks to the list of selected tanks using the arrow buttons. The list of available tanks can be filtered by type, content and/or operation.

#### 2. Set alarm settings

Here the desired alarm limits can be adjusted. By default, Lo & LoLo limit alarms for Volume & Inert Pressure is enabled. In addition, more alarm settings can be set under **Additional Alarm Settings** using the **Select alarms** drop down menu. The set limits and alarms are remembered and used as a default for the next time.

#### 3. Review settings & Complete

When the desired settings are correct, click the **Ok** button, which will set the operation and alarm settings on all selected tanks. Clicking **Cancel** will close the window without applying any changes.

3.4 End operation on Tanks

To open the end operation dialog (Figure 3-5), press Alt-F2 or Operation->End operation on tanks menu:

												-			<
						E	nd t	ank opera	tion						
Select T	anks							I		Alarm Sottir	100				
Any typ	<u>апкэ</u>	<ul> <li>Any cor</li> </ul>	tent 🔻	Any operation	,					HiHi	Volume	98	%		_
Available	-					Selected (3	)			🗌 Hi	Volume	95	%		
Name	Type	Content	Operation		•	Name 🔻	Туре	Content	Operation		Volume	10	%		
CT1 P	Cargo		Discharging			CT7 S	Cargo	Sulfuric acid	- Loading	Deviation	Volume	3	%		
CT1 S	Cargo		Discharging			ст7 р	Cargo	Sulfuric acid	Loading	Additional A	Alarm Settings		Select al	arms	•
СТ2 Р	Cargo	Coca Cola	Loading			CT6 S	Cargo	Sulfuric acid	Loading						_
CT2_F	Cargo	Cora Cola	Loading			010_3	cargo	Sulfuric aciu	Loading						
C12_5	Cargo		Loading		Ŀ	>									
C13_P	Cargo	Coca Cola	Loading			>									
CT3_S	Cargo	Coca Cola	Loading												
CT4_P	Cargo	Coca Cola	Loading		le.										
CT4_S	Cargo	Coca Cola	Loading		Ľ	<									
CT5_P	Cargo	Coca Cola	Loading												
CT5_S	Cargo	Coca Cola	Loading												
CT6_P	Cargo		Discharging												
CT8_P	Cargo		None												
										1					
												Ok	C	ancel	

Figure 3-5: End operation on tanks

To end loading or discharging operation on tanks follow these steps:

#### 1. Select the desired tanks

This is done by moving the tanks from the list of available tanks to the list of selected tanks using the arrow buttons. The list of available tanks can be filtered by type, content and/or operation.

#### 2. Set alarm settings

Here the desired alarm limits can be adjusted. By default, all alarms for Volume is disabled. In addition, more alarm settings can be set under **Additional Alarm Settings** using the **Select alarms** drop down menu. The set limits and alarms are remembered and used as a default for the next time.

#### 3. Review settings & Complete

When the desired settings are correct, click the **Ok** button, which will set the operation and alarm settings on all selected tanks. Clicking **Cancel** will close the window without applying any changes.

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### 3.5 Reset Tanks

Reset tanks is used for removing their content. For instance, after a tank has been discharged and cleaned, this function can be used.

To open the reset tanks dialog (Figure 3-6), open **Operation->End operation on tanks** menu:

										-		×
						Reset Tanks	s (Rem	ove content)				
Select	Tanks			[					Alarm Settings			
Any typ	e	<ul> <li>Any con</li> </ul>	itent 🔻	Any operation					Select alarm below to apply to the selected tanks	any ala	rm char	nges
Available	2				-	Selected (0)			to the selected tanks	5-		
Name	Туре	Content	Operation		-	Name 🔻 Type	Content	Operation	Additional Alarm Settings	38	iect alarr	15 .
CT1_P	Cargo		Discharging									
CT1_S	Cargo		Discharging									
CT2_P	Cargo	Coca Cola	Loading									
CT2_S	Cargo	Coca Cola	Loading		>>							
CT3_P	Cargo	Coca Cola	Loading									
CT3_S	Cargo	Coca Cola	Loading									
CT4_P	Cargo	Coca Cola	Loading									
CT4_S	Cargo	Coca Cola	Loading									
CT5_P	Cargo	Coca Cola	Loading									
CT5_S	Cargo	Coca Cola	Loading									
CT6_P	Cargo		Discharging									
CT6_S	Cargo	Sulfuric acid	None	•								
									0	k	Can	cel

Figure 3-6: Reset tanks

To reset tanks, follow these steps:

#### 1. Select the desired tanks

This is done by moving the tanks from the list of available tanks to the list of selected tanks using the arrow buttons. The list of available tanks can be filtered by type, content and/or operation.

#### 2. Set alarm settings

Here the desired alarm settings can be adjusted. The default is that no alarm settings are changed. However, if desired, alarm settings can be set under **Additional Alarm Settings** using the **Select alarms** drop down menu.

#### 3. Review settings & Complete

When the desired settings are correct, click the **Ok** button, which will remove the content and set the configured alarm settings on all selected tanks. Clicking **Cancel** will close the window without applying any changes.

### 3.6 Zero-set/Optimize tanks

This function is used to zero adjust pressure sensors on tanks. However, some restrictions for zero adjustment apply:

- To zero adjust any Inert Gas Pressure (IGP) sensors, the tank must be open to atmosphere.
- To zero adjust any bottom or upper sensors, the sensors cannot be submerged in fluid.
- We recommend zero adjustment to be performed immediately before loading.

To perform this operation, open **Operation->Zero Set/Optimize Tanks** menu. This opens the popup window shown in Figure 3-7 below:

														- •	×
				This o t	O  perat	ptin tion v , and	nize/Zer vill automat requires all	o Set tically z tanks	t Tank ero-set to be e	s (Press all pressur mpty and o	SURE SENSE re sensors on open to atmo	O <b>rS)</b> the selected sphere.	1		
Select 1	Tanks												Alarm Settings		
Any typ	e	<ul> <li>Any co</li> </ul>	ntent 🔻	Any operation	•								Select alarm below to apply an	y alarm cha	anges
Available						1	Selected (3)	_	1				to the selected tanks		
Name	Туре	Content	Operation	Volume	L,		Name 🔻	Туре	Conte	Operation	Volume	Inert Press	Additional Alarm Settings	Select alar	·ms •
CT1_P	Cargo		Discharging	0,00 m <sup>3</sup>			CT9_S	Cargo		None	2927,70 m <sup>3</sup>	-13 mBar			
CT1_S	Cargo		Discharging	0,00 m <sup>3</sup>			CT9_P	Cargo		None	2920,80 m <sup>3</sup>	-13 mBar			
CT2_P	Cargo	Coca Cola	Loading	Ø8000,00 m <sup>3</sup>	T		CT8_S	Cargo		None	3073,20 m <sup>3</sup>	-13 mBar			
CT2_S	Cargo	Coca Cola	Loading	17000,00 m³	Ť	>>									
CT3_P	Cargo	Coca Cola	Loading	3070,60 m <sup>3</sup>	T	>									
CT3_S	Cargo	Coca Cola	Loading	3077,60 m <sup>3</sup>	T	<									
CT4_P	Cargo	Coca Cola	Loading	3083,20 m <sup>3</sup>		<<									
CT4_S	Cargo	Coca Cola	Loading	3076,40 m <sup>3</sup>											
CT5_P	Cargo	Coca Cola	Loading	3076,40 m <sup>3</sup>	Т										
CT5_S	Cargo	Coca Cola	Loading	3083,20 m <sup>3</sup>											
4					•		•					Þ			
													Ok	Ca	ncel

Figure 3-7: Zero set tanks

# 4 VIEWS

This chapter describes in detail the functionality of the main views introduced in chapter 2.4.

### 4.1 Value Table

This view shows the tank data in a spreadsheet like format, and consists of three areas (Figure 2-3):

- 1. Filtering: Used to select which tanks to display. Can select views based on tank type, tank content, etc.
- 2. Displayed tanks: Shows the selected tanks, and their key values.
- 3. Selection of columns: Used to select what information are shown.

Value Tabl	le Bar Gra	aphs 🏾 🍫 Cargo	ିତ Ballas	t Poel Oil	Report	N History			
View: Cargo [ALL	.] <b>v</b> Fi	Itering: Any tank	▼ Any type	<ul> <li>Any content</li> </ul>	<ul> <li>Any operation</li> </ul>	n 🔻 Clear all filte	rs		
Name	Туре	Content	Operation	Vol %	Volume	Level	Weight	Ullage	Temperati
CT4_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3076,40 m <sup>3</sup>	16,04 m	3076,40 MT	1,96 m	1
CT5_P	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3076,40 m <sup>3</sup>	16,05 m	3076,40 MT	1,95 m	1
CT5_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3083,20 m <sup>3</sup>	16,04 m	3083,20 MT	1,96 m	1
CT6_P	🛕 Cargo		Discharging	0 % 🛕	0,00 m <sup>3</sup>	0,00 m	0,00 MT	18,00 m	1
CT6_S	Cargo		None	100 %	3075,70 m <sup>3</sup>	16,04 m	3075,70 MT	1,96 m	1
CT7_P	Cargo		None	100 %	3075,70 m <sup>3</sup>	16,04 m	3075,70 MT	1,96 m	1
CT7_S	Cargo		None	100 %	3082,60 m <sup>3</sup>	16,04 m	3082,60 MT	1,96 m	1
CT8_P	Cargo		None	100 %	3080,10 m <sup>3</sup>	16,04 m	3080,10 MT	1,97 m	2
CT8_S	Cargo		None	100 %	3073,20 m <sup>3</sup>	16,04 m	3073,20 MT	1,96 m	1
CT9_P	Cargo		None	100 %	2920,80 m <sup>3</sup>	16,03 m	2920,80 MT	1,97 m	1
CT9 S	Cargo		None	100 %	2927 70 m <sup>8</sup>	16.04 m	2927 70 MT	1.96 m	1
Sum/Avg:				79 %	68441,00 m <sup>3</sup>	12,93 m	68281,00 MT	4,48 m	1

Figure 4-1: Tank Value table view

Tip: The columns (types, size, etc) in the value table view can configured (0)

#### 4.1.1 Tank filtering

To control which tanks to view, open the View dropdown shown in Figure 4-2.



Figure 4-2: Value table view selection



The various views are categorized into three:

Tank Type/Content	These views are used to filter tanks either by tank type or content. Cargo [ALL]: Shows all cargo tanks Cargo [LOADING]: Shows all cargo tanks in loading operation Cargo [DISCHARGING]: Shows all cargo tanks in discharging operation In addition, one view pr. content type currently set on the tanks is available.
Filtered	When selecting this option, the filter row (#1 in Figure 4-1) is used to filter the tanks as desired. Filtering can be done by: Tanks: Select one or more tanks Type: Cargo, Ballast, Fuel, etc.
	Content: Filter by currently used content Operation: Filter by tank operation
Scratchpads	Scratchpads are views that the user can create and save. Multiple views can be created with the desired tanks. Blank rows and rows with partial sum values can be added. See 4.1.2 for detailed description.

#### 4.1.2 Scratchpads

#### Create new scratchpad view

To create a new scratchpad view, open the View dropdown (Figure 4-2) and click the + icon. This opens the dialog shown below (Figure 4-3).



*Figure 4-3: Create new scratchpad* 

- 1. Enter a name for the scratchpad view
- 2. 'Include tanks in current view': If checked will include all the tanks in the current view, otherwise the created scratchpad will be initially empty.
- 3. Click the **Ok** button to create the scratchpad or **Cancel** to cancel.

#### Working with scratchpads

Once a scratchpad is selected it is possible to edit which tanks are viewed. The following rows can be added to a scratch pad:

- 1. Tank: Displays tank values for this tank.
- 2. Blank: A blank row, can be used add spacing between rows for easier readability.
- 3. Part. Sum: A row which shows the sum/average values for tanks above (up to previous part. sum, or top if no part. sum is defined above).
  - a. Tank volume & weight are shown as sum
  - b. All other values are shown as average

An example is shown in Figure 4-4 showing tank, blank and part. sum rows. The first part. sum row shows the sum/average values for tanks CT1\_P and CT1\_S. The second part. sum row shows the sum/average for tanks CT8\_P and CT8\_S.



