Operating Instructions
Tankvision Professional NXA85
Simple Movements

Endress+Hauser

People for Process Automation

1. 👁

Endress+Hauser

Order code: XXXXX-XXXXXX
Ser. no.: XXXXXXXXXXXX
Ext. ord. cd.: XXX.XXXX.XX

Serial number

2. www.endress.com/deviceviewer

Endress+Hauser
Operations App

Download on the App Store

ANDROID APP ON Google Play

3. 📖
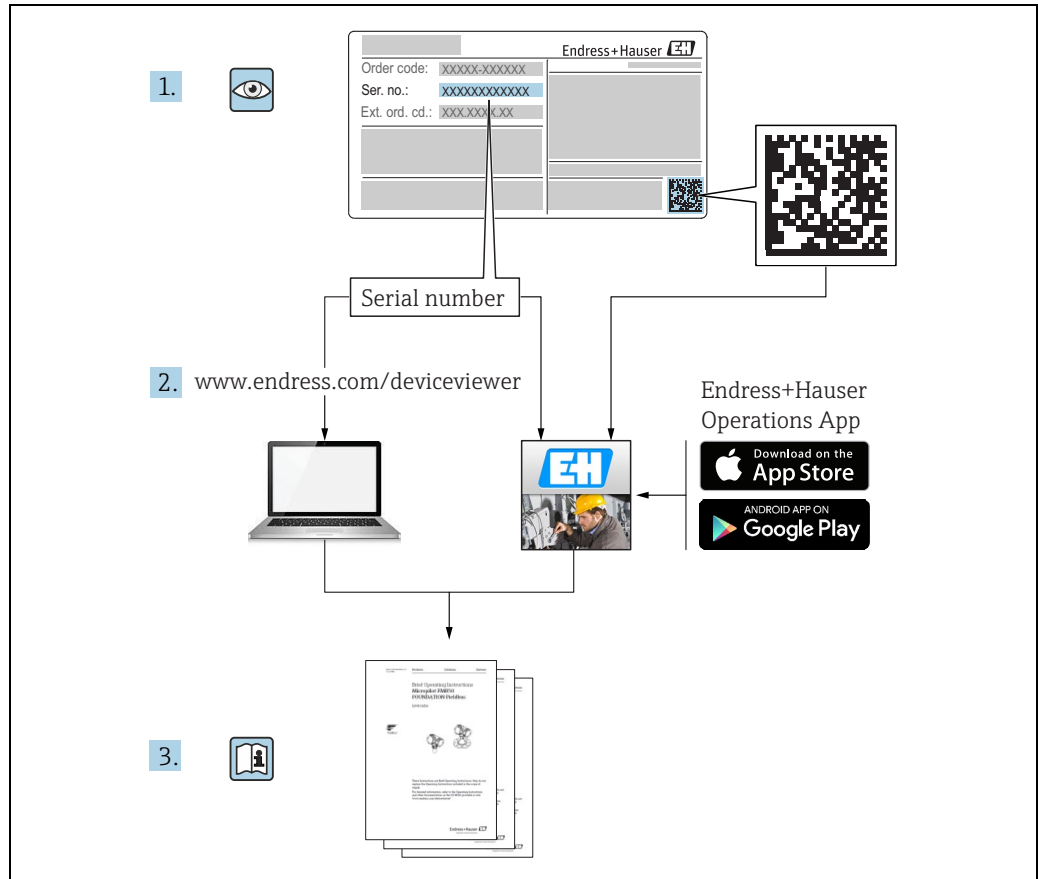
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Table of Contents

1   Document information

1.1   Target audience for this manual

This manual should support during the installation of Tankvision Professional NXA85.
It is recommended to receive a training on the system by Endress+Hauser.

1.2   Version history

Document version	Valid for SW version	Changes to the previous version
BA01653G/00/EN/01.16	18.0.2	Initial version
BA01653G/00/EN/02.17	18.1.1	Unification of the W&M and the non W&M software packages.

Due to the certification process with weights and measures agencies, the latest
software version might only be certified at a later stage. Also some features might be
incompatible with the weights and measure regulations and can therefore not be
combined.

