

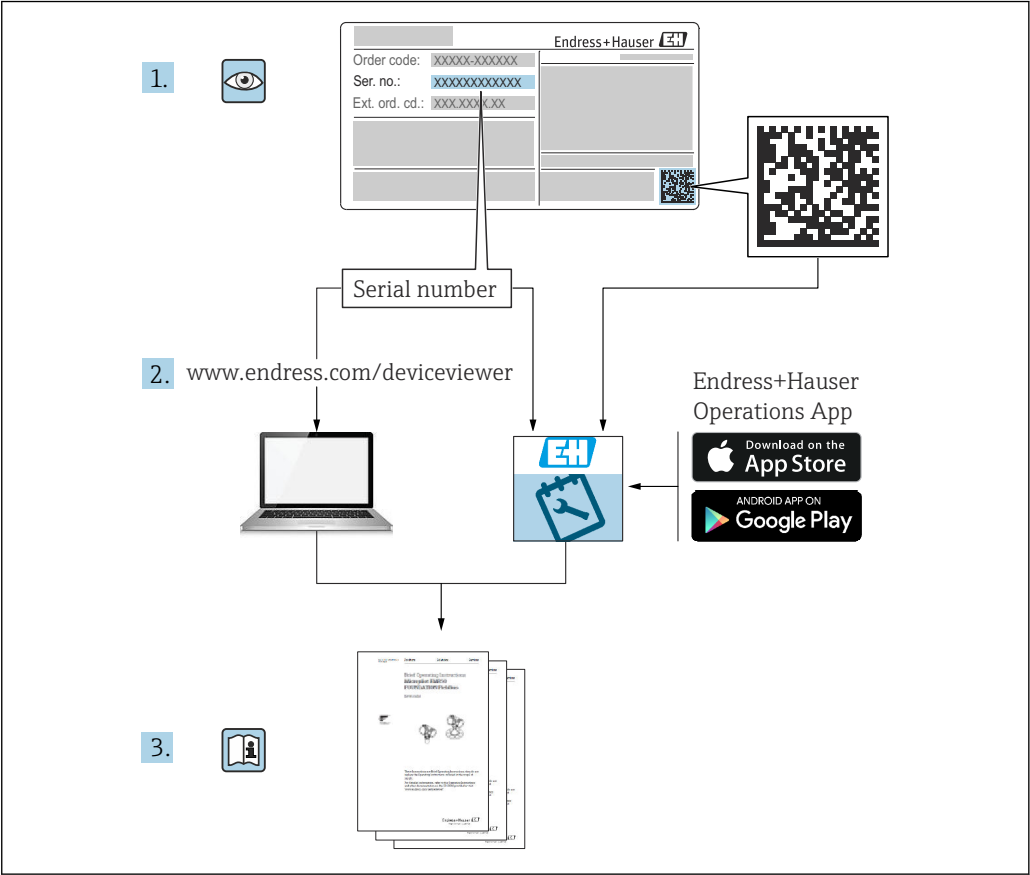
Operating Instructions

Tankvision Multi Scan NXA83B

Web Client System Operation



- Make sure the document is stored in a safe place such that it is always available when working on or with the device.
- To avoid danger to individuals or the facility, read the "Basic safety instructions" section carefully, as well as all other safety instructions in the document that are specific to working procedures.
- The manufacturer reserves the right to modify technical data in line with technological developments without prior notice. Your Endress+Hauser sales center will supply you with current information and updates to this manual.



A0023555

Change history

Software version 3.0.10

- Changes/comments: Initial version
- Document: BA01297G/01.14

Software version 3.0.12

- Changes/comments: Change of order code structure
- Document: BA01297G/02.15

Software version 3.1.0 and 4.0.0

- Changes/comments: Old V1 support and simplified configuration
- Document: BA01297G/03.16

Software version 3.4.0 and 4.4.0

- Changes/comments: Changes to V1 Driver and GBT calculations
- Document: BA01297G/04.18

Software version 5.0.0

- Changes/comments: Migration to Windows 10 IoT operating system
- Document: BA01297G/05.21

Software version 5.1.0

- Changes/comments: Introduction of a new Webserver
- Document: BA01297G/06.23-00

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1 About this document

1.1 Document function

This manual is giving detailed information on the system capabilities and architecture. It supports project and sales engineers in designing the system architecture during acquisition and execution phase. Furthermore during operation time of the system all servicing personnel in need of detailed knowledge about the system capabilities.