View:         Favourite Tanks [SCRATCH]         Filtering:         Any type         Any t	16,53 m 16,53 m
Name         Type         Content         Operation         Vol %         Volume         Level         Weight         Ullage           CT1_P         Cargo         II Sulfuric acid         Loading         9%         1465,40 m <sup>3</sup> 1,47 m         2693,58 MT         1           CT1_S         Cargo         ISulfuric acid         Loading         9%         1467,10 m <sup>3</sup> 1,47 m         2700,09 MT         1           Part sum/avg:         C         Cargo         Income         9%         2932,50 m <sup>3</sup> 1,47 m         5393,67 MT         1	16,53 m 16,53 m
CT1_P         Cargo         Sulfuric acid         Loading         9%         1465,40 m³         1,47 m         2693,58 MT         1           CT1_S         Cargo         I Sulfuric acid         Loading         9%         1467,10 m³         1,47 m         2690,58 MT         1           Part sum/avg:         Cargo         I Sulfuric acid         Loading         9%         2932,50 m³         1,47 m         2700,09 MT         1	16,53 m 16,53 m
CT1_S         Cargo         Image: Sulfuric acid         Loading         9 %         1467,10 m³         1,47 m         2700,09 MT         1           Part sum/avg:         Image: Sulfuric acid         Image: Sulfuric acid	16,53 m
Part sum/avg:         9%         2932,50 m³         1,47 m         5393,67 MT         10	
	16,53 m
CT8_P         Cargo         None         100 %         3080,10 m³         16,04 m         3080,10 MT	1,97 m
CT8_S Cargo None 100 % 3073,20 m <sup>3</sup> 16,04 m 3073,20 MT	1,96 m
Part sum/avg: 100 % 6153,30 m <sup>3</sup> 16,04 m 6153,30 MT	1,96 m

Figure 4-4: Example scratchpad

To add/delete rows from scratchpad right-click the desired row which shows a context menu (Figure 4-5).

Value Table	Ba	r Graphs	s 🍄 Ca	rgo	⁰�	Ballast
View: Favourite Tanks	[SCRATCH]	•	Filtering: A	ny tank	c	▼ An
Name	Туре		Content		Operatio	n
CT1_P	Cargo		Sulfuric aci	d	Loading	
CT1_S Part sum/avg:	Cargo	Viev	Sulfuric aci w tank details ert tank(s)	Ч	I,oading	
CT8_P CT8_S	Cargo Cargo	Inse Inse Ren	ert blank row ert partsum nove selected i	None None		

Figure 4-5: Insert/delete rows

The following options are available:

- View tank details: Opens the faceplate for this tank (See chapter 0).
- Insert tank(s): Shows a dialog where desired tank(s) can be added.
- Inert blank row: Inserts a blank row at this location.
- **Insert part sum**: Insert a part sum row at this location.
- Remove selected row(s): Deletes the selected row from the scratchpad.

#### **Deleting scratchpads**

A scratchpad group can be deleted by clicking the  $\overline{III}$  icon to the right of the scratchpad in the view list (See Figure 4-2).

#### 4.1.3 Views

When the 'Values' (#3 in Figure 4-1) view are selected, the following settings can be changed:

- Adding/removing columns: By right-clicking a column header (See Figure 4-6).
- Column width: By clicking and dragging the separator line on the right side of the column.
- Column order: By clicking and dragging the column header to the desired location.

The column settings (column types, order and widths) are saved automatically, and are individual to each client computer of the system.

View: Ballas	t	▼ Fi	iltering: Any tank	<ul> <li>Any type</li> </ul>	e • Any conten	Any operation	▼ Clea	r all filters
Name	Туре	Content	Operation	Content	Volume	Remain Add colu	mn 🕨	Content
WB1	🛕 Ballast		None		1181,20 m <sup>3</sup>	Remove	column	Density
WB2	🛕 Ballast		None		1251,30 m <sup>3</sup>	0,00 m <sup>3</sup>	0	Density Mode
WB3	🛕 Ballast		None		1023,30 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Density Settings
WB4_P	🛕 Ballast	📕 Cola Zero	None	Cola Zero	935,70 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Inert Pressure
WB4_S	🛕 Ballast	Cola Zero	None	Cola Zero	1986,90 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Level
WB5_P	🛕 Ballast	E Cola Zero	None	Cola Zero	2104,70 m <sup>3</sup>	0,00 m <sup>3</sup>	0	Level @ FC
WB5_S	🛕 Ballast	E Cola Zero	None	Cola Zero	1012,60 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Load Rate
WB6_P	🛕 Ballast	E Cola Zero	None	Cola Zero	665,80 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Operation
WB6_S	🛕 Ballast	Cola Zero	None	Cola Zero	1441,50 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Remaining Time
WB7_P	🛕 Ballast	E Cola Zero	None	Cola Zero	1324,30 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Remaining Volum
WB7_S	🛕 Ballast	Cola Zero	None	Cola Zero	962,30 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Remaining Weigh
WBHT_P	🛕 Ballast	Cola Zero	None	Cola Zero	1033,40 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Tank Type
WBHT_S	🛕 Ballast	Cola Zero	None	Cola Zero	665,80 m <sup>3</sup>	0,00 m <sup>3</sup>	C	Target Volume
								Temperature
								Ullage
								Ullage @ FC
								Volume
								Volume %
								Weight
								Weight (air)

Figure 4-6: Adding/removing columns

Using the *Alarm [Limits]* and the *Alarm [Enabled]* views, alarm for the tanks can easily be viewed and configured. Figure 4-7 shows the *Alarm [Limits]* view.

Valu	e Table	Bar Graphs	🗢 Cargo 🥄	> Ballast	> Fuel Oil	Re	port L	ИН	istory														
View: Carg	w: Cargo (ALL)    Filtering: Any tank  Any type  Any content  Any content  Clear all filters																						
		INERT PRESSURE	E			TEM	PERATURE							VOLUI	ME								
Name	Туре	HiHi	Hi	Lo	LoLo	HiH	li	Hi		Lo		LoLo		HiHi		Hi		Lo		LoLo		Devia	tion
CT1_P	🛕 Cargo	🖉 400 mBar	🖉 300 mBar	🖉 -300 mBar	🖉 -400 mBar	Ø	50,0 °C	Ø	30,0 °C	Ø	5,0 °C	Ø	0,0 °C	Ø	98 %	Ø	95 %	Ø	10 %	0	5 %	Ø	3 %
CT1_S	🛕 Cargo	🖉 400 mBar	Ø 300 mBar	🖉 -300 mBar	🖉 -400 mBar	D	50,0 °C	Ø	30,0 °C	Ø	5,0 °C	0	0,0 °C	D	98 %	Ø	95 %	Ø	10 %	0	5 %	Ø	3 %
CT2_P	🛕 Cargo	🖉 400 mBar	🖉 300 mBar	🖉 -300 mBar	🖉 -400 mBar	D	50,0 °C	Ø	30,0 °C	Ø	5,0 °C	0	0,0 °C	Ø	98 %	Ø	95 %	0	10 %	0	5 %	Ø	3 %
CT2_S	🛕 Cargo	🖉 400 mBar	🖉 300 mBar	🖉 -300 mBar	🖉 -400 mBar	D	50,0 °C	0	30,0 °C	0	5,0 °C	0	0,0 °C	Ø	98 %	0	95 %	0	10 %	0	5 %	0	3 %
CT3_P	🛕 Cargo	🖉 400 mBar	🖉 300 mBar	🖉 -300 mBar	🖉 -400 mBar	0	50,0 °C	0	30,0 °C	0	5,0 °C	0	0,0 °C	Ø	98 %	0	95 %	0	10 %	0	5 %	Ø	3 %
CT3_S	🛕 Cargo	🖉 400 mBar	🖉 300 mBar	🖉 -100 mBar	🖉 -300 mBar	Ø	50,0 °C	0	30,0 °C	Ø	5,0 °C	0	0,0 °C	Ø	98 %	0	95 %	0	10 %	Ø	5 %	Ø	3 %
CT4_P	🛕 Cargo	🖉 400 mBar	🖉 300 mBar	🖉 -100 mBar	🖉 -300 mBar	Ø	50,0 °C	0	30,0 °C	Ø	5,0 °C	0	0,0 °C	Ø	98 %	Ø	95 %	Ø	10 %	0	5 %	Ø	3 %
CT4_S	🛕 Cargo	🖉 400 mBar	Ø 300 mBar	🖉 -300 mBar	🖉 -400 mBar	0	50,0 °C	0	30,0 °C	0	5,0 °C	0	0,0 °C	0	98 %	0	95 %	0	10 %	0	5 %	0	3 %

Figure 4-7: Alarm [Limits] view

### 4.2 Bar Graphs

This view shows the tank data in graphical bar format, and consists of two areas (Figure 2-4):

- 1. Filtering: Used to select which tanks to display. Can select views based on tank type, tank content, etc.
- 2. Displayed tanks: Shows the selected tanks, and their key values.



Figure 4-8: Tank Bar graph view

The type of values shown for each tank is fixed, to see more/other values open the tank faceplate by double-clicking the desired tank (Section 0).

### 4.3 Layout Views

The layout views are created specifically for each installation, and will vary depending on the type of vessel, whether the system includes valve & pump control, etc. An example is shown in Figure 4-9:



Figure 4-9: Ballast layout view

CT1 S Sulfuric acid Loading нн 100 75 50 н 25 0 51 % 9,33 m 8666,60 m3 19,5 °C

While the exact layout of the view will vary, each tank is displayed according to Figure 4-10 below:

Figure 4-10: Tank view

The following information is presented:

- 1. The name, content and operation of the tank, and an alarm indicator in case the tank has any alarms. In this case
  - a. Name: CT1\_S
  - b. Content: Sulfuric acid
  - c. Operation: Loading
  - d. Alarms: The tank has one (or more) high priority alarms indicated by the yellow triangle (See Chapter 5 for details on alarm system).
- 2. Bar graph showing the current volume % of the tank.
  - a. The bar has the same color as the content for easy identification
  - b. If load rate is detected on the tank, an animated arrow is shown (as is the case here). Pointing upwards is positive load rate and pointing downwards is negative.
  - c. Volume alarms are shown as icons (HH, H, L and LL) to the right of the bar. In this case the tank has Hi and HiHi alarms enabled and the Hi alarm is active.
- 3. Key measurement data for tank.
  - a. Showing: Volume %, Ullage (Level for Ballast and Misc tanks), Volume and Temperature.
  - b. If any of the shown values has an alarm, this is indicated by the alarm icon to the right of the value. In this example the Volume % has an alarm.

Clicking the tank symbol will open the faceplate.



The tank faceplate (Figure 4-11) shows key data for the tank, and can be used to keep a closer look at specific tanks (Multiple faceplates can be opened simultaneously).



Figure 4-11: Tank faceplate

The faceplate contains five tabs:

- **Overview**: Shows key values for the tank.
- Alarms: Show and adjust alarm settings.
- Trend: Use to trend tank parameters over time.
- Calculator: Use to calculate tank volume based on ullage or vice-versa.
- Service: Service information

In addition, an alarm indicator for the tank is shown at the top right corner to give a quick overview of whether this tank has any alarms (Place mouse over icon for additional information). The example above has 1 high priority alarm.

#### 4.4.1 Overview

The overview tab (Figure 4-12), shows the following data:

- 1. Bars showing the volume, ullage and inert pressure of the tank. Alarm limits are visualized on the bar.
- 2. Content of the tank
- 3. Measurement values
- 4. Operation settings & values

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Figure 4-12: Tank faceplate - Overview tab

#### 4.4.2 Alarms

This tab shows all alarms for the tank (Figure 4-13), the possible adjustments to each alarm is:

- Enabled: Whether this alarm is enabled or not.
- Limit: The limit for this alarm.

Only certain settings can be changed, which is indicated by the 🖉 (pencil) symbol.

CT1_S					×
Overview Alarms	Tre	end Calculator	Serv	ice	🗛 0 🗸 1 🕒 0 🔾 0
All alarms on CT1_S					
Name	Туре	Туре	Enabled	Limit	State
CT1_S	State	Missing Sensor Input	$\checkmark$	True	Passive
CT1_S.BT	State	Sensor Disabled	$\checkmark$	True	Passive
CT1_S.Inert State		Sensor Disabled	$\checkmark$	True	Passive
CT1_S.Inert Pressure HiHi		Value above HiHi limi	0 🗹	🖉 400 mBar	Passive
CT1_S.Inert Pressure	Hi	Value above Hi limit	0 🗹	🖉 300 mBar	Passive
CT1_S.Inert Pressure	Lo	Value below Lo limit		🧷 -300 mBar	Passive
CT1_S.Inert Pressure	LoLo	Value below LoLo lim		🧷 -400 mBar	Passive
CT1_S.MT	State	Sensor Disabled	$\checkmark$	True	Passive
CT1_S.Radar	State	Sensor Disabled	$\checkmark$	True	Passive
CT1_S.Temperature	HiHi	Value above HiHi limi		Ø 50,0 ℃	Passive
CT1_S.Temperature	Hi	Value above Hi limit		Ø 30,0 ℃	Passive
CT1_S.Temperature	Lo	Value below Lo limit		Ø 5,0 ℃	Passive
074 0 T			ÅП	A	. · · · · · · · · · · · · · · · · · · ·

Figure 4-13: Tank faceplate - Alarms tab

Clicking the column header will sort the list according to that column.

#### 4.4.3 Trend

This tab enabled trending tank values over time (Figure 4-14).



Figure 4-14: Tank faceplate - Trend tab

- 1. Use this drop-down menu to select the desired tags to trend
- 2. Shows the trends for the selected tags
- 3. Select the desired time range for the trend.

For more detailed analysis, including zooming and custom time range selection, use the history view (see Chapter 7).