1.3   Document function

1.3.1   Used symbols

Safety symbols

Symbol	Meaning
⚠ DANGER A0011189-EN	DANGER! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
⚠ WARNING A0011190-EN	WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
⚠ CAUTION A0011191-EN	CAUTION! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE A0011192-EN	NOTICE! This symbol contains information on procedures and other facts which do not result in personal injury.

Electrical symbols

Symbol	Meaning
⎓ A0011197	Direct current A terminal to which DC voltage is applied or through which direct current flows.
∼ A0011198	Alternating current A terminal to which alternating voltage is applied or through which alternating current flows.
⏚ A0011200	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

⏚ A0011199	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.

Symbols for certain types of information

Symbol	Meaning
ℹ️ A0011193	**Tip** Indicates additional information.
📄 A0011195	**Reference to page** Refers to the corresponding page number.
1. , 2. , 3. …	Series of steps
✔ A0018373	Result of a sequence of actions

Symbols in graphics

Symbol	Meaning
1, 2, 3 …	Item numbers
1. , 2. , 3. …	Series of steps
A, **B**, **C** …	Views
⬡EX A0011187	**Hazardous area** Indicates a hazardous area.
⬡EX A0011188	**Indicates a non-hazardous location** Safe area (non-hazardous area)

1.4   Documentation

1.4.1   Operating instructions

Document number	Instrument	Type of Document
BA00390G/00	Tankvision Professional	System Configuration
BA00391G/00	Tankvision Professional	Data Communications Controller
BA00392G/00	Tankvision Professional	Installation
BA00393G/00	Tankvision Professional	Maintenance
BA00394G/00	Tankvision Professional	Movements System Configuration
BA00395G/00	Tankvision Professional	Movements Operation
BA00396G/00	Tankvision Professional	System Operation
BA01293G/00	Tankvision Professional	OPC Tank Data Server
BA01294G/00	Tankvision Professional	OPC TG Client Configuration
BA01295G/00	Tankvision Professional	Web Server/Client System Operation
BA01363G/00	Tankvision Professional	Product and Tank Data Synchronization
BA01653G/00	Tankvision Professional	Simple Movements
BA01654G/00	Tankvision Professional	System Monitor

2   Identification

2.1   Product identification

The following options are available for identification of the software:

- Nameplate specifications
- Order code with breakdown of the software features on the delivery note
- Enter serial numbers from nameplates in W@M Device Viewer
  (www.endress.com/deviceviewer): All information about the software is displayed.

For an overview of the technical documentation provided, enter the serial number from the nameplates in the W@M Device Viewer (www.endress.com/deviceviewer)

2.2   Nameplate
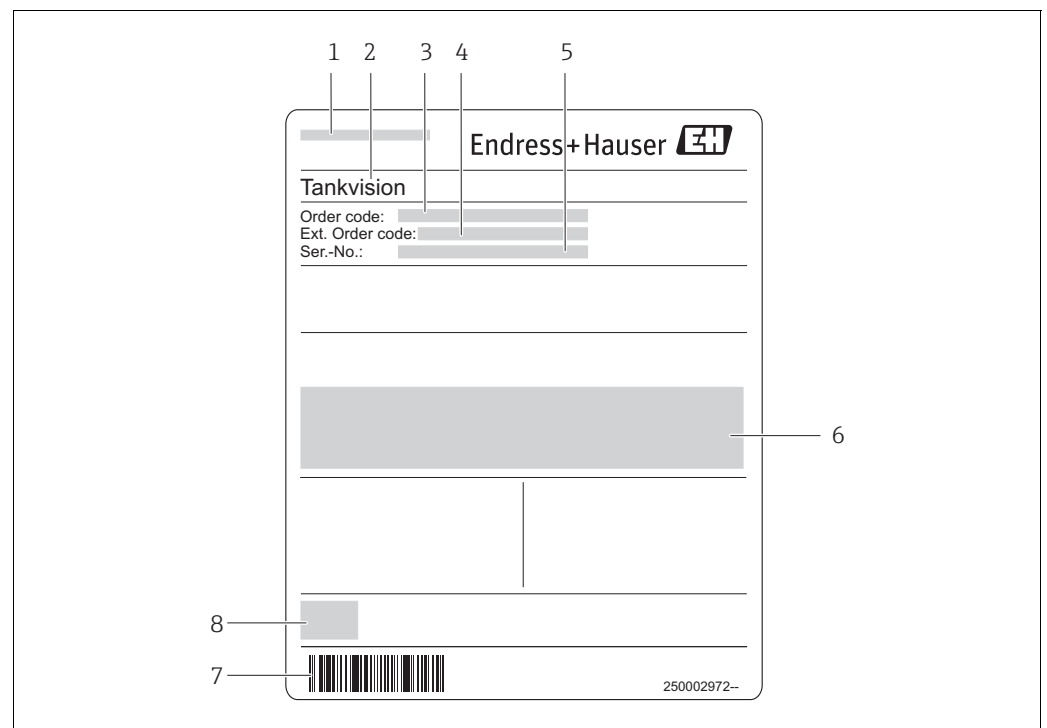
1   Address of manufacturer
2   Device name
3   Order code
4   Extended order code (Ext. ord. cd.)
5   Serial number (Ser. no.)
6   Certificate and approval relevant data
7   Barcode
8   CE mark