1.2 Symbols

1.2.1 Safety symbols

DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Symbols for certain types of information and graphics

Tip

Indicates additional information



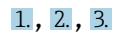
Reference to documentation



Reference to graphic



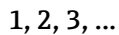
Notice or individual step to be observed



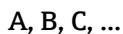
Series of steps



Result of a step



Item numbers



Views



Safety instructions

Observe the safety instructions contained in the associated Operating Instructions

1.3 Documentation

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the matrix code on the nameplate

1.3.1 Technical Information (TI)

Planning aid

The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

1.4 Registered trademarks

1.4.1 Modbus™

Modbus is a registered trademark of Schneider Electric USA, Inc.

1.4.2 Microsoft, Windows, Silverlight

Microsoft, Windows and Silverlight are registered trademarks of the Microsoft Corporation

1.4.3 HART®

Registered trademark of HART Communication Foundation, Austin, USA

1.4.4 Varec®

Registered trademark of Varec, Inc. Copyright 2003

1.4.5 Others

Enraf, Honeywell, Rosemount, Emerson, Saab, L&J, GPE are registered trademarks and trademarks of these organizations and companies.

All other marks are property of their respective owners.

2 Basic safety requirements

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Intended use

2.2.1 Applications

Inventory control

By using Tankvision Multi Scan to monitor the tank level and stored volume of valuable liquids remotely, owners or operators of tank farms or terminals for petroleum products and chemicals (liquids) can visualize the volume of the stored medium in real time. The data can be used to plan the inventory and distribution. The data can also be used to manage tank farm operations like pumping or transferring products. Tankvision has its unique concept using network technology. Without using proprietary software, the users can visualize and manage their valuable liquids stored in the tanks by a web browser. Tankvision Multi Scan is a flexible and cost effective solution due to its scalable architecture. The application coverage goes from small depots with only a few tanks up to refineries.

Inventory Calculations

Tankvision Multi Scan calculates based on measured variables and tank capacity tables:

- Observed or gross volumes
- Net volumes and
- Mass

of products like

- Hydrocarbons, Liquefied gases,
- Asphalt.

They are corrected according to international standards, including API/ASTM tables 5A, 5B/6, 53A, 53B/54, 23/24, LPG.

This includes temperature corrections at 15 °C (60 °F) and alternative temperatures. Additionally, available pump able volumes and water volume are calculated.

Remote configuration of measuring equipment

Some on-site operations can be avoided using remote configuration of measuring equipment during commissioning or maintenance (the availability of this feature may depend on the system configuration).

Application areas

- Tank farms in refineries
- Ship loading terminals
- Marketing and distribution terminals
- Pipeline terminals
- Logistic terminals for tanks storing products like crude oils, refined white and black products, chemicals, LPG

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

Before connecting or disconnecting the device:

- ▶ Switch off the supply voltage.

2.4 Operational safety

Risk of injury!

- ▶ Operate the device only if it is in proper technical condition, free from errors and faults.
- ▶ The operator is responsible for the interference-free operation of the device.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers!

- ▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

Furthermore, the device meets the legal requirements of the applicable UK regulations (Statutory Instruments). These are listed in the UKCA Declaration of Conformity along with the designated standards.

By selecting the order option for UKCA marking, Endress+Hauser confirms a successful evaluation and testing of the device by affixing the UKCA mark.

Contact address Endress+Hauser UK:

Endress+Hauser Ltd.

Floats Road

Manchester M23 9NF

United Kingdom

www.uk.endress.com

2.6 IT security

Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

3 Incoming acceptance and product identification

3.1 Incoming acceptance

Check the following during incoming acceptance:

- ☐ Are the order codes on the delivery note and the product sticker identical?
- ☐ Are the goods undamaged?
- ☐ Do the data on the nameplate match the ordering information on the delivery note?
- ☐ If required (see nameplate): are the Safety Instructions e.g. XA provided?



If one of these conditions is not met, please contact the manufacturer's sales office.

3.2 Product identification

The following options are available for identification of the device:

- Nameplate data
- Extended order code with breakdown of the device features on the delivery note
- Enter serial number from nameplates in *W@M Device Viewer* www.endress.com/deviceviewer. All of the information on the measuring device is displayed along with an overview of the scope of technical documentation provided.
- Enter the serial number on the nameplate into the *Endress+Hauser Operations app* or scan the *2-D matrix code* on the nameplate with the Endress+Hauser Operations app

3.2.1 Nameplate

The information that is required by law and is relevant to the device is shown on the nameplate, e.g.:

- Manufacturer identification
- Order number, extended order code, serial number
- Technical data, degree of protection
- Firmware version, hardware version
- Approval-related information, reference to Safety Instructions (XA)
- DataMatrix code (information about the device)

3.2.2 Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Place of manufacture: See nameplate.

4 System Operation Introduction

The Tankvision Multi Scan is a reliable scalable tank inventory system suited for small terminals and depots, or as part of a larger system on sites with more storage tanks.