#### 4.4.4 Calculator

This is a calculator based on the current tank measurement and volume table (Figure 4-15). Given a trim and list, volume or weight can be entered, and the ullage calculated, or vice-versa.

CT1_S					×
Overview	Alarms	Trend	Calculator	Service	🛕 3 🚺 5 🕕 0 💽 0
Calculate Tank	Values				
Ullage	13,00	m	Enter an	y value to see the	resulting calculated values.
Ullage @ FC	13,00	m	These va	lues do not affect	t any other parts of the
Level	5,00	m	system.		
Level @ FC	5,00	m			
Volume	5000,00	m³			
Density	960,0	kg/m³ (air)			
Weight	4805,50	MT			
Weight (air)	4800,00	MT			
Trim	1,0	0			
List	2,0	•			

Figure 4-15: Tank faceplate - Calculator tab



#### 4.4.5 Service

The service tab (Figure 4-16) consists of 6 sub-tabs:

- Sensor Inputs: Shows the sensors configured for this tank
- **Density**: Shows the tank density settings
- Sizes: Shows the tank measurements and sensor positions.
- **Tags**: Lists all tags for the tank
- Alarms: Lists all alarms for the tank
- Attributes: Lists all attributes for the tank

#### Sensor Inputs

This tab lists all the sensors connected to this tank and their corresponding values and parameters such as: raw value, sensor value, filter settings, position in tank (Figure 4-16).

Oven		arme	Trend Calcu	lator	envice	<b>▲</b> 2	<b>1</b> 2 <b>0</b> 0 <b>0</b>		
Over		11113	Trend Calcu			<u> </u>	V 2 0 0 0		
Sens	or Inputs	Densit	y Sizes	Tags A	larms	Attributes			
Name	Туре	Enabled	Sensor Auto Zero	Raw value	Sensor va	lue Filtered value	Filter Facto		
Inert	Inert	$\checkmark$	Auto Zero	7566,95	-13 mBar	-			
Radar	Radar	~		1,00 m	1,00 m	1,00 m	10		
BT	Temperature	$\checkmark$		1078,10	19,6 °C	2			
MT	Temperature			1078,10	19,8 °C	:			
UT	Temperature	$\checkmark$		1078,07	19,9 °C				
•	Filtering								
Sensor Filtering         Current         0       1       2       3       4       5       6       7       8       9       10         Defaults       None: 7       Loading: 2       Reset       Image: Control of the second sec									

Figure 4-16: Tank faceplate - Service tab

Sensor inputs on the tank are low pass filtered to reduce noise and provide a more stable reading. Filtering is applied on a scale from 0 to 10, where 0 means no filter and 10 is the maximum. When the tank is not in loading or discharging operation, it is expected that the volume in the tank is constant and a higher filter value is applied (7 is the default) to reduce the effect of liquid sloshing in the tank due to movement.

However, during loading/discharging the volume is changing and a lower filter (2 is the default) is used.

The slider in Figure 4-16 can be used to adjust filter if experience dictates it should be higher or lower. When the value has been adjusted, it can be set as the new default using the **+** button. To reset the back to factory defaults us the **Reset** button.

**Density view** 

Shows the density settings for the tank and the actual density calculated (Figure 4-17).

CT1_S						×
Overview	Alarms Tre	end Ca	alculator	Service		<b>A</b> 1 🔽1 🕒 0 🕚 0
Sensor Inputs	Density	Sizes	Tags	Alarms	Attributes	
Density Setting	IS					
Mode: OD1: RT1: Exp.Coeff.: Actual Density: Actual Temp:	Expansion coef 1842,3 kg/m <sup>3</sup> 15,0 °C 0,00097 1/°C 1845,2 kg/m <sup>3</sup> 18,0 °C	ficient				
Area: Tanks						

Figure 4-17: Tank faceplate - Density settings

#### Sizes view

Shows the tank measurements and sensor positions in the tank (Figure 4-18). The sensor positions are shown graphically, and the view can be selected using the **Graph View** drop-down menu.



Figure 4-18: Tank faceplate - Sizes

The tags, alarms and attributes view show detailed service information for the tank. These views are not needed for normal operation and not described in this manual.

### 4.5 Draft & Trim/List

To view the draft and trim/list of the vessel press **F4** or **System->View draft & trim/list** menu, which opens the view as a popup (Figure 4-19). The view contains the following information:

#### • Ambient Conditions

The atmospheric pressure and temperature. Depending on the configuration they can be either measured from a sensor or set manually.

Atmospheric pressure is an important measurement used as a reference to other pressure sensors. In the case of failure of this sensor, it can be switched to **Manual** using the drop-down menu and a pressure can be entered manually.

#### • Trim/List

Shows the trim and list of the vessel in degrees and meter. The method for calculating trim and list can be selected between:

- o Inclinometer: Measured by an inclinometer sensor
- Draft: Measured from the draft sensors
- Manual: Entered manually

#### • Drafts

Shows the measured drafts of the vessel. To get an accurate reading the density of the sea water must be entered in the **Seawater density** field.

Draft						×
Overview	Trend Servi	ce			<b>A</b>	o <b>V</b> o <b>O</b> o <b>V</b> o
Ambient co	nditions					
Pressure	1013 mBar	Manual 🔻				
Temperature	25,0 °C	Manual 🔻				
Trim/List						
Trim 0,0	°/ 0,00 m (aft)	Inclinome 🔻	2	91	20	21
List 0,0	°/ 0,00 m (port)	Inclinome 🔻	- - T	rim	- L	isto
			ئ-ئ	0,0 °	` ئ	0,0 °
5.6			`∕ó Aft	Fore	ング Port	Stbd
Dratts						
DP: DS:	0,00 m 0.00 m		0.00 m			
			0,00 111		$\rightarrow$	
		l	0,00 m			
Max draft:	0,00 m					
Seawater den	sity: 1025,0 kg/m <sup>3</sup>					
Ship LPP/Wid	th: 280 m / 32 m					

Figure 4-19: Draft & Trim/List view

### 4.6 Line/Vapor pressure

If the system has line and/or vapor pressures configured, these can be viewed by opening menu **System->View line pressures** & **System->View vapor pressures**. Figure 4-20 below shows the line pressures.

				HIHI-PRE	SSURE		HI-PRESS		
	Name T	Туре т	Pressure	Limit		On/Off	Limit		On/Off
>	BP_2 🦞	Line	0,3 Bar	Ø	2,0 Bar		Ø	1,0 Bar	
	BP_3 🦞	Line	0,9 Bar	Ø	2,0 Bar		Ø	1,0 Bar	
	BP_4	Line	-0,6 Bar		2,0 Bar		Ø	1,0 Bar	
	FIRE_P	Line	0,6 Bar	Ø	2,0 Bar		Ø	1,0 Bar	
	MAN1_P	Line	-0,1 Bar		2,0 Bar			1,0 Bar	
	MAN1_S	Line	-0,5 Bar	Ø	2,0 Bar		D	1,0 Bar	
	MAN2_P	Line	-0,5 Bar	Ø	2,0 Bar			1,0 Bar	
	MAN2_S	Line	0,4 Bar	Ø	2,0 Bar		D	1,0 Bar	
	MAN3_P	Line	-0,4 Bar	Ø	2,0 Bar			1,0 Bar	
	MAN3_S	Line	-0,3 Bar	Ø	2,0 Bar		D	1,0 Bar	
	MAN4_P	Line	-0,3 Bar	Ø	2,0 Bar		67	1,0 Bar	
	MAN4_S	Line	0,6 Bar	Ø	2,0 Bar		Ø	1,0 Bar	
	MANE D	1:	0 0 D	~	3 A B		~	400	

Figure 4-20: Line pressures

This view shows all line pressures of the system. Alarm limits are also displayed, and adjustable if the cell has the pencil symbol. If a line has an alarm it is indicated by an alarm icon next to the name (As is the case for BP\_2 and BP\_3 in the example above).

To monitor specific line(s) right click the line to show a context menu and click **View details** (Figure 4-21):

	Name	Ŧ	Туре	Ŧ
>	BP_2	V	Line	
	BP_3		Line	
	BP_4	View	details	

Figure 4-21: Line pressure context menu

This opens the faceplate for the line (Figure 4-22):

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Figure 4-22: Line pressure faceplate

The current pressure is displayed on the gauge, together with the set alarm limits (Indicated by the H and HH icons in the above example). Additionally, the line pressure is graphed over time, with a selectable time range.

# 5 ALARM SYSTEM

This chapter describes the operation and usage of the alarm system in CARGOMASTER®. The alarm system is used to inform the operator of abnormal situations, system failures, values outside limits, etc. The system includes a buzzer (audible alarm) which is triggered when a new alarm is active. Depending on the configuration, also external lights might be connected and triggered by certain alarms.

### 5.1 Alarm types

The various types of alarms in the system are:

- Limit: Alarms triggered when a measurement value is above or below a set limit (I.e. on tank volume %). Normally these types are configured:
  - HiHi: Critical priority alarm, triggered when value above the limit
  - $\circ$  Hi: High priority alarm, triggered when value above the limit
  - Lo: High priority alarm, triggered when value below the limit
  - o LoLo: Critical priority alarm, triggered when value below the limit
  - State: Alarms triggered by a change in state. Examples:
    - o Out of range alarm on sensor: Sensor is outside the specified range
    - Sensor Disabled: Alarm on a tank indicating a sensor has been disabled
    - o IO alarm: Alarms indicating failure in communication with IO system.

### 5.2 Severities & States

An alarm can have one of three different severities: Critical, High and Medium. Additionally, alarms can be shelved which means the alarm is hidden from the main alarm view for a specified time (See Chapter X). To display alarm information in the user interface icons for each severity are used and shown below:

Table 1: Alarm severity icons

Critical	High	Medium	Shelved
A	V	•	

In addition to having a given severity, an alarm is always in one of five states. Table 2 shows the states and how the alarm is presented depending on the state.

Table 2: Alarm states

State	Description	Display Icon	List color
Passive	The alarm is passive.	None	Not visible in lists
Active	The alarm is active, the initial state after the alarm limit is violated.	Critical, High or Medium depending on alarm severity.	Blinking Red, yellow or turquoise.
Acknowledged	The alarm is still active, but the user has acknowledged the alarm.	Critical, High or Medium depending on alarm severity.	Steady Red, yellow or turquoise.
Returned	The alarm was active and unacknowledged by the user but the value has returned below the alarm limit threshold.	Critical, High or Medium depending on alarm severity.	Black/white.
Shelved	The alarm has been put on the shelve list by the user.	The shelved icon.	Steady Red, yellow or turquoise. <sup>1</sup>

The various states and the triggers for transitions from one state to another is illustrated in the figure below (Figure 5-1).



Figure 5-1: Alarm state diagram

<sup>&</sup>lt;sup>1</sup> Shelved alarms are not visible in the normal alarm lists, only in the shelved list.

#### 5.3 Main view

Figure 5-2 shows the main view of the application with the following alarm information present:

- 1. This shows an overview of the total number of alarms in the system:
  - a. See Table 1 for description of the different icons.
  - b. The number next to each icon is the number of alarms for this severity.
  - c. In the case of zero alarms, the icon is colored grey.
- 2. The alarm icon next to the tank name indicates that tank CT1\_P has one (or more) alarms, where the highest severity is critical.
- 3. The alarm icon next to the volume % indicates that the tank CT1\_P has one (or more) alarms on the volume %, where the highest severity is critical.
- 4. Shows the top 3 active alarms, colored according to Table 2.
- 5. Open the alarm menu with the following options:
  - a. Details List: Opens a detailed alarm list as a separate popup
  - b. Shelve alarm: Shelves the selected alarm in area #4
- 6. Silences the alarm buzzer
- 7. Acknowledges the selected alarm in area #4