2.3 Order code and device version

To find out the version of your software, enter the order code indicated on the nameplate in the search screen at the following address:
www.products.endress.com/order-ident

2.4 Device documentation

The information required to retrieve the documentation can be found on the nameplate of the device.

Technical documentation can also be downloaded from the Download Area of the Endress+Hauser web site: www.endress.com→ Download. However this technical documentation applies to a particular instrument family and is not assigned to a specific device.

2.4.1 W@M Device Viewer

1. Launch the W@M Device Viewer: www.endress.com/deviceviewer

2. Enter the serial number (Ser. no.) of the device: see nameplate.
   ↳ All the associated documentation is displayed.

2.4.2 Endress+Hauser Operations App

The *Endress+Hauser Operations App* is available both for android smart phones (Google Play Store) and for iPhones and iPads (App Store).

Via the serial number:

1. Launch the *Endress+Hauser Operations App*.

2. Enter the serial number (Ser. no.) of the device: see nameplate.
   ↳ All the associated documentation is displayed.

2.5 Registered trademarks

Microsoft®, Windows® and Internet Explorer®
Registered trademarks of the Microsoft Corporation

Modbus®
Registered trademark of the Modbus-IDA, Hopkinton, MA, USA

Java®
Registered trademark of Sun Microsystems, Inc.

Mozilla® Firefox®
Registered trademark of the Mozilla Foundation

Android® and Google Play® are registered trademarks of Google Inc.

iPhone® and iPad® are trademarks of Apple® Inc., registered in the U.S. and other countries.

3 Basic safety instructions

3.1 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 beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates
  (depending on the application)
- Following instructions and basic conditions

The operating personnel must fulfill the following requirements:

- Being instructed and authorized according to the requirements of the task by the facility's owner operator
- Following the instructions in these Operating Instructions

3.2 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

3.3 Designated use

3.3.1 Application

Tankvision Professional is specifically designed for operators of bulk storage facilities, marketing terminals, refineries and pipelines. It is designed to handle all the data acquisition, supervisory control and monitoring required in a single fully integrated solution.

Tankvision Professional integrates all major types of tank measurement instruments into one system.

All measured and calculated tank parameters are accessible to your tank farm and terminal operators as well as to connected host systems.
Multi-user operation is provided by the inbuilt Web Server offering the opportunity to access data at any connected location (local/remote) e.g. for administrative and accounting purposes.

3.4 Workplace safety

For work on and with the device:

- Wear the required personal protective equipment according to federal/national regulations.
- Switch off the supply voltage before connecting the device.

3.5   Operational safety

Risk of injury!

- Operate the device in proper technical condition and fail-safe condition only.
- The operator is responsible for interference-free operation of the device.

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

- If, despite this, modifications are required, consult with Endress+Hauser.

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 repair of an electrical device.
- Use original spare parts and accessories from Endress+Hauser only.