The Web Client can be provided on any Windows or Macintosh station with a network connection to the device. The interface provides a uniform, network accessible front end to different vendor's instruments, hiding many of the differences between the gauges employed on site.

A wide range of communication drivers and interfaces already exist and more are being developed all the time. This manual is intended as a guide, for tank farm operators, in using the software.

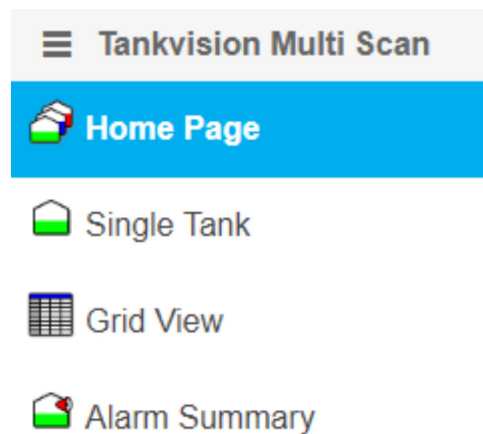
5 System Installation

There is no installation required for the Tankvision Multi Scan web client. To use the web client all that is needed is a modern web browser (for example, the latest version of Microsoft Edge or Google Chrome). If an incompatible browser is used, the screens will not be displayed properly.

To access the Tankvision Multi Scan Web Client, navigate to the appropriate URL e.g. <http://multiscan>. Either the name of the Tankvision Multi Scan, or the IP address can be used.

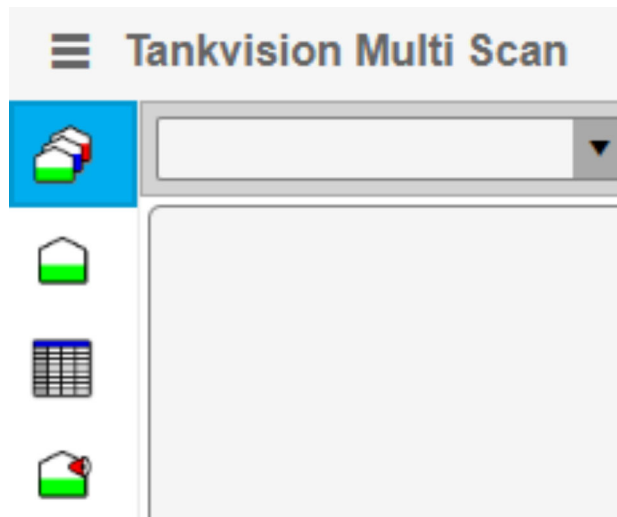
6 Navigation

The different views available in the Tankvision Multi Scan web client can be navigated using the drawer on the left hand side of the screen.



 1 Navigation Drawer

The current view will be highlighted. To navigate to another view, simply click upon the name of the view. When navigation has taken place, the drawer will shrink so that only the icons are visible. This is to maximize the space available for the content.



2 Collapsed Navigation Drawer

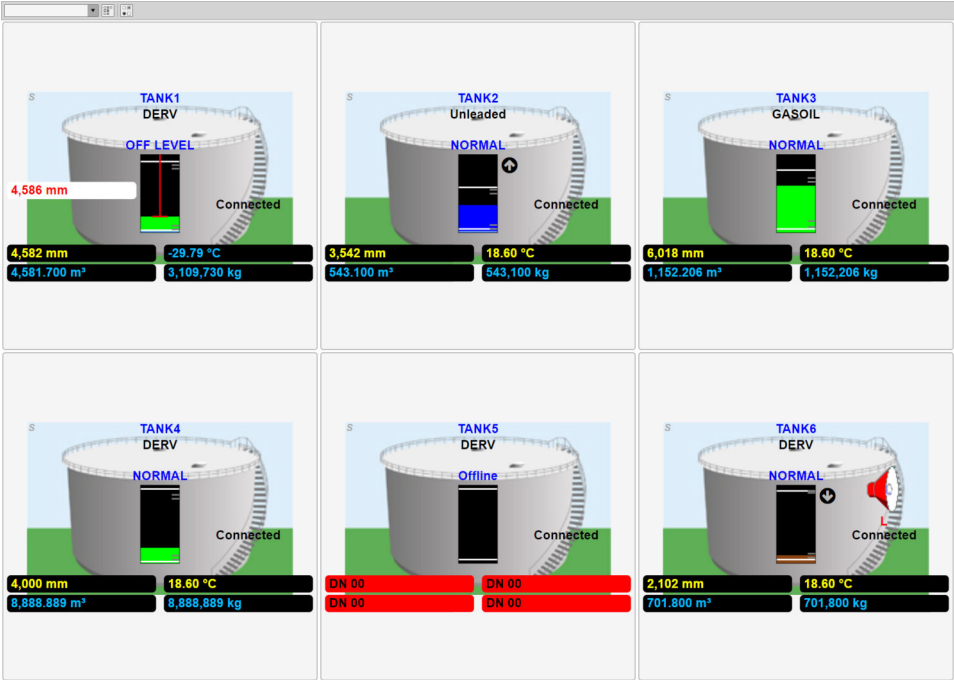
If it is necessary to see the names of the available views, then the drawer can be expanded again by clicking upon the **hamburger**  at the top of the drawer.