	C Trim (aft): 0,00 m	List (port): 0,0 °/0,00 r	Max draft: n 0,00 m	12:32:46	Alarms:	17 <b>0</b> 0 <b>0</b> 0	ation: NO01NBTH	EODA02 CAR	GOMASTER KR Version: 1.2.0	⊐ × ROHNE Marine
	Value Table	Bar Grap	hs 🍄 Cargo	⁰� Ballast	₽� Fuel Oil	Report	N History			$\bigcirc$
	View: Cargo [ALL]	▼ Filte	ering: Any tank	▼ Any type	▼ Any content	<ul> <li>Any operation</li> </ul>	on 🔻 Clear all filter	-3		
	Name	Туре	Content	Operation	Vol %	Volume	Level	Weight	Ullage	▲
121	CT1_P	🛕 Cargo		Discharging	3 0%	0,00 m <sup>3</sup>	0,00 m	0,00 MT	18,00 m	lues
الك	CT1_S	🛕 Cargo		Discharging	0 % 🛕	0,00 m <sup>3</sup>	0,00 m	0,00 MT	18,00 m	Þ
	CT2_P	🤨 Cargo	Coca Cola	Loading	Ø 47 %	8000,00 m <sup>3</sup>	Ø 8,00 m	7840,00 MT	🖉 10,00 m	Jarm
	CT2_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	17000,00 m <sup>3</sup>	17,00 m	17000,00 MT	1,00 m	Lim
	CT3_P	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3070,60 m <sup>3</sup>	16,04 m	3070,60 MT	1,96 m	its]
	CT3_S	🤨 Cargo	Coca Cola	Loading	100 %	3077,60 m <sup>3</sup>	16,04 m	3077,60 MT	1,96 m	- ≥
	CT4_P	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3083,20 m <sup>3</sup>	16,04 m	3083,20 MT	1,96 m	arm
	CT4_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3076,40 m <sup>3</sup>	16,04 m	3076,40 MT	1,96 m	[Enab
	CT5_P	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3076,40 m <sup>3</sup>	16,05 m	3076,40 MT	1,95 m	oled]
	CT5_S	🛕 Cargo	Coca Cola	Loading	100 % 🛕	3083,20 m <sup>3</sup>	16,04 m	3083,20 MT	1,96 m	
	CT6_P	🛕 Cargo		Discharging	0 % 🛕	0,00 m <sup>3</sup>	0,00 m	0,00 MT	18,00 m	
	Sum/Avg:				79 %	68441,00 m <sup>3</sup>	12,93 m	68281,00 MT	4,48 m	T
	•								•	
	Alarm time	Priority	Area Nam	е Туре	Description	n Limit	Current	State St	tate time Opera	tor
	> 25.09.2019 12:2	7 High	Lines VAP	5.PRESS State	e Out of rai	nge True	True	Active 2	5.09.2019 12	
4	25.09.2019 12:27:	3 High	Lines VAP	_3.PRESS_S State	e Out of ran	ige True	True	Active 2	5.09.2019 12:2	
	20.09.2019 13:35:	0 High	Tanks CT2	S.Volume Hi	Value abo	ve Hi limit 95 %	100 %	Active 2	0.09.2019 13:5	
	Operation 🔹	View	• Repor	t 🔹	System 🔹	Alarm 🔹	Silence Alarm	Ack Alarm	Help	•
Q (=) (						5	6	7		

Figure 5-2: Alarm information

#### 5.3.1 Main alarm list

The main alarm list (#4 in Figure 5-2) shows the top three active alarms. Alarms are sorted by the following rules:

- First all the alarms are sorted by state in this order: Active, Acknowledged, Returned
- Then the alarms are sorted by severity in this order: Critical, High, Medium
- Last, the alarms are sorted by time.

#### 5.3.2 Icon context information

When the mouse is placed over an alarm icon, more information is shown. Figure 5-3 shows an example: Volume % of tank CT1\_S has two alarms: HiHi and Hi.

View: Cargo [ALL]		Filtering: Any t	ank 🔻 A	ny type	• An	y content 🔻 🔻	ny operation 🔻 Cle	ear all filter
Name	Туре	Content	Operation	Vol %		Volume	Level	Weigh
CT1_P	🛕 Cargo	Sulfuric acid	None		100 % 🛕	17000,00 m <sup>3</sup>	17,00 m	31
CT1_S	🛕 Cargo	Sulfuric acid	None		100 % 🛕	17000,00 m <sup>3</sup>	17,00 m	314
CT2_P	Cargo	Coca Cola	None		48 % F	Alarms (2)		
CT2_S	Cargo	Coca Cola	None		100 %	Critical		
CT3_P	Cargo	Coca Cola	None		100 %	T1_S.Volume HiHi	Value above HiHi limit	Active
CT3_S	Cargo	Coca Cola	None		100 %	CT1_S.Volume Hi	Value above Hi limit	Active (
			1	Ζ/		1		1
		Mouse ov	er tooltip	Y				

Figure 5-3: Alarm icon tooltip

### 5.4 Details list

In a situation where many alarms are active, it is possible to open a popup window with more alarm information. To open this list (shown below in Figure 5-4) press **Alt-F11** or **Alarm->Details List** menu.

	Alarm time 🔻	Priority 🔻	Area 🔻	Name T	Туре 🔻	Description <b>T</b>	Limit	Current	State 🔻	St
	01.10.2019 11:18:04	Critical	Tanks	CT1_S.Volume	HiHi	Value above HiHi limit	98 %	100 %	Active	
	01.10.2019 11:17:44	Critical	Tanks	CT1_P.Volume	HiHi	Value above HiHi limit	98 %	100 %	Active	0
>	02.10.2019 07:00:17	High	Tanks	CT2_P.Volume	Hi	Value above Hi limit	45 %	48 %	Active	0
	02.10.2019 06:50:35	High	Lines	VAP_1.PRESS_S	State	Out of range	True	False	Returned	0
	02.10.2019 06:50:35	High	Lines	VAP_4.PRESS_S	State	Out of range	True	True	Returned	0
	02.10.2019 06:50:35	High	Lines	VAP_2.PRESS_S	State	Out of range	True	False	Returned	0
	02.10.2019 06:49:03	High	Lines	VAP_5.PRESS_S	State	Out of range	True	False	Returned	0
	02.10.2019 06:49:03	High	Lines	VAP_3.PRESS_S	State	Out of range	True	False	Returned	0
	01.10.2019 11:21:10	High	Lines	VAP_6.PRESS_S	State	Out of range	True	False	Returned	0
	01.10.2019 11:17:45	Medium	Tanks	CT1_P.Volume	Hi	Value above Hi limit	95 %	100 %	Returned	0

Figure 5-4: Alarm details list

The list shows all alarms present in the system, colored according to Table 2. The functions in the details list are (referring to numbers in Figure 5-4):

- 1. Select between Live and History tab
  - a. Live shows the current alarm situation
  - b. History shows the historical alarms (See chapter 0)
- 2. Select the alarms to display:
  - a. Active alarms: The default view. Shows all alarms except shelved/suppressed.
  - b. Shelved alarms: Shows only the shelved alarms.
  - c. Suppressed alarms: Shows only the suppressed alarms.
  - d. All alarms: Shows all alarms, including shelved & suppressed.
- 3. The column header can be clicked:
  - a. Clicking the name will sort by this column
  - b. Clicking the T icon will open a menu where filters can be applied to this column
- 4. Acknowledges all visible alarms in the list
- 5. Acknowledge the selected alarm
- 6. Shelve the selected alarm
- 7. Unshelve the selected alarm

The alarm list contains a context menu which is shown when an alarm is right-clicked:

Live       History         View:       Active alarms         Alarm time       T         Priority       T         Priority       T	
View: Active alarms           Alarm time       Priority       Area       Name       Type         01.10.2019       11:18:04       Critical       Tanks       CT1_S.Volume       Hill	
Alarm time     Priority     Area     Name     Type       01.10.2019     11:18:04     Critical     Tanks     CT1_S.Volume     Hill	
01.10.2019 11:18:04 Critical Tanks CT1_S.Volume Hil	e 🔻
	łi
> 01.10.2019 11:17:44 Critical Tanks CT1_P.Volume Hil	-li
01.10.201 Acknowledge Tanks CT1_P.Volume Hi	
Shelve	
Unshelve	
Open associated object	

Figure 5-5: Alarm list context menu

It has these options:

- Acknowledge: Acknowledges the clicked alarm
- Shelve: Shelves the clicked alarm
- **Unshelve:** Unshelves the clicked alarm
- **Open associated object**: Opens the faceplate for the object with the alarm (In the example above would open the faceplate for tan CT1\_P).

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#### 5.4.1 Historical alarms

By selecting the **History** tab, the view changes to display of historical alarms shown in Figure 5-6 below. The history contains the last 10 000 alarm events and can be used as a diagnostic/troubleshooting tool.

ive History								
y alarm 🔻 Any obje	ct 🔻 Any	area	<ul> <li>Any priori</li> </ul>	ty 🔻 Clear all filte	rs			
State time 🔻	State	Priority 🔻	Area 🔻	Name 🔻	Alarm Limit	Alarm Enabled	Туре 🔻	Description
24.09.2019 06:35:51	Active	High	Lines	VAP_3.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:33:47	Active	High	Lines	VAP_6.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:29:30	Passive	High	Lines	VAP_6.PRESS_SENSOR	True	$\checkmark$	State	Out of range
24.09.2019 06:29:30	Passive	High	Lines	VAP_3.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:28:45	Acknowledged	High	Tanks	CT3_P.Volume	95 %		Hi	Value above Hi limit
24.09.2019 06:28:44	Acknowledged	High	Tanks	CT4_S.Volume	95 %		Hi	Value above Hi limit
24.09.2019 06:28:43	Acknowledged	High	Tanks	CT5_S.Volume	95 %	$\searrow$	Hi	Value above Hi limit
24.09.2019 06:28:42	Acknowledged	High	Lines	VAP_6.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:28:38	Acknowledged	High	Lines	VAP_3.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:27:26	Returned	High	Lines	VAP_4.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:23:30	Active	High	Lines	VAP_4.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:21:56	Active	High	Lines	VAP_3.PRESS_SENSOR	True		State	Out of range
24.09.2019 06:21:46	Returned	High	Lines	VAP_2.PRESS_SENSOR	True		State	Out of range
23.09.2019 12:51:28	Active	High	Lines	VAP_2.PRESS_SENSOR	True		State	Out of range
22.00.2040 42.54.20	A _4:	110-6	1	VAD C DECC CENCOD	т	E.A.	C4-4-	A. 4 - 4

Figure 5-6: Historical alarm list

The view can be filtered by a specific alarm, object, area or priority using the drop-down menus. In addition, the view has a context menu shown below (Figure 5-7) which can be used to quickly add filters based on the selected/clicked alarm.

Liv	e History					
Any	alarm 🔻 Any ob	ect 🔻 Any	area	<ul> <li>Any priori</li> </ul>	ty 🔻 Clea	r all filte
	State time 7	State	Priority <b>T</b>	Area 🔻	Name	т
	24.09.2019 06:29:30	Passive	High	Lines	VAP_6.PRESS_SE	NSOR
>	24.09.2019 06:29:30	Passive	High	Lines	VAP_3.PRESS_SE	NSOR
	24.09.2019 06:28:	Filter by	•	This alarm		
	24.09.2019 06:28:	Remove Filter		This object (VAP_3.PRESS_SENSOR)		
	24.09.2019 06:28:45	Open associated ob	ject ·	This priority (High)		
	24.09.2019 06:28:42	Acknowledged	High	This area (Lines)	VAP_0.PKESS_SE	NSOR

Figure 5-7: Historical alarm context menu



### 5.5 Alarm shelving

Alarm shelving is the process of removing and alarm from the main display lists and putting it on a "shelf". As an example, this can be used in the case of a faulty sensor for a tank. In this case a service attendance might be required, which will be done after some weeks. In the meantime, the operator is aware of the alarm (and might have also disabled the sensor on the tank to enable manual input) and can shelve it to remove it from the main lists. Shelving is always done using a specified time duration, such that after the specified time the alarm reappears on the main alarm lists.

#### Note: Shelving is not possible for critical alarms.

When shelving an alarm, the following prompt is shown:

Shelve	×
CT1_S.Volume - Hi - Value	e above Hi limit
Select shelve duration:	Select time span
Reason for shelving:	
	Ok Cancel

Figure 5-8: Shelve alarm prompt

The operator must enter two things to be allowed to shelve:

- 1. The shelve duration. This is the time after which the alarm will be automatically removed from the shelve list and re-appear on the main alarm lists.
- 2. Enter a text describing the reason for shelving this alarm. E.g. "Service scheduled for date X".

### 5.6 Testing of alarms

During commissioning of CARGOMASTER® system, replacement of sensors etc, it is normally advised to perform tests of the alarm limits.

Example on how to test 95% high level alarm and 98% high high level alarm by disabling tank radar:

#### 5.6.1 Disable tank level radar.

From "Value Table" view, right-click desired tank name, then click "View tank details". In tank detail window appearing, select "Service" and uncheck "Enabled" for Radar:

CT1_P								:	×
Over	view Ala	arms	Trend	Calculator	Service		<b>A</b> 2 <b>V</b> 4	00	0
Sens	or Inputs	Densit	y Sizes	s Tags	Alarms	Attributes			
Name	Туре	Enabled	Raw value	Sensor value	Filtered value	Filter Factor	DL [m]	DT [m]	C
Inert	Inert		2902,52	0 mBar 😣					
Radar	Radar		6,35 m	6,35 m	6,35 m	35	0.000	0.000	a
BT	Temperature	$\checkmark$	1079,30	19,9 °C			0.000	0.000	1
MT	Temperature	$\checkmark$	1079,30	20,1 °C			0.000	0.000	a
UT	Temperature	$\checkmark$	1079,30	20,2 °C			0.000	0.000	9
Sensor Filtering									
Current		0 1 2	3 4 5 6	7 8 9 10	+ 0 means	s minimal (no) s m. The default	ensor filte	ering, 10 each mo	de
Defaults	0 1 2 3 4 5 6 7 8 9 10 maximum. The default values for each mode Defaults None: 7 Loading: 2 Discharging: 2								
Area: Tan	ks								

Figure 5-9: Disabling tank level radar

Alarm "Sensor Disabled" will now appear:

Alarm time	Priority	Area	Name	Туре	Description	Limit	Current
01.07.2021 12:31:24	High	Tanks	CT1_P.Radar	State	Sensor Disabled	True	True

Figure 5-10: Sensor Disabled alarm

#### 5.6.2 Set tank volume % manually.

From "Value Table" view, write manual Vol% for the same tank as pt 5.6.1, starting with 96% for testing the 95% (Hi) alarm limit.