3.6   Product safety

The device is designed to meet state-of-the-art safety requirements, has been tested and left thefactory in a condition in which it is safe to operate. The device complies with the applicable standards and regulations as listed in the EC declaration of conformity and thus complies with the statutory requirements of the EG directives. Endress+Hauser confirms the successful testing of the device by affixing to it the CE mark.

4 Operators Manual

4.1 Introduction

Tankvision Professional has two movement packages. The Full Movements packages is a paid for license option which contains more functionality than the Simple Movements package which is freely available to all users.

Features which the Full Movements package possesses and the Simple Movements package does not include:
- **Multi-tank movements**: In full movements you can configure a receipt into 5 tanks, for instance.
- **Flow rate monitoring**: Operators can be notified of unplanned stoppages while the movement progresses or imbalances between flow rates in the source and destination tanks in a transfer.
- **Site policy enforcement**: Supervisors can configure what alerts operators will receive during the movement process according to the source or class of the movement. Safety policy options can be made strictly enforced or overridable with audited events.
- **Reporting**: Operators can print out a movement ticket for the movement detailing the consequences of the movement to the inventory held on site.

Should these features be useful to site operations in most cases a simple license upgrade can be supplied from your local sales representative.

4.2 Operation

4.2.1 Terminology and Concepts

At the most basic level there are 2 stages to setting up a simple movement. In the first stage the user calculates the target level for a tank based on the current state of that tank and the quantity to move, pre-alarms are also entered that will sound during the progress of the movement. In the second stage the movement is set, which informs the system that tank levels are expected to move and starts the monitoring of the process.
Once the movement has completed the movement is stopped, which ends the monitoring of the tank.
The movement details are held in the system against each tanks' record, which means that there is no historical information regarding the movement preserved in the system, and that only one movement process can be defined for a tank at any time.

4.2.2 Simple Movements in Grid View

There is a default view in Grid View called Movements and is the basic user interface for monitoring movements.

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By default; on this view you are shown various data and statistics concerned with the movement:

• **Planned Volume**: The movement quantity expressed as a standard volume.
• **Simple Movement Status**: The state the tank is in: Active or Stopped.
• **Start Level**: The level in the tank when the movement was set.
• **Time to Stop Gauge**: An estimate of the time until the target level is reached based on the current flow rate.
• **Target Level**: The level to which you have planned as the end point of your movement.
• **Target Direction**: The direction the level is moving.
• **Transferred Volume**: The volume (standard) that has been moved since the movement was set.
• **Volume Left**: The volume (standard) that has yet to be moved to complete the movement.
• **Target Pre Alarm**: The levels configured as early warnings of the movement completing.

> **Planned Volume** differs from **Planned Quantity** in that the **Planned Volume** for movements where product is being removed from the tank is displayed as being negative and the **Planned Quantity** is always positive. The **Target Direction** field indicates the direction of the movement when the flow rate is in the expected direction.

It is possible you may need to create your own version of this view if you typically use other measurements to calculate your movements, weight or TOV for instance. Documentation for this is in the Tankvision Professional System Operation manual BA00396G.

Additional fields available to be added to Grid View views that are related to the Simple Movements feature are as follows:

• **Movement Target Type**: Indicates which tank measurement was used to define the movement quantity.
• **Planned Quantity**: The numerical value of the movement quantity.
• **Quantity Transferred**: The amount of product that has been transferred since the movement was set.
• **Quantity Left**: The amount of product that needs to be transferred to complete the movement.
• **Transferred Mass**: The quantity transferred since the movement was set expressed as a mass.

4.2.3 Setting a movement

To set a movement on a tank, locate the tank in your grid view display and right click on it to bring up the context menu and then select **Set Movement**. This will then launch the Simple Movements module. Alternatively select the tank with a left click and then click the movement button 🖼 on the Grid View tool bar.