The available views are:

- Home Page →  14
- Single Tank Overview →  22
- Grid View →  23
- Alarm Summary →  26

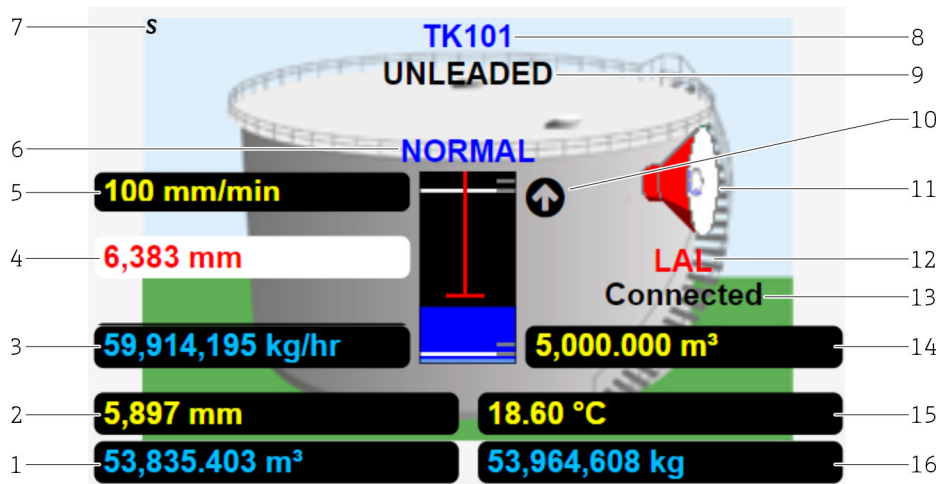
7 Home Page

Once launched in the web browser, the Home Page is loaded. The very first time that the client is launched, all tanks will be displayed in the home page. For subsequent launches, the tank filter that was last used will be applied.



3 Home Page

7.1 Tank Details



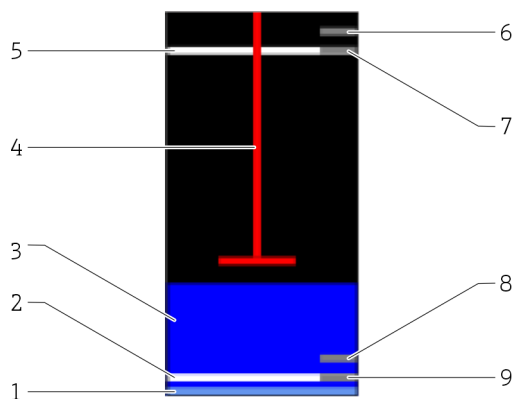
4 Tank Details

- 1 Custom Data 3
- 2 Custom Data 1
- 3 Custom Data 6
- 4 Displacer Position
- 5 Custom Data 5
- 6 Servo Status
- 7 Simulator Indicator
- 8 Tank ID
- 9 Product Name
- 10 Flow Indicator
- 11 Alarm Indicator
- 12 Alarm Code
- 13 Connection Status
- 14 Custom Data 7
- 15 Custom Data 2
- 16 Custom Data 4

For each tank the following details are available:

- **Simulator Indicator:** only visible if tank data is simulated
- **Tank ID:** the Tank ID of the tank
- **Product Name:** the name of the product that the tank contains
- **Flow Indicator:** only visible if the level flow rate for the tank exceeds the flow threshold defined in the Tankvision Multi Scan system settings, if visible indicates the direction of flow
 - Load
 - Receipt
- **Alarm Indicator:** only visible if there are active alarms for the tank
- **Alarm Code:** the code of the most significant active alarm for the tank
- **Displacer Position:** the current displacer position, only displayed if the displacer is off level
- **Custom Data 1-7:** configurable custom data fields, each field will only be displayed if it is configured to display a value → 19