"Hi" alarm will now appear for this tank:

Alarm time	Priority	Area	Name	Туре	Description	Limit	Current
01.07.2021 12:32:32	High	Tanks	CT1_P.Volume	Hi	Value above Hi limit	95 %	96 %

Figure 5-11: Hi alarm

Perform the same for 98% (HiHi) alarm limit by manually entering 99%, "HiHi" alarm will appear:

	Alarm time	Priority	Area	Name	Туре	Description	Limit	Current
	01.07.2021 12:33:19	Critical	Tanks	CT1_P.Volume	HiHi	Value above HiHi limit	98 %	99 %
_				-				

Figure 5-12: HiHi alarm

#### 5.6.3 Enable tank level radar.

After completion of testing the alarm limits, tank level radar must be enabled in order to have correct sensor readings.

Perform reverse operation of pt 5.6.1 and make sure "Enabled" is checked for the radar. "Sensor disabled" alarm will now disappear.

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# 6 VALVE CONTROL

This chapter describes the operation of the valve control part of the system. Note that, depending on the system this might not be configured. An example of a layout view of the ballast system is shown in Figure 6-1. It shows the ballast tanks, the piping, valves and pumps. The view consists of various components which are color coded to indicate whether valves are open or closed. Pipes connected to tanks shows the same color as content in the tank for easy identification.



Figure 6-1: Ballast layout view

### 6.1 Valves

Three different valves are supported:

- On/off valve: A remote controlled on/off valve.
- **Throttle valve**: A remote controlled throttle valve.
- Manual valve: A manual on/off valve. Note: No remote control but can be set for indication.

To control the valves, click the symbol and a popup menu according to the clicked valve will show.

### 6.1.1 On/off valve

The on/off valve symbol is shown below (Figure 6-2).



Figure 6-2: On/off valve

It has four states:



- 1. **Closed**: The valve is closed. The circle around it is grey and the angle of the valve symbol is 90° relative to the input/output pipes. The color of the output pipe is grey.
- 2. **Travelling**: The valve is travelling (between open and closed position). The circle around is animated with a dashed line to indicate valve movement. The valve symbol is angled 45° relative to the input/output pipes. The circle around it is colored according to the pipe, and the color of the output pipe is set equal to the input.
- 3. **Open**: The valve is open. The valve symbol is angled 0° relative to the input/output pipes. The circle around it is colored according to the pipe, and the color of the output pipe is set equal to the input.
- 4. **Unknown**: The position of the valve is unknown. The valve symbol is angled 45° relative to the input/output pipes. The circle around is colored according to the pipe, and the color of the output pipe is set equal to the input.

# When the valve is in the unknown position, the cause is likely due to a failure of the valve or the external valve control system. Check for alarms or check external valve control system for details.

Clicking the valve opens the context menu shown below (Figure 6-3):

- Valve Position: Shows the valve current position
- Valve Operation: Press **Open** or **Close** to issue a command to the valve system to open or close the valve.

Context Menu		Faceplate	(popup)			
801-B130	801-B130		×			
Claud	Operatio	on Service	<b>A</b> 0 <b>V</b> 0 <b>O</b> 0 <b>O</b> 0			
801-B130 🗖 🗙	Valve Po	osition				
Valve Position Closed	0	Closed				
Valve Operation						
Open Close	Valve O	peration				
1		Close Open				

Figure 6-3: On/off valve context menu & faceplate

The context menu opens next to the valve and is closed if another context menu is opened. If desired the faceplate for the valve can be opened as a popup window by clicking the maximize icon on the context menu (See Figure 6-3). This window has the same information as the context menu but can be kept open.

#### 6.1.2 Throttle valve

The throttle valve is shown below (Figure 6-4).



Figure 6-4: Throttle valve

The symbol has these states:

- 1. **Fully closed**: The valve opening is shown as 0 %. The circle around it is grey and the angle of the valve symbol is 90° relative to the input/output pipes. The color of the output pipe is grey.
- 2. **Partially open**: The actual valve opening is shown (45 % in this case, and the valve symbol is angled 45° relative to the input/output pipes. The circle around it is colored according to the pipe, and the color of the output pipe is set equal to the input.
- 3. **Fully open**: The valve is open, shown by 100 % opening. The valve symbol is angled 0° relative to the input/output pipes. The circle around it is colored according to the pipe, and the color of the output pipe is set equal to the input.

Clicking the valve opens the context menu shown below (Figure 6-5):

- Valve Position: Shows the valve current position
- Valve Setpoint: Used to control the set point of the valve. The current setpoint is shown in percentage next to the slider (30 % in this case). Use the ++/-- buttons to adjust setpoints in ± 10 % steps or +/- to adjust in ± 1 % steps. Alternatively drag the slider to the desired set point.



Figure 6-5: Throttle valve context menu & faceplate

The context menu opens next to the valve and is closed if another context menu is opened. If desired the faceplate for the valve can be opened as a popup window by clicking the maximize icon on the context menu (See Figure 6-5). This window has the same information as the context menu but can be kept open.

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#### 6.1.3 Manual valve

This valve has no feedback or remote control from the real physical valve and is only used as a manual/tick-off valve in the diagrams. The manual tick of valve symbol is shown below (Figure 6-6). To easily separate it from actual remote-controlled valves it does not have the circle around, and it has the text **Manual** next to the set position (open or closed).



Figure 6-6: Manual valve

It has two states:

- 1. **Closed**: Valve symbol is colored grey and the color of the output pipe is grey.
- 2. **Open**: Valve symbol is colored according to the pipe, and the color of the output pipe is set equal to the input.

Clicking the valve opens the context menu shown below (Figure 6-7):

• Valve indication: Shows the manually set position of the valve (Open or Closed). Click the **Open** or **Close** button to change the indicated position.

Context Menu	Faceplate	(popup)
	A129	×
A129 Manual:	Indication Service	<b>A</b> 0 <b>V</b> 0 <b>O</b> 0 <b>O</b> 0
A129 X Valve Indication Closed	Valve indicated position Closed	Note: This valve is not remote controlled, only manual indication.
Note: This valve is not remote 3-A726 controlled Open Close losed	Valve indication Close Open	

Figure 6-7: Manual valve context menu & faceplate

The context menu opens next to the valve and is closed if another context menu is opened. If desired the faceplate for the valve can be opened as a popup window by clicking the maximize icon on the context menu (See Figure 6-7). This window has the same information as the context menu but can be kept open.

### 6.2 Other Symbols

Depending on the configuration, the layout might contain other symbols than tanks and valves. Figure 6-8 shows the most common symbols. These symbols do not have any function and are purely used

for visualization. They follow the regular coloring rules of piping, one exception is the sea chest, which is a source of sea water and thus has a blue color (Similar to a tank).



Figure 6-8: Layout symbols

# 7 HISTORICAL DATA

To access and trend historical data navigate to the **History** tab of the main view. This view lists all available tags for trending, shown under the Available tags heading, the list can be filtered using the search box.

Double-clicking the desired tag to add it to the chart, up to 6 tags can be viewed simultaneously. To remove a tag from the chart, click the X icon on the legend above the chart.

Use the **From**, **Time period** and **To** options below the chart to select the desired time range. The chart can also be dragged using the mouse to adjust the time.



Figure 7-1: Historical data trending

## 8 **REPORTS**

The reports of the system are available under the **Reports** tab of the main view. Currently one report is available: Survey Report.

### 8.1 Survey Report

To generate the survey report, select **Survey Report** and click **Show** button which open this prompt:

	-			×
Survey Report P	arameters	5		
Content	(select)			•
Loading Port				
Weight in air				
		Ok	C	ancel

Figure 8-1: Survey report parameters

Select the desired content, enter the loading port and click **Ok** to generate the report. If weight in air is desired, select the checkbox next to it, otherwise weight in vacuum is displayed. An example is shown below (Figure 8-2):

Value Table 🖬 Bar Graphs	Cargo 🍄 Ball	last 🍄	Fuel Oil	Report	N History		$\overline{\mathbf{v}}$
Report type: Survey Report 🔻 Show							
	) 🖶 🚽						Ŧ
							<b></b>
		Skarpefjord					
	Su	rvey Rep	ort		KROHNI Marine		
	02	.10.2019 11:37	26				
Port of Loading: Cargo Content:	Brevik Sulfuric acid						
Density @ 15 C	: 1842,3 kg/m³						
Density Settings	C 0.00 m Linte	0.0.0					
Max Draft:	0,00 m List.	0,0					
Tank	Ullage [m]	Volume [m³]	Volume [m³]	Density [kg/m³]	Weight (MT)	Temp [°C]	
CT1_P	1,00	17000,00	17000,00	1848,5	31423,68	21,3	
CT1_S	1,00	17000,00	17000,00	1850,7	31461,21	23,6	
CT6_S	1,96	3075,70	3075,70	1844,3	5672,42	17,0	
CT7_P	1,96	3075,70	3075,70	1851,2	5693,77	24,2	
CT7_S	1,96	3082,60	3082,60	1850,8	5705,33	23,8	
Total/Avg	1,58	43234,00	43234,00	1849,1	79956,41	22,0	
							T
						•	▶ 100 % ▼

Figure 8-2: Survey Report

### 8.2 Summary Report

The summary report is used to show the tank parameters (Volume, weight, etc.) at the start/end and the change over a time period, f.ex. before and after a loading operation.

To generate the summary report, select **Summary Report** and click **Show** button which open this prompt:

	-	×
Summary Repo	ort Parameters	
Location		
From Date	Enter date	
To Date	Enter date	
Weight in air		
	Ok	Cancel

Figure 8-3: Summary Report parameters

Select the (optionally) location, enter the From/To data and click **Ok** to generate the report. If weight in air is desired, select the checkbox next to it, otherwise weight in vacuum is displayed. An example is shown below (Figure 8-4):

Note: This report uses historical data, if historical data is not available for the provided time range it will not be present on the report (Default historical data is available for the last 90 days).