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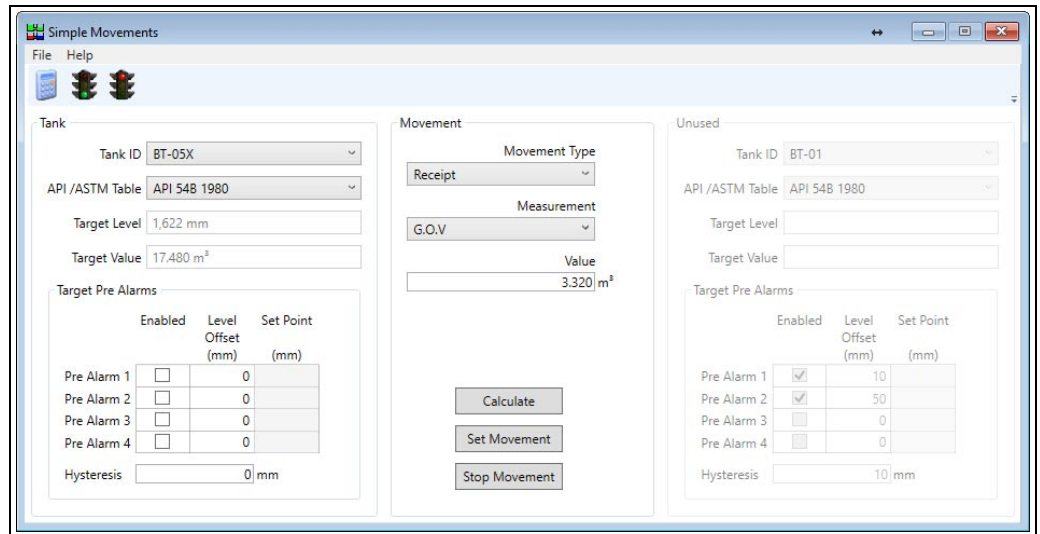
In order to configure a movement you need to complete the details required to calculate the target level for the tank you have selected. If you plan to transfer a quantity from one tank to another in your tank gauging system you may configure both at the same time using this screen.

Typically, you will choose the tank you wish to move product in to or out of, then determine the type of movement you wish to perform, choose the measurement method you will use to plan the movement and then **Calculate** resulting target level. Repeat the process if you are not satisfied with the result. Once you have a target level, click **Set Movement** and you are ready to switch on the pumps, open values and so on.

> In order to calculate the target level for your movement there needs to be valid, current tank gauging data on which to base the calculations. Live tank values that are missing, such as product level, reference density or product temperature might prevent a successful calculation resulting in not being able to set a movement.

If you need to change the target level during the movement activity, you can recalculate and click **Set Movement** again. Note that the new movement will start from the current position in the tank, not the position when you originally set the movement.

4.2.4 Stopping a Movement

When the movement has completed you can set the tank's movement status back to stopped in the following ways:
- **Context Menu in Grid View**: Right-click on the tank in grid view and select **Stop Movement**.
- **Simple Movements Module**: Open the Simple Movements window, select the tank and click **Stop Movement**.

Stopping a movement has the effect of deactivating the target level and pre-alarms for the tank.

4.2.5 Simple Movement Parameters

Movement Type

The movement type field determines the direction of the movement, and in some cases determines the target and planned quantity for the movement.

Type	Description
Receipt	Planned quantity is to be received in to the tank; resulting in a net increase in product in the tank.
Load	Planned quantity is to be removed from the tank; resulting in a new decrease in the amount of product in the tank.
Empty	Take all the available product out of the tank; the target level will be the tank's minimum operating level.
Fill	Add enough product into the tank to fill the ullage space.
Transfer To	**Enables second tank**: Move a defined quantity of product from the tank on the left to the tank on the right.
Empty To	**Enables second tank**: Move all available product from the left-hand tank into the right-hand tank.
Fill From	**Enables second tank**: Move enough product from the right-hand tank to fill the ullage space in the left-hand tank.