7.1.1 Flood Panel



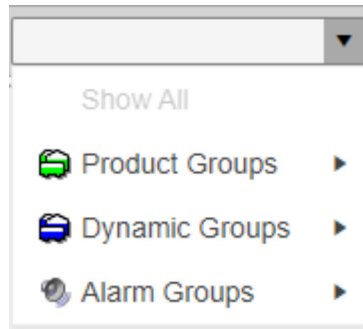
5 Flood Panel

- 1 Free Water
- 2 Minimum Operating Level
- 3 Product
- 4 Displacer
- 5 Maximum Operating Level
- 6 High High Alarm Setpoint
- 7 High Alarm Setpoint
- 8 Low Alarm Setpoint
- 9 Low Low Alarm Setpoint

- **Displacer:** represents the displacer position in the tank, only visible if the displacer is off level
- **Product:** represents the amount of product in the tank
If the *Use Product Colours* flag is ticked in the Tankvision Multi Scan system settings, this will be filled in the product color. If the flag is not ticked then this will be colored:
 - **Green** if the tank is static, i.e. the absolute level flow rate is less than the flow threshold set in the Tankvision Multi Scan system settings
 - **Blue** if the tank is in receipt, i.e. the level flow rate is positive and exceeds the flow threshold set in the Tankvision Multi Scan system settings
 - **Brown** if the tank is loading, i.e. if the level flow rate is negative and exceeds the flow threshold set in the Tankvision Multi Scan system settings
- **Free Water:** represents the amount of free water (if any) in the tank, this will always be colored light blue.
- **Maximum Operating Level:** indicator of the maximum operating level for the tank
- **High High Alarm Setpoint:** indicator of the high high alarm level setpoint for the tank
- **High Alarm Setpoint:** indicator of the high alarm level setpoint for the tank
- **Low Alarm Setpoint:** indicator of the low alarm level setpoint for the tank
- **Low Low Alarm Setpoint:** indicator of the low low alarm level setpoint for the tank
- **Minimum Operating Level:** indicator of the minimum operating level for the tank

7.2 Filter

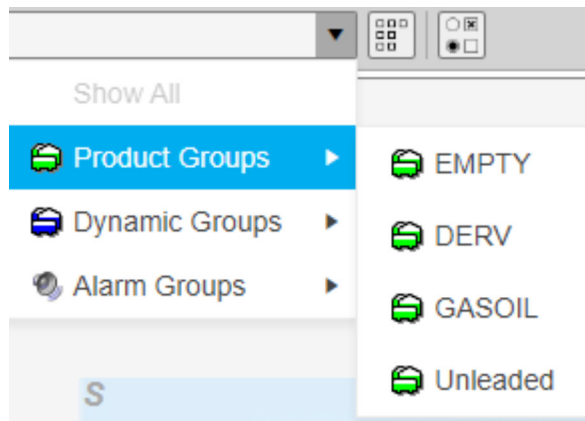
The tanks which are displayed can be filtered by three criteria. To select the criteria by which the tanks are to be filtered, click on the filter box which is found in the top-left corner of the view. The available criteria will be displayed:



6 Tank Filters

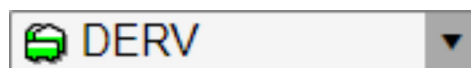
7.2.1 Product Groups

To filter the tanks by product, move the mouse over the **Product Groups** entry. The products configured on the Tankvision Multi Scan will be displayed for selection.



7 Filter Tanks by Product

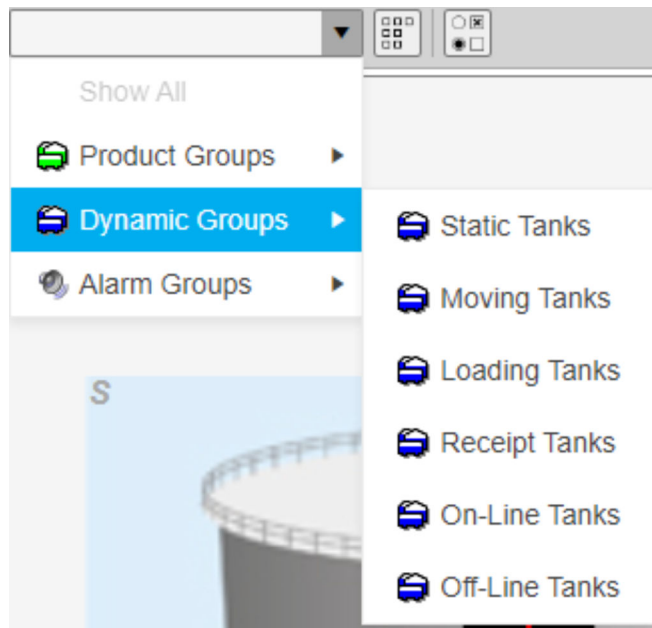
Click on a product name. Only the tanks that contain that product will be displayed. The current filter will be displayed in the filter box.