art type: Sum				♥ Danast	-0	Fuel Oil	E Re	oort	N History						
Sictipo.	mary Report 🔻	Show													
⊕ ⊕ ⊗ C	<b>)   4 4</b> 1	of 3 🕨 🕨 💷 🛅 🖶	•												
						S	karpefiord								
						Summ	arv Re	nort					[	KROHNE	
				10.01	2022.00	00.00		10.01.2	022 22:00:00					Marine	
				10.01.	2022 00		10	10.01.2	022 22.00.00						
	Location:	Brevik													
		Start	End												
	Time:	10.01.2022 00:00:00	10.01.2	022 22:00:00											
	Trim:	0,7 °	0,3 °												
	List:	0,2 °	0,3 °												
	Max Draft:	0,51 m	0,23 m												
						Contor	t Dotoilo								
						Conter Star	nt Details		En	d		Trans	sferred		
	Tank	Density settings [M	T/m³ (air),'	°C,1/°C]	Vo	Conter Star lume [m³]	nt Details t Weight (a	air)	Ene Volume [m³]	d Weig	ht (air)	Trans Volume [m <sup>3</sup>	sferred '] Weigh	nt (air)	
	Tank	Density settings [M	<b>T/m³ (air)</b> ,	° <b>C,1/°C]</b>	Vo	Conter Star Iume [m <sup>3</sup> ]	nt Details t Weight (i	air) AT]	End Volume [m³] 8 39	d Weig	ht (air) [MT]	Trans Volume [m <sup>3</sup>	sferred ] Weigh	nt (air) [M1]	
	Tank Cola Zero Unknown	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15	<b>T/m³ (air),</b> ,0 OD2/RT	° <b>C,1/°C]</b> 2: 1,0039/25,0 2: 1,0039/25,0	Vo	Conter Star lume [m³] 9,29 15.89	t Details t Weight ( 0 0	air) AT] ,01	End Volume [m³] 8,39 16.03	d Weig	ht (air) [MT] 0,01 0.02	Tran: Volume [m <sup>2</sup> -0,9 0 1	sferred <sup>9</sup> ] Weigh 0 3	nt (air) [MT] 0,00	
	<b>Tank</b> Cola Zero Unknown	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15	<b>T/m³ (air),</b> ,0 OD2/RT ,0 OD2/RT	° <b>C,1/°C]</b> 2: 1,0039/25,0 2: 1,0039/25,0	Vo	Conter Star Iume [m <sup>a</sup> ] 9,29 15,89	nt Details t Weight ( 0 0 0	air) //T] .01 .01	End Volume [m³] 8,39 16,03	d Weig	ht (air) [MT] 0,01 0,02	Trans Volume [m <sup>3</sup> -0,9 0,1	<b>sferred</b> 7] Weigh 0 3	nt (air) [МТ] 0,00 0,00	
	<b>Tank</b> Cola Zero Unknown	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15	<b>T/m³ (air),</b> ,0 OD2/RT ,0 OD2/RT	° <b>C,1/°C]</b> 2: 1,0039/25,0 2: 1,0039/25,0	Vo	Conter Star lume [m³] 9,29 15,89 Car	nt Details t Weight ( 0 0 0 0 0 0	air) //T] ,01 ,01	End Volume [m³] 8,39 16,03	d Weig	ht (air) [MT] 0,01 0,02	Tran: Volume [m <sup>2</sup> -0,9 0,1	<b>sferred</b> "] Weigh 0 3	<b>t (air)</b> [MT] 0,00 0,00	
	<b>Tank</b> Cola Zero Unknown	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15	<b>T/m³ (air),</b> ,0 OD2/RT ,0 OD2/RT	°C,1/°C] 2: 1,0039/25,0 2: 1,0039/25,0 \$	Vo	Conter Star lume [m³] 9,29 15,89 Car	nt Details t Weight ( 0 0 0 0 go Tanks	air) AT] 01 01	Enc Volume [m³] 8,39 16,03	d Weig End	ht (air) [MT] 0,01 0,02	Tran: Volume [m <sup>2</sup> -0,9 0,1	sferred <sup>2</sup> ] Weigh 0 3 Transfe	nt (air) [M1] 0,00 0,00	
	Tank Cola Zero Unknown Tank	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15 Content	T/m <sup>3</sup> (air), ,0 OD2/RT ,0 OD2/RT Ullage	°C,1/°C] 2: 1,0039/25,0 2: 1,0039/25,0 S Volume 1	Vo tart Temp	Conter Star lume [m <sup>3</sup> ] 9,29 15,89 Car Density	nt Details t Weight ( 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	air) //T] /01 /01 Ullage	End Volume [m³] 8,39 16,03 Volume	d Weig End Temp	ht (air) [MT] 0,01 0,02 Density	Trans Volume [m <sup>2</sup> -0,9 0,1 Weight	sferred <sup>7</sup> ] Weigh 0 3 Transfe Volume	nt (air) [MT] 0,00 0,00 erred Weight	
	Tank Cola Zero Unknown Tank	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15 Content	T/m <sup>°</sup> (air), ,0 OD2/RT ,0 OD2/RT Ullage [m]	<sup>2</sup> C,1/°C] 2: 1,0039/25,0 2: 1,0039/25,0 2: 1,0039/25,0 S Volume [m <sup>3</sup> ]	Vo tart [°C]	Conter Star Jume [m³] 9,29 15,89 Car Density [MT/m³ (airl]	nt Details t Weight ( 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	air) /11] .01 .01 Ullage [m]	End Volume [m³] 8,39 16,03 Volume [m²]	d Weig End Temp [°C]	ht (air) [MT] 0,01 0,02 Density [MT/m3 (air)]	Trans Volume [m <sup>4</sup> -0,9 0,1 Weight (air)	sferred 7] Weigh 0 3 Transfe Volume [m <sup>2</sup> ]	nt (air) [MT] 0,00 0,00 erred Weight (air)	
	Tank Cola Zero Unknown Tank CT1_P	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15 Content Cola Zero	T/m³ (air), 0 OD2/RT 0 OD2/RT Ullage [m] 0,50	2 <b>C,1/°C]</b> 2: 1,0039/25,0 2: 1,0039/25,0 2: 1,0039/25,0 <b>S</b> Volume [m <sup>*</sup> ]	Vo tart [°C] 0,3	Conter Star 1ume [m <sup>*</sup> ] 9,29 15,89 Car Density [MT/m <sup>*</sup> (air)] 2,5429	nt Details t Weight ( 0 0 0 go Tanks Weight (air) [MT] 0,00	air) /17] .01 .01 Ullage [m] 0,74	Ent Volume [m³] 8,39 16,03 Volume [m²] 0,40	d Weig End Temp [°C] 0,9	ht (air) [MT] 0,01 0,02 [MT/m <sup>3</sup> (air)] 1,5511	Tran: Volume [m <sup>2</sup> -0,9 0,1 Weight (air) [MT] 0,00	sferred "] Weigh 0 3 Transfe Volume [m"] 0,01	t (air) [M1] 0,00 0,00 erred Weight (air) [M1] 0,00	
	Tank Cola Zero Unknown Tank CT1_P CT1_S	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15 Content Cola Zero Cola Zero	T/m³ (air), 0 OD2/RT 0 OD2/RT 0 OD2/RT Ullage [m] 0,50 0,23	<sup>2</sup> C,1/°C] 2: 1,0039/25,0 2: 1,0039/25,0 <b>S</b> Volume [m <sup>2</sup> ] 0,40 0,54	Vo tart Temp [°C] 0,3 0,9	Conter Star lume [m <sup>2</sup> ] 9,29 15,89 Car Density [MT/m <sup>2</sup> (air)] 2,5429 1,6509	nt Details t Weight ( 0 0 0 go Tanks Weight (air) [MT] 0,00 0,00	air) /17] /01 /01 /01 /01 /01 /01 /01 /01 /0,74 /0,19	Enc Volume [m³] 8,39 16,03 Volume [m³] 0,40 0,64	d Weig End Temp [°C] 0,9 0,6	ht (air) [MT] 0,01 0,02 Density [MT/m <sup>3</sup> (air)] 1,551 0,4031	Trans Volume [m <sup>2</sup> -0,9 0,1 Weight (air) [M1] 0,00 0,00	sferred 7 Weigh 0 3 Transfe Volume [m <sup>2</sup> ] 0,01 0,10	tt (air) [MT] 0,00 0,00 erred Weight (air) [MT] 0,00 0,00	
	Tank Cola Zero Unknown Tank CT1_P CT1_S CT2_P	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15 Content Cola Zero Cola Zero Cola Zero	T/m³ (air), 0 OD2/RT 0 OD2/RT 0 OD2/RT Ullage [m] 0,50 0,23 0,30	<sup>2</sup> C,1/ <sup>2</sup> C] 2: 1,0039/25,0 2: 1,0039/25,0 S Volume [m <sup>2</sup> ] 0,40 0,54 0,05	Vo tart [°C] 0,3 0,9 0,4	Conter Star 9,29 15,89 Car Density (air)] 2,5429 1,6509 2,4069	nt Details t Weight ( 0 go Tanks Weight (air) [MT] 0,00 0,00 0,00	air) 01 01 Ullage [m] 0,74 0,19 0,10	Enc Volume [m³] 8,39 16,03 Volume [m³] 0,40 0,64 0,28	d Weig End Temp ["C] 0,9 0,6 0,1	ht (air) [MT] 0,01 0,02 Density [MT/m <sup>3</sup> (air)] 1,5511 0,4031 2,9727	Tram Volume [m <sup>2</sup> -0,9 0,1 Weight (air) [MT] 0,00 0,00 0,00	sferred "] Weigh 0 3 Transfe Volume [m"] 0,01 0,01 0,23	nt (air) [MT] 0,00 0,00 erred Weight (air) [MT] 0,00 0,00 0,00	
	Tank Cola Zero Unknown Tank CT1_P CT1_S CT2_P CT2_S	Density settings [M OD1/RT1: 1,0089/15 OD1/RT1: 1,0089/15 Content Cola Zero Cola Zero Cola Zero Cola Zero Cola Zero	T/m³ (air), 0 OD2/RT 0 OD2/RT Ullage [m] 0,50 0,23 0,30 0,68	*C,1/*C] 2: 1,0039/25,0 2: 1,0039/25,0 2: 1,0039/25,0 8 Volume [m*] 1 0,40 0,54 0,56	tart Temp [°C] 0,3 0,9 0,4 0,1	Conter Star 9,29 15,89 Car Density (MTm <sup>3</sup> (air)] 2,5429 1,6509 2,4069 2,4069	nt Details t Weight ( 0 0 go Tanks Weight (air) [MT] 0,00 0,00 0,00 0,00	air) AT] 01 01 01 Ullage [m] 0,74 0,19 0,10 0,64	End Volume [m²] 8,39 16,03 16,03 Volume [m²] 0,40 0,64 0,28 0,32	d Weig End Temp [*C] 0,9 0,6 0,1 0,9	ht (air) [MT] 0,01 0,02 Density [MT/m <sup>2</sup> (air)] 1,5511 0,4031 2,9727 2,2025	Tran: Volume (m' -0.9 0,1 Weight (air) [MT] 0,00 0,00 0,00 0,000	sferred " Weigh 0 3 Transfe Volume [m <sup>2</sup> ] 0,01 0,10 0,23 -0,24	tt (air) [MT] 0,00 0,00 erred Weight (air) [MT] 0,00 0,00 0,00 0,00	

Figure 8-4: Summary Report

### 8.3 Value Table Report

The value table report shows values in the same format as in the "Values" view of the Value Table (See 4.1).

To generate the value table report, select **Value Table Report** and click **Show** button which open this prompt:

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Figure 8-5: Value Table Report parameters

Select the "Show draft" checkbox to include draft information on the report, select the desired Tank View (4.1.1) and click **Ok** to generate the report. An example is shown below (Figure 8-6):