Measurement

Unless one of the Fill/Empty options is selected you can choose how you want to plan the quantity for the movement

Measurement	Description	Transfer Compatible
Absolute GOV	The value specified is the target gross observed volume for the tank.	No
Absolute TOV	The value specified is the target total observed volume for the tank.	No
Absolute GSV	The value specified is the target gross standard volume for the tank.	No
Absolute Weight	The value specified is the target gross weight for the tank.	No
Absolute Mass	The value specified is the target gross mass for the tank.	No
Absolute Level	The value specified is the target level for the tank.	No
GOV	The value specified is the gross observed volume to be moved.	Yes
TOV	The value specified is the total observed volume to be moved.	Yes
GSV	The value specified is the gross standard volume to be moved.	Yes
Weight	The value specified is the weight of product to be moved.	Yes
Mass	The value specified is the mass of product to be moved.	Yes
Level	The values specified is vertical distance the product level is to be moved in the tank. If used with a transfer, the level change is defined for the source tank, the equivalent change in standard volume is applied to the destination tank.	Yes

The difference in TOV and GOV calculations is that TOV treats water in the tank as product. So if you have installed automatic water sensing equipment in tanks containing a mixture of ethanol and gasolene you should use TOV in order to ignore the false water readings.

Commands

- **Calculate**: Calculate a target level based on the current tank gauging data, the movement type, measurement and value. No change is made to the database as a result of this.
- **Set Movement**: Change the status of the tank to **Active** and set the target level and pre-alarms previously calculated.
- **Stop Movement**: Change the status of the tank to **Stopped** and disable any target level and pre-alarms configured on the tank.

4.2.6   Pre-alarms

Pre-alarms are intended as a way to use the Tankvision Professional alarm and event handler to provide notification of the progress of movements. Up to 4 pre-alarms can be defined each with a different offset from the target level. The system uses the direction information you specify to decide whether the alarm will go off when the level goes under or over a given level, so you should always define a positive offset value. The calculated set point is displayed for you to check the results of your calculation.
Pre-alarms are deactivated when the movement status is returned to **Stopped**.
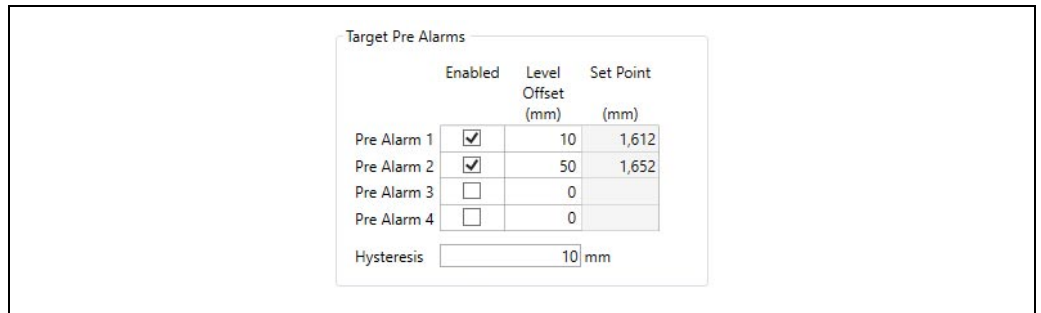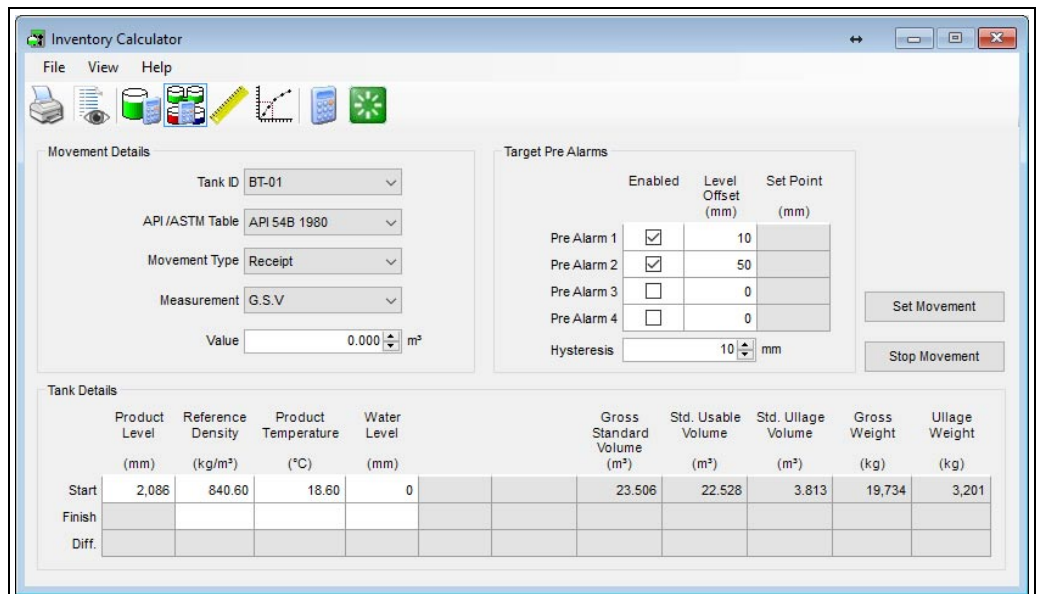