8 Filter by Product

7.2.2 Dynamic Groups

To filter the tanks by status, move the mouse over the **Dynamic Groups** entry. The available statuses will be displayed for selection.



9 Filter Tanks by Status

Click on the required status. This will filter the tanks as follows:

- **Static Tanks:** only tanks that are not moving, i.e. with an absolute level flow rate less than the flow threshold set in the Tankvision Multi Scan system settings, will be displayed
- **Moving Tanks:** only tanks that are moving, i.e. with an absolute level flow rate greater than the flow threshold set in the Tankvision Multi Scan system settings, will be displayed
- **Loading Tanks:** only tanks that are loading, i.e. with a negative level flow rate exceeding the flow threshold set in the Tankvision Multi Scan system settings, will be displayed
- **Receipt Tanks:** only tanks that are in receipt, i.e. with a positive level flow rate exceeding the flow threshold set in the Tankvision Multi Scan system settings, will be displayed
- **On-Line Tanks:** only tanks that are not offline will be displayed
- **Off-Line Tanks:** only tanks that are offline will be displayed

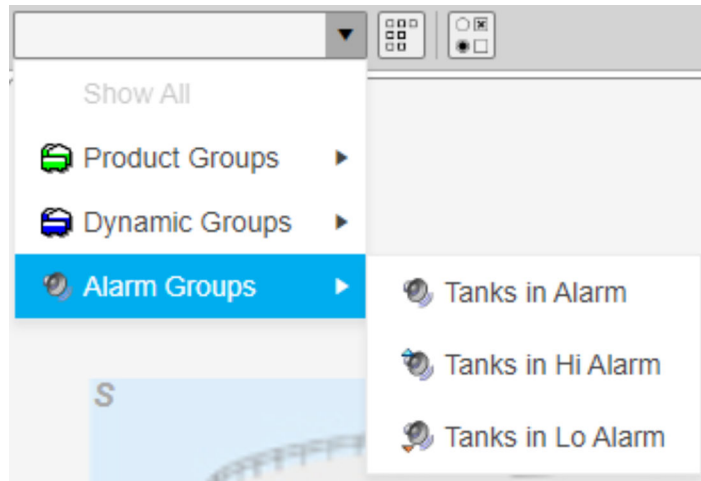
Click on a status. Only the tanks fulfilling the defined criterium will be displayed. The current filter will be displayed in the filter box.



10 Filter by Status

7.2.3 Alarm Groups

To filter the tanks by alarm status, move the mouse over the **Alarm Groups** entry. The available alarm statuses will be displayed for selection.

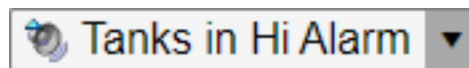


11 Filter Tanks by Alarm Status

Click on the required alarm status. This will filter the tanks as follows:

- **Tanks In Alarm:** only tanks that have an active high alarm or active low alarm will be displayed
- **Tanks In Hi Alarm:** only tanks that have an active high alarm will be displayed
- **Tanks In Lo Alarm:** only tanks that have an active low alarm will be displayed

Click on an alarm status. Only the tanks which have the defined active alarms will be displayed. The current filter will be displayed in the filter box.



12 Filter by Alarm Status

7.3 Orientation

The way that the tanks are laid out can be changed by using the **Orientation** button. Clicking the button toggles the orientation between:

- **Horizontal:** tanks are sorted by tank id from left to right and then top to bottom with a vertical scrollbar if required
- **Vertical:** tanks are sorted by tank id from top to bottom and then left to right with a horizontal scrollbar if required

7.4 Custom Fields

The custom fields which are displayed on the details (→ 15) for each tank can be amended by clicking on the Custom Fields button. The following screen will be displayed.

Custom Data Fields

Field	Data	Prefix
Custom Data 1	Product Level	
Custom Data 2	Product Temperature	
Custom Data 3	Gross Standard Volume	
Custom Data 4	Gross Mass	
Custom Data 5		
Custom Data 6		
Custom Data 7		

Reset

Cancel

Submit

13 Custom Fields

For details of the position of the custom data fields → 15. To change the data that will be displayed for a specific custom field, click on the **Data** entry for that field. A list of the available fields will be displayed.

Data

Product Level

Observed Density

Observed Temperature

Oil Depth

Percentage Level

Percentage Volume

Product Depth

Product Level

14 Select Custom Field

Click on the field to be displayed. The list of custom data fields will be updated to reflect the change. To prevent any data being displayed in a specific custom data field, click on the **Data** entry for that field and pick the blank (first) entry from the list.

To change the prefix that will be displayed in front of the data for a specific custom field, click on the **Prefix** entry for that field. A prefix (up to four characters in length) can then be entered.