Name     Type     Content     Operation     Content       CT1_P     Cargo     Cola Zero     Loading     Cola Zero       CT1_S     Cargo     Cola Zero     Loading     Cola Zero       CT1_S     Cargo     Cola Zero     Loading     Cola Zero       CT2_S     Cargo     Cola Zero     Loading     Cola Zero       CT3_P     Cargo     Cola Zero     Loading     Cola Zero       CT3_S     Cargo     Cola Zero     Loading     Cola Zero       CT3_S     Cargo     Cola Zero     Loading     Cola Zero       CT3_S     Cargo     Cola Zero     Loading     Cola Zero       CT4_S     Cargo     Cola Zero     Loading     Cola Zero       CT5_S     Cargo     Cola Zero     Loading     Cola Zero       CT5_S     Cargo     None     Cr5_S     Cargo     None       CT6_P     Cargo     None     Cr7_S     Cargo     None       CT8_S     Cargo     None     Cr8_S     Cargo     None       CT8_S     Cargo     None     Cr9_S     None       CT9_S     Cargo     None     Cr10_S     Cargo       CT6_P     Cargo     None     Cr13_S     Cargo       CT8_	Skan Value Tal	pefjord							
Name         Type         Content         Operation         Content           CT1_P         Cargo         Cola Zero         Loading         Cola Zero           CT1_S         Cargo         Cola Zero         Loading         Cola Zero           CT2_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         CT5_S         Cargo         None           CT5_S         Cargo         None         CT7_S         Cargo         None           CT7_S         Cargo         None         CT7_S         Cargo         None           CT7_S         Cargo         None         CT8_S         Cargo         None <th>Skar Value Tal</th> <th>pefjord</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Skar Value Tal	pefjord							
Name         Type         Content         Operation         Content           CT1_P         Cargo         Cola Zero         Loading         Cola Zero           CT1_S         Cargo         Cola Zero         Loading         Cola Zero           CT2_P         Cargo         Cola Zero         Loading         Cola Zero           CT2_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         CT5_S         Cargo         None           CT6_P         Cargo         None         CT7_S         Cargo         None           CT7_S         Cargo         None         CT8_S         Cargo         None           CT7_S         Cargo         None         CT8_S         Cargo         None <td>Value Tal</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Value Tal								
Name         Type         Content         Operation         Content           CT1_P         Cargo         Cola Zero         Loading         Cola Zero           CT1_S         Cargo         Cola Zero         Loading         Cola Zero           CT2_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_P         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         Cola Zero         None           CT5_S         Cargo         None         Cr6_S         Cargo         None           CT6_S         Cargo         None         Cr7_S         Cargo         None           CT7_S         Cargo         None         Cr8_S         Cargo         None           CT7_S         Cargo         None         Cr8_S         Cargo         None </td <td>10.01.202</td> <td>ble Repo</td> <td>ort</td> <td></td> <td></td> <td></td> <td>KROHNE</td> <td>1</td> <td></td>	10.01.202	ble Repo	ort				KROHNE	1	
Name         Type         Content         Operation         Content           C11_P         Cargo         Cola Zero         Loading         Cola Zero           C11_S         Cargo         Cola Zero         Loading         Cola Zero           C12_P         Cargo         Cola Zero         Loading         Cola Zero           C13_S         Cargo         Cola Zero         Loading         Cola Zero           C13_P         Cargo         Cola Zero         Loading         Cola Zero           C13_S         Cargo         Cola Zero         Loading         Cola Zero           C14_P         Cargo         Cola Zero         Loading         Cola Zero           C14_S         Cargo         Cola Zero         Loading         Cola Zero           C15_S         Cargo         None         C15_S         Cargo         None           C15_S         Cargo         None         C16_S         None         C17_S         Cargo         None           C17_S         Cargo         None         C17_S         Cargo         None         C18_S         Cargo         None           C17_S         Cargo         None         C18_S         Cargo         None         C19_S		22 10:10:12					Marine		
Name         Type         Content         Operation         Content           CT1_P         Cargo         Cola Zero         Loading         Cola Zero           CT1_S         Cargo         Cola Zero         Loading         Cola Zero           CT2_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_P         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         Cr5_S         Cargo         None           CT6_F         Cargo         None         Cr6_S         Cargo         None         Cr7_S           CT7_S         Cargo         None         Cr8_S         Cargo         None         Cr8_S           CT7_S         Cargo         None         Cr8_S         Cargo         None         Cr8_S           CT7_S         Cargo	10.01.202	22 10.19.15							
CT1_P         Cargo         Cola Zero         Loading         Cola Zero           CT1_S         Cargo         Cola Zero         Loading         Cola Zero           CT2_P         Cargo         Cola Zero         Loading         Cola Zero           CT2_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         CT5_S         Cargo         None           CT6_P         Cargo         None         CT7_S         Cargo         None           CT7_S         Cargo         None         CT8_S         Cargo         None           CT7_S         Cargo         None         CT9_S         Cargo         None           CT7_S         Cargo         None         CT9_S         Cargo	Volume [m³]	Rem. Volume [m³]	Rem. Weight [MT]	Target Vol. [m³]	Load Rate [m³/h]	Weight [MT]	Weight (air) [MT]	Ullage [m]	
CT1_5         Cargo         Cola Zero         Loading         Cola Ze           CT2_P         Cargo         Cola Zero         Loading         Cola Ze           CT2_F         Cargo         Cola Zero         Loading         Cola Zero           CT3_F         Cargo         Cola Zero         Loading         Cola Zero           CT3_F         Cargo         Cola Zero         Loading         Cola Zero           CT3_F         Cargo         Cola Zero         Loading         Cola Zero           CT4_F         Cargo         Cola Zero         Loading         Cola Zero           CT4_F         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         Cr5_S         Cargo         None           CT6_S         Cargo         None         Cr6_S         Cargo         None         Cr7_P           CT7_S         Cargo         None         Cr8_S         Cargo         None         Cr8_S           CT7_P         Cargo         None         Cr8_S         None         Cr8_S         Cargo         None         Cr8_S         Cargo	17000,00	0,00	0,00	16660,00	0,00	17119,35	17100,65	1,00	
CT2_P         Cargo         Cola Zero         Loading         Cola Zero           CT2_S         Cargo         Cola Zero         Loading         Cola Zero           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_S         Cargo         Cola Zero         Loading         Cola Zero           CT4_P         Cargo         Cola Zero         Loading         Cola Zero           CT4_P         Cargo         Cola Zero         Loading         Cola Zero           CT4_P         Cargo         Cola Zero         Loading         Cola Zero           CT5_F         Cargo         None         Cola Zero         Loading         Cola Zero           CT5_F         Cargo         None         Cola Zero         None         Cola Zero           CT6_F         Cargo         None         Cola Zero         None         Cola Zero           CT6_F         Cargo         None         Cola Zero         None         Cola Zero           CT7_F         Cargo         None         Cola Zero         None         Cola Zero         None           CT7_F         Cargo         None         Cola Zero         None         Cola Zero         None         Cola Zero	17000,00	0,00	0,00	16660,00	0,00	17148,92	17130,22	1,00	
CT2_5         Cargo         Cola Zero         Loading         Cola Ze           CT3_P         Cargo         Cola Zero         Loading         Cola Zero           CT3_5         Cargo         Cola Zero         Loading         Cola Zero           CT4_9         Cargo         Cola Zero         Loading         Cola Zero           CT4_5         Cargo         Cola Zero         Loading         Cola Zero           CT4_5         Cargo         Cola Zero         Loading         Cola Zero           CT5_5         Cargo         None         Cr5_5         Cargo         None           CT6_9         Cargo         None         Cr7_5         Cargo         None         Cr7_5           CT7_5         Cargo         None         Cr7_5         Cargo         None         Cr7_5           CT7_5         Cargo         None         Cr7_5         Cargo         None         Cr7_5           CT7_5         Cargo         None         Cr8_5         None         Cr9_5         Cargo         None         Cr9_5           CT9_5         Cargo         None         Cr9_5         None         Cr9_5         Cargo         None         Cr10_7         Cr10_5         Cargo         <	17000,00	0,00	0,00	16660,00	0,00	17135,91	17117,21	1,00	
CT3_P         Cargo         Cola Zero         Loading         Cola Ze           CT3_S         Cargo         Cola Zero         Loading         Cola Ze           CT4_P         Cargo         Cola Zero         Loading         Cola Zero           CT4_S         Cargo         Cola Zero         Loading         Cola Zero           CT5_P         Cargo         Cola Zero         Loading         Cola Zero           CT5_S         Cargo         None         Craft         Cola Zero           CT5_S         Cargo         None         Craft         Cola Zero           CT6_S         Cargo         None         Craft         Cola Zero           CT6_S         Cargo         None         Craft         Cola Zero           CT7_P         Cargo         None         Craft         Cola Zero           CT7_S         Cargo         None         Craft         Craft           CT8_S         Cargo         None         Craft         Craft           CT9_P         Cargo         None         Craft         Craft           CT8_S         Cargo         None         Craft         Craft           CT9_S         Cargo         None         Craft <td< td=""><td>17000,00</td><td>0,00</td><td>0,00</td><td>16660,00</td><td>0,00</td><td>17116,30</td><td>17097,60</td><td>1,00</td><td></td></td<>	17000,00	0,00	0,00	16660,00	0,00	17116,30	17097,60	1,00	
CT3_5         Cargo         Cola Zero         Loading         Cola Ze           CT4_P         Cargo         Cola Zero         Loading         Cola Ze           CT4_S         Cargo         Cola Zero         Loading         Cola Ze           CT5_5         Cargo         None         Cola Zero         Loading         Cola Zero           CT5_F         Cargo         None         None         Cola Zero         Loading         Cola Zero           CT5_5         Cargo         None         None         Cola Zero         None         Cola Zero           CT6_5         Cargo         None         None         Cola Zero         None         Cola Zero           CT6_5         Cargo         None         None         Cola Zero         None         Cola Zero           CT7_5         Cargo         None         None         Cola Zero         None         Cola Zero           CT6_5         Cargo         None         None         Cola Zero         None         Cola Zero           CT7_5         Cargo         None         None         Cola Zero         None         Cola Zero           CT8_5         Cargo         None         Corgo         None         Cola Zero	2404,57	604,62	608,22	3009,19	1059,76	2418,91	2416,26	5,69	
CT4_P         Cargo         Cola Zero         Loading         Cola Ze           CT4_S         Cargo         Cola Ze         Loading         Cola Ze           CT5_P         Cargo         None         Cargo         None           CT5_S         Cargo         None         Cargo         None           CT6_P         Cargo         None         Cargo         None           CT6_S         Cargo         None         Cargo         None           CT7_S         Cargo         None         Cargo         None           CT7_S         Cargo         None         Cargo         None           CT7_S         Cargo         None         Cargo         None           CT8_S         Cargo         None         CT9_S         Cargo         None           CT9_S         Cargo         None         CT9_S         Cargo         None           CT9_S         Cargo         None         CT9_S         None         CT10_P         Cargo         None           CT10_P         Cargo         None         CT10_S         Cargo         None         CT10_S         Cargo         None	3077,60	0,00	0,00	3016,05	0,00	3102,02	3098,63	1,96	
CT4_5         Cargo         Cola Zero         Loading         Cola Zero           CT5_P         Cargo         None         Crossing         Cola Zero           CT5_S         Cargo         None         Crossing         Cola Zero           CT5_S         Cargo         None         Crossing         Cola Zero           CT6_S         Cargo         None         Crossing         Cola Zero           CT8_S         Cargo         None         Crossing         Cola Zero           CT9_P         Cargo         None         Crossing         Cola Zero           CT9_S         Cargo         None         Crossing         Cola Zero           CT10_P         Cargo         None         Crossing         None           CT10_S         Cargo         None         Crossing         None	3083,20	0,00	0,00	3021,54	0,00	3109,12	3105,73	1,96	
CTS_P         Cargo         None           CTS_S         Cargo         None           CT6_S         Cargo         None           CT6_S         Cargo         None           CT7_P         Cargo         None           CT7_P         Cargo         None           CT7_P         Cargo         None           CT8_P         Cargo         None           CT8_S         Cargo         None           CT9_P         Cargo         None           CT9_S         Cargo         None           CT10_P         Cargo         None           CT10_F         Cargo         None	3076,40	0,00	0,00	3014,87	0,00	3106,98	3103,60	1,96	
CTS_5         Cargo         None           CT5_5         Cargo         None           CT6_7         Cargo         None           CT7_5         Cargo         None           CT7_5         Cargo         None           CT7_5         Cargo         None           CT8_5         Cargo         None           CT8_5         Cargo         None           CT9_5         Cargo         None           CT9_5         Cargo         None           CT9_5         Cargo         None           CT10_7         Cargo         None           CT10_7         Sargo         None	3076,40	0,00	0,00	3014,87	0,00	3102,82	3099,44	1,95	
CT6_P         Cargo         None           CT6_S         Cargo         None           CT7_P         Cargo         None           CT7_S         Cargo         None           CT8_P         Cargo         None           CT8_S         Cargo         None           CT9_S         Cargo         None           CT9_S         Cargo         None           CT9_S         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3083,20	0,00	0,00	3021,54	0,00	3103,19	3099,80	1,96	
CT6_S         Cargo         None           CT7_P         Cargo         None           CT7_S         Cargo         None           CT8_P         Cargo         None           CT9_P         Cargo         None           CT9_P         Cargo         None           CT9_S         Cargo         None           CT10_P         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3083,20	0,00	0,00	3021,54	0,00	3109,13	3105,74	1,96	
CT7_P         Cargo         None           CT7_S         Cargo         None           CT8_P         Cargo         None           CT9_P         Cargo         None           CT9_P         Cargo         None           CT9_P         Cargo         None           CT10_P         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3075,70	0,00	0,00	3014,19	0,00	3104,62	3101,23	1,96	
CT7_5         Cargo         None           CT8_P         Cargo         None           CT8_S         Cargo         None           CT9_F         Cargo         None           CT9_F         Cargo         None           CT9_F         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3075,70	0,00	0,00	3014,19	0,00	3106,06	3102,67	1,96	
CT8_P         Cargo         None           CT8_S         Cargo         None           CT9_P         Cargo         None           CT9_S         Cargo         None           CT10_P         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3082,60	0,00	0,00	3020,95	0,00	3102,50	3099,11	1,96	
CT8_S         Cargo         None           CT9_P         Cargo         None           CT9_S         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3080,10	0,00	0,00	3018,50	0,00	3101,11	3097,72	1,97	
CT9_P         Cargo         None           CT9_5         Cargo         None           CT10_P         Cargo         None           CT10_S         Cargo         None	3073,20	0,00	0,00	3011,74	0,00	3096,97	3093,59	1,96	
CT9_S Cargo None CT10_P Cargo None CT10_S Cargo None	2920,80	0,00	0,00	2862,38	0,00	2943,03	2939,82	1,97	
CT10_P Cargo None CT10_S Cargo None	2927,70	0,00	0,00	2869,15	0,00	2956,41	2953,19	1,96	
CT10_S Cargo None	1086,60	0,00	0,00	1064,87	0,00	1096,65	1095,46	1,99	
- +	1086,60	0,00	0,00	1064,87	0,00	1096,76	1095,56	1,97	
DECK_P Cargo None	52,10	0,00	0,00	51,06	0,00	52,46	52,40	0,52	
DECK_S Cargo None	1564,60	0,00	0,00	1533,31	0,00	1578,09	1576,37	1,10	

Figure 8-6: Value Table Report

### **9 MAINTENANCE**

#### 9.1 Sensor Disable

If a sensor shows significant evidence of being damaged, it may be necessary to disable it, until it can be replaced.

To disable a sensor, follow this procedure:

- 1. Open the faceplate for the tank where the sensor is located.
  - a. In the bar graph or layout view: Click the tank to open faceplate
  - b. In the value table view: Right click the tank and click View tank details
- 2. Click the **Service** tab
- 3. Locate the sensor and click the Enabled checkbox (See Figure 9-1 below).

**Note:** Disabling a sensor will trigger a **Sensor Disabled** alarm on the affected tank. If desired this alarm can be shelved until service can be performed on the faulty sensor.