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4.2.7   Transfers

Certain movement types involve 2 tanks, selecting one of these enables the right hand tank detail controls. The tank details on the left hand side are the source tank for **Empty To** and **Transfer To**; for **Fill From** the source tank is on the right. Conceptually, you are in effect configuring 2 movements at once, one receipt and one load that share a common movement quantity.
The Pre-alarms for each side of the transfer are independently configured.

### 4.2.8   Inventory Calculator

Much of the functionality in the previous sections also exists in the Inventory Calculator Movement page. You can calculate target levels, **Set** and **Stop** movements and configure Pre-Alarms for a tank. However, there is no facility for configuring transfer type movements. One thing that the Inventory Calculator affords is the ability to evaluate the affect a movement will have on a tank's inventory. This What-if scenario planning is the main reason for using this screen.

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4.2.9   Automatic Control of Unauthorised Movements

The system can automatically disable the two unauthorised movement alarms when a movement is set and then automatically re-activate them when the movement is **stopped**. To set up the automatic control of unauthorised movements first enable **Automatically generate unauthorised movements** in the Tankvision Professional settings dialog - from **Home Page** → **Admin** → **System Settings** menu option.
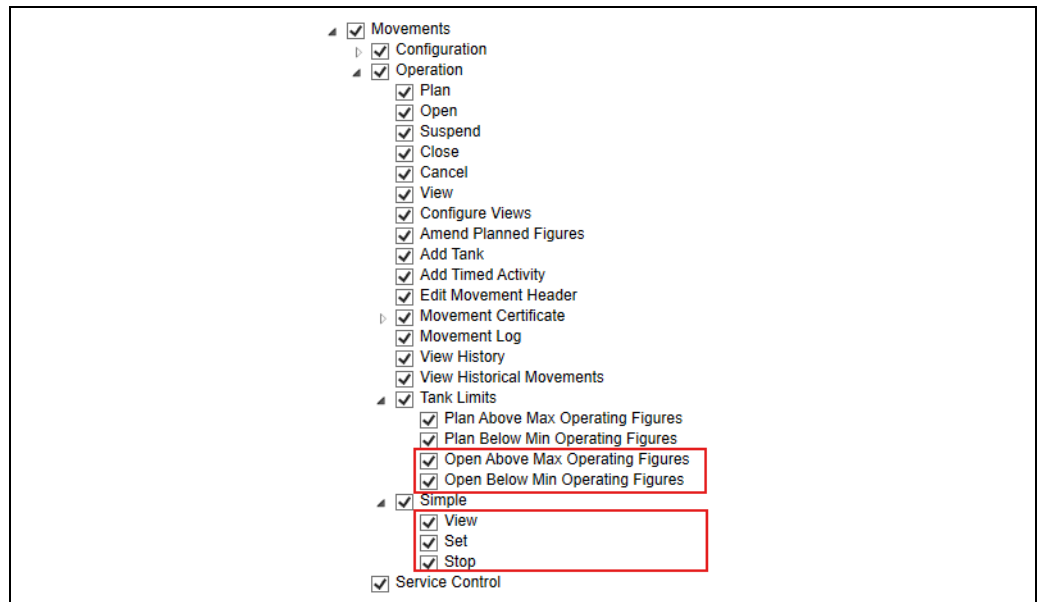

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