To set the custom data fields back to the original values, click on the **Reset** button. Any changes made to the custom data fields will be reverted.

To close the screen without saving the changes to the custom data fields, click the **Cancel** button.

To save the changes to the custom data fields and close the screen, click the **Submit** button.

8 Single Tank Overview

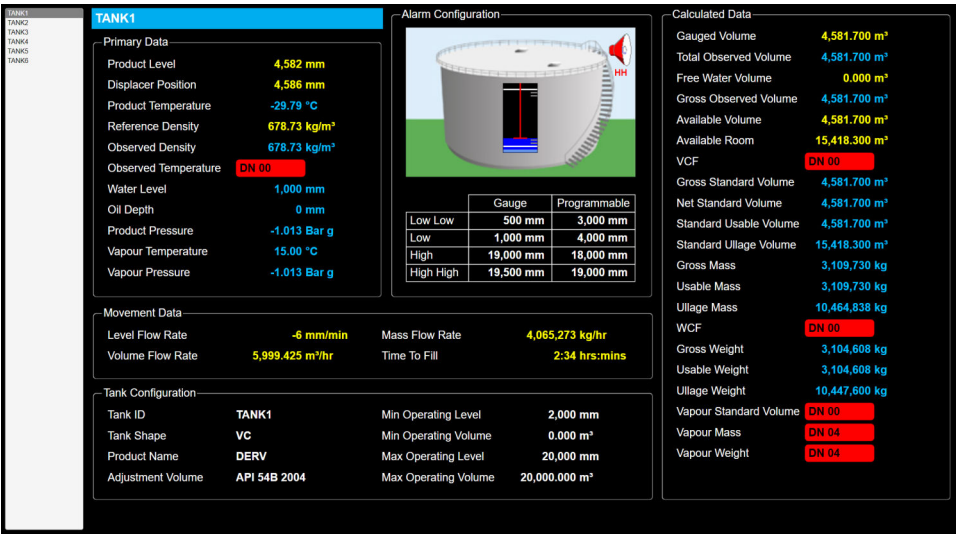
The Single Tank Overview provides a detailed display of all data for a single tank. Once the Single Tank Overview view has been loaded, other tanks can be viewed by selecting them from the list on the left.

The displayed data is organized into logical groups; Primary Gauging data, Movement data, Tank configuration, Calculated data and Alarm Settings.

Any data values in manual mode will be displayed in blue.

Any data values unavailable for any reason will be replaced by a diagnostic number and will be displayed in black on a red background.

See the illustration below for a typical example.



15 Tank Details

Tool tips are used throughout to provide further information to the user on each of the data display fields.

If the selected tank has an active alarm, a horn icon will be displayed along with the alarm code for the highest priority active alarm. For details of the active alarms navigate to the Alarm Summary view → 26.

For details of the flood panel → 16.

9 Grid View

The grid view is a tabular view of tank data.

Views		Flow Type		Level Flow Rate							
Tank ID	Product Name	Alarm Status	Product Level (mm)	Product Temperature (°C)	Water Level (mm)	Reference Density (kg/m³)	Total Observed Volume (m³)	Available Room (m³)	Level Flow Rate (mm/min)		
TANK1	DERV	HEI	4.582	-29.79M	1.000M	678.73	4,581.700M	15,418.300	-6		
TANK2	Unleaded	OK	3.542	18.60	250M	1,000.00	543.100M	0.000	10		
TANK3	GASOIL	OK	6.018	18.60	0M	1,000.00	1,152.205M	0.000	0		
TANK4	DERV	OK	4.000	18.60	0M	1,000.00	8,888.889M	0.000	0		
TANK5	DERV	OK	OFFLINE	OFFLINE	OFFLINE	OFFLINE	OFFLINE	OFFLINE	OFFLINE		
TANK6	DERV	L	2.102	18.60	0M	1,000.00	701.800M	0.000	-10		

16 Grid View

The background colour of each row indicates the direction that the tank is moving. If a tank is in receipt, i.e. the level flow rate is positive and exceeds the flow threshold set in Tankvision Multi Scan system settings, then the background is blue (by default). If a tank is loading, i.e. the level flow rate is negative and exceeds the flow threshold set in Tankvision Multi Scan system settings, then the background is brown (by default). The background colors for tanks in receipt or load can be customized → 24. Manual data values are suffixed with the letter **M**.

9.1 Filter

For details of how to filter the tanks that are displayed → 16.

9.2 Views

The grid view comes as standard with several pre-defined data views. These can be selected by using the **Views** Views Tank Gauging box at the top of the view. To select a different view, click on the **Views** box. A list of the available views will be displayed.