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Over	view Ala	arms	Trend Calcu	lator S	ervice	<b>A</b> 2	V2 🖸 0 🕔
Sens	or Inputs	Densit	y Sizes	Tags A	larms A	Attributes	
Name	Туре	Enabled	Sensor Auto Zero	Raw value	Sensor value	Filtered value	Filter Factor
nert	Inert	$\checkmark$	Auto Zero	7566,95	-13 mBar		
Radar	Radar			1,00 m	1,00 m	1,00 m	10
BT	Temperature			1078,10	19,6 °C		
MT	Temperature	$\checkmark$		1078,10	19,8 °C		
JT	Temperature	$\checkmark$		1078,07	19,9 °C		
• ensor	Filtering						
urrent efaults		0 1 2 None: 7 Loading: 2 Dischargin	3 4 5 6 7 8 Reset ▼ g; 2	9 10 +	0 means m maximum. will be app tank.	inimal (no) sensor The default values lied when changir	filtering, 10 for each mod g operation f

Figure 9-1: Tank sensor disabled

#### 9.2 Sensor Auto-Zero

Sensor auto-zero function are available for tank and line pressure sensors.

**Note:** Tank pressure sensors can also auto zeroed using the **Zero Set/Optimize Tank** function (0), and is more efficient to use for zero setting multiple tank sensors.

- For Tanks:
  - Open the Tank Faceplate and select the **Service->Sensor Inputs** tab (Figure 9-1)
  - o Click the Auto Zero button for the pressure sensor
  - Figure 9-2 shows, click **OK** to confirm and auto zero the sensor.
- For Lines:
  - Open the Line Faceplate and select the **Service->Sensors** tab (0)
  - o Click the Auto Zero button for the pressure sensor
  - Figure 9-2 shows, click **OK** to confirm and auto zero the sensor.

Confirm		×
Auto zero requires the tank to be unp Confirm before proceeding.	ressurized (ope	n to atmosphere).
	ОК	Cancel

Figure 9-2: Auto Zero confirm

In addition to automatic zero settings, the sensors offset & gain can also be set manually (9.3).

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### 9.3 Sensor offset & gain

The system has an option to adjust the offset and gain for sensors, this offers the possibility to compensate incorrectly zero-adjusted sensors, e.g. where a tank has been zeroed with cargo still in the tank.

Offset

Gain

Adds or subtracts a constant value.

Adds a percentage correction to the sensor value. Note this is not considered an everyday routine, please read the examples carefully before attempting to adjust the gain settings.

#### 9.3.1 Offset adjustment

To see and/or adjust the offset values for a sensor, it's faceplate needs to be opened. In the case of a tank sensor the easiest way is:

- 1. Open the tank faceplate
  - a. In the bar graph or layout view: Click the tank to open faceplate
  - b. In the value table view: Right click the tank and click View tank details
- 2. Click the Service tab
- 3. Locate the desired sensor and right click it which opens a context menu:

S	Sensor Inputs				nsity	Size	s Tags	
Nan	ne	Туре	Ena	abled	Raw value	e Se	nsor value	
BP		Pressure	$\checkmark$		5771,77	27	4 mmH2O	
			Open Sensor Faceplate					

#### Click Open Sensor Faceplate 4.

The sensor faceplate shows detailed data for the sensor, including the zero (offset) and gain value as shown below (Figure 9-3):



Figure 9-3: Analog sensor faceplate

In this example the offset for bottom pressure sensor for tank WB4\_P shows 100 mmH<sub>2</sub>O. It has a corresponding Value of 274 mmH<sub>2</sub>O. The Value is the pressure on the sensor currently used for level presentation (level = pressure divided on density). Let's assume that this sensor currently has incorrect offset adjustment, and that it is necessary to correct it. To make this example simple, we also assume that the tank contains fresh water with a density of 1.0000. The correct level in the tank is now 350 mm and we need to enter a new offset value. The deviation is  $350-274 = 76 \text{ mmH}_2\text{O}$ , and the correct offset value should then be  $100 - 76 = 24 \text{ mmH}_2\text{O}$  (Old offset minus deviation equals new offset).

To set the new offset value click the Set Zero/Gain button, which shows the following:

Set Zero /	' Gain	-	□ ×	
Sensor:	WB4_P.	BOT_PRE	SS	
Zero:	100	mmH	20	
Gain:	1			
		OK	Cancel	

Figure 9-4: Set Zero/Gain dialog

It shows the currently set values for zero (offset) and gain, enter the new desired values, in this case a zero value of 24 mmH<sub>2</sub>O, and keep the gain unchanged at 1. Click the **OK** button to store the new values.

After adjustments the value of the sensor value is changed:

WB4_P_BOTTOM_	PRESS_SENS	OR_1			×
Overview	Trend	Service		4	0 0 0 0 0 0 0
Values 1. Input/Raw v 2. Scaled value 3. Value after : 4. Value after ; 5. Output value	Pensor: W → Convert	5860,00 74 mmH20 50 mmH20 50 mmH20 50 mmH20	PRESS_SENSOR_ Gain	Modbus Rtu Master (MB_INELTEH - Reg 5529,00 - 27648,00 5528 - 27649 0 - 25000 mmH2O 24 mmH2O	rr)
			Filter timeconstant: Filter windowsize:	Off 500 mmH2O	
			Sensor Type:	Relative	

Figure 9-5: Sensor after zero (offset) adjustment

And the tank shows the correct level:

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Figure 9-6: Tank after sensor zero (offset) adjustment

Note: The sensor should be zeroed using the normal procedure as soon as the tank is empty. See chapter 0.

#### 9.3.2 Gain adjustment

Gain adjustments may be applied where you have deviations that are not constants, but where the deviation is a certain percentage of the reading, e.g. where the deviation is 5% at both 50% level and 98% level. Applying a gain of 1.05 will add 5% to the reading whereas gain 0.95 will subtract 5% from the reading.

Note: It is necessary to use a pressure calibrator in order to precisely determine the deviation in reading from the sensors. The use of experience data alone may not be sufficient to achieve the highest possible accuracy.

In the following example, the tank shown is displaying a 130 mmH<sub>2</sub>O too low value for 98% level. When the level drops to nearly empty tank, the reading displays very close to correct, with only a few mm deviation.

Note: Use the gain setting with care, as this is normally a temporary fix as the sensor is most probably out of spec.



Figure 9-7: Sensor deviation

Our example tank is 18000 mm high. Consider the numbers:

Level %	70	98
Actual Level [mm]	12600	17640
Sensor Reading [mm]	12510	17510
Needed gain adjustment	12600/12510 = 1.0072	17640/17510 = 1.0074

Note that the deviation at 70 % level is 90 mm and at 98 % it is 130mm. However, the deviation factor is the same, and both readings can be tuned in by applying the same gain correction: 1.007.

Do not forget to include actual density in the arithmetic when you calculate what the correct reading should be. Actual Density = Density compensated for the actual temperature.

# **10 REFERENCE**

#### 10.1 Keyboard Shortcuts

Shortcut key	View
Alt+F3	Value Table – Numerical spreadsheet display
Ctrl+F3	Bar graph – Vertical bars displaying key tank values
Shift+F3	Layout – Custom layout views depending on configuration. If multiple views are configured pressing the shortcut keys will cycle thru the layout views.
F2	Prepare Tanks for Loading
Shift-F2	Prepare Tanks for Discharge
Alt-F2	End operation on Tanks
F4	Show Draft & Trim/List
Alt-F11	Show alarm detail list
F11	Silence alarm
Shift-F11	Acknowledge selected alarm

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### 10.2 Alarm Descriptions

This chapter describes the various alarms in the system. The actual alarms that can be present depends on the configuration and might be less than the ones listed here.

#### 10.2.1 Tag Alarms

These alarms are general and can occur on any tag (value) in the system depending on the configuration<sup>2</sup>. The alarms are:

Alarm Type	Description	Cause
LoLo	Value below LoLo limit	The value is below the configured LoLo alarm limit.
Lo	Value below Lo limit	The value is below the configured Lo alarm limit.
Hi	Value above Hi limit	The value is above the configured Hi alarm limit.
HiHi	Value above HiHi limit	The value is above the configured HiHi alarm limit.
Deviation	Value deviated from setpoint	The value deviated from the configured setpoint (Deviation larger than the set limit).

#### 10.2.2 State Alarms

These alarms indicate the presence of an abnormal or failure situation of the system and devices. Various components of the system such as Tanks, IO protocols, etc. have different alarms, and are listed below.

#### **10.2.2.1** Tank Alarms

Description	Cause	Resolution
Missing Sensor Input	The tank does not have valid input on one or more sensors, due to IO error, faulty sensor, etc. Resulting in values of the tank to be uncertain.	Fix the IO/sensor error. In the meantime, the faulty sensor can be disabled on the tank and a manual input can be given (See chapter 4.4.5).
Sensor Disabled	A sensor input on the tank has been disabled.	Fix the IO/sensor. While waiting on spares/service, this alarm can be shelved.

#### 10.2.2.2 Line Alarms

Description	Cause	Resolution
Missing Sensor Input	The line does not have valid input on one or more sensors, due to IO error, faulty sensor, etc. Resulting in values of the line to be uncertain.	Fix the IO/sensor error.

<sup>&</sup>lt;sup>2</sup> In a standard configuration 'Deviation' alarm is present on tank volume and LoLo/Lo/Hi/HiHi alarms present on line pressures and tank temperature, inert pressure and volume.



### 10.2.2.3 Draft Alarms

Description	Cause	Resolution
Missing Sensor Input	The draft does not have valid input on one or more sensors, due to IO error, faulty sensor, etc.	Fix the IO/sensor error. In the meantime, the trim/list can be entered manually or by inclinometer/draft (depending on which is available) in the "View draft & trim/list" window (F4).

### 10.2.2.4 System Alarms

Description	Cause	Resolution
Primary server down	The primary server is down (faulty, power failure, etc), the backup server has taken over.	Make sure the PC is powered on, otherwise contact KROHNE Marine for support.
Backup server down	The backup server is down (faulty, power failure, etc), this means there is no redundancy if the primary fails.	Make sure the PC is powered on, otherwise contact KROHNE Marine for support.
Primary history storage error	An error occurred when storing historical data on the primary server. Can affect access to historical trending.	Restart system, if alarm persists contact KROHNE Marine for support.
Backup history storage error	An error occurred when storing historical data on the backup server. Can affect access to historical trending.	Restart system, if alarm persists contact KROHNE Marine for support.

### 10.2.2.5 Valve Alarms

#### On/Off valve

Description	Cause	Resolution
Maximum travel	The valve failed to open or close within	
time exceeded	the set maximum time.	
Travel time	The valve open or closing time was	
below minimum	below the set minimum time.	

#### Throttle valve

Description	Cause	Resolution
Position not	The valve failed to reach the setpoint	
reached in time	within the set maximum time.	

#### 10.2.2.6



#### 10.2.2.7 IO Alarms

Note: Most IO alarms will result in sensors connected to that IO device to lose their readings. This will be indicated by "bad value" indication (See chapter 2.6), also "Missing sensor input" alarms on tanks/lines where the sensors are located will be raised.

#### **Modbus**

Description	Cause	Resolution
Hardware error	The protocol failed due to a hardware error (Faulty serial port, etc) causing communication to stop.	Restart system, if alarm persists contact KROHNE Marine for support.
Communication error	The device failed to communicate (Failure in external system, cable disconnect, etc), causing communication to stop.	Make sure external system is operational and check for disconnected cables, etc. Finally restart system, if alarm persists contact KROHNE Marine for support.

#### <u>IS40</u>

Description	Cause	Resolution
Port 1 Error	The protocol failed due to a hardware error (Faulty serial port, etc) causing communication to stop on port 1.	Restart system, if alarm persists contact KROHNE Marine for support.
Port 2 Error	The protocol failed due to a hardware error (Faulty serial port, etc) causing communication to stop on port 2.	Restart system, if alarm persists contact KROHNE Marine for support.
Port 1 Timeout	The device communication timed out on port 1 (Failure in IO cabinet, cable disconnect, etc).	Make sure SCU is powered on and no cables are disconnected, etc. Finally restart system, if alarm persists contact KROHNE Marine for support.
Port 2 Timeout	The device communication timed out on port 2 (Failure in IO cabinet, cable disconnect, etc).	Make sure SCU is powered on and no cables are disconnected, etc. Finally restart system, if alarm persists contact KROHNE Marine for support.

Note: The IS40 IO Protocol will continue to function unless there is a failure on both port 1 and port 2.



#### 10.2.2.8 Sensor Alarms

Note: Most sensor alarms will result in the measurement value from the sensor to be uncertain. This will be indicated by "bad value" indication (See chapter 2.6), also alarms on the tank where the sensor are located will be raised.

#### Analog Sensor

Description	Cause	Resolution
Out of range	The sensor raw value is outside the allowed range causing the value to be uncertain.	

#### Radar Sensor

Description	Cause	Resolution
Hart Com Error	Communication between the SCU and the radar failed.	
Hardware Error	The radar reports a hardware error.	
PLC Module Error	Internal failure in the SCU.	
Open/short circuit	Open or short circuit on the line from SCU to radar.	

#### IS40 Temp Sensor

Description	Cause	Resolution
AD Card	Internal communication error between	
error	TI and AD card.	
Out of range	The sensor raw value is outside	
	allowed range.	
Conversion	The sensor value could not be	
error	converted.	
Calibration	AD card calibration failed.	
error		