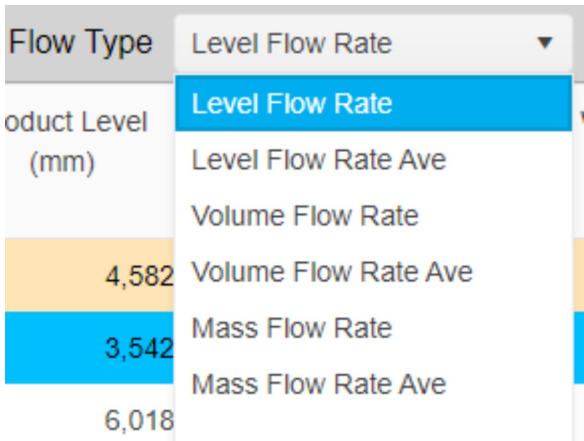


17 Select View

Click on the view required and the grid view will be updated to reflect the columns in the newly selected view.

9.3 Flow Type

The flow type selection appends additional flow rate information columns to the selected view. To change the additional information, click on the **Flow Type** Flow Type Level Flow Rate box. A list of the available flow types will be displayed.

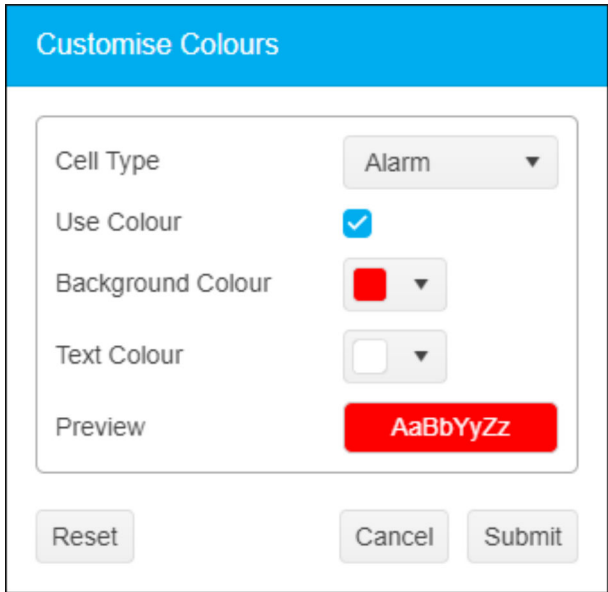


18 Select Flow Type

Click on the flow type required and the grid view will be updated to reflect the selection.

9.4 Customize Colors

Some of the colors used to display the data in the grid view can be customized. To change the colors, click on the **Customize Colors** button at the top of the view. The following screen will be displayed.



19 Customize Colors

These cell types can be customised:

- **Alarm**
Cells containing an alarm code
- **Error**
Cells containing data with an invalid status
- **Manual**
Cells containing manual data

- **Offline**

Cells containing data for an offline tank

- **Load**

Cells for a tank that is loading and is not affected by the colors defined for another cell type

- **Load**

Cells for a tank that is in receipt and is not affected by the colors defined for another cell type

The following table shows the cell types that can be customised and their default values.

Cell Type	Use Color	Background Color	Foreground Color
Alarm	☒	Red	White
Error	☒	Red	Black
Manual	☒	Black	Blue
Offline	☒	Red	Black
Load	☒	Brown	Black
Load	☒	Blue	Black

To set the cell colors back to the original values, click on the **Reset** button.

Any changes made to the cell colors will be reverted. To close the screen without saving the changes to the cell colors, click the **Cancel** button.

To save the changes to the cell colors and close the screen, click the **Submit** button.

10 Alarm Summary

The Alarm Summary provides information about the active alarms for the tanks. Once the Alarm Summary has been loaded, other tanks can be viewed by selecting them from the list on the left. If a tank has any active alarms, then a horn icon will be displayed next to the tank id in the list. Once a tank has been selected, the active alarms for that tank are highlighted by the presence of a horn icon next to the relevant alarm(s).

 TANK1

TANK2

TANK3

TANK4

TANK5

 TANK6

Gauge Alarms

Level Alarms

☐ High High

☐ High

 Low

☐ Low Low

Temperature Alarms

☐ High

☐ Low

☐ Deviance

Density Alarms

☐ High

☐ Low

☐ Deviance

Tank Alarms

Level Alarms

☐ High High

☐ High

☐ Low

☐ Low Low

☐ Variable

☐ Time To Target

☐ Floating Roof

☐ Difference

Temperature Alarms

☐ High

☐ Low

Density Alarms

☐ High

☐ Low

Movement Alarms

☐ High Flow

☐ Low Flow

☐ Unauthorised

☐ Theft

Free Water Alarms

☐ High

☐ Low

Communications

☐ No reply from gauge

20 Alarm Summary

26

Endress+Hauser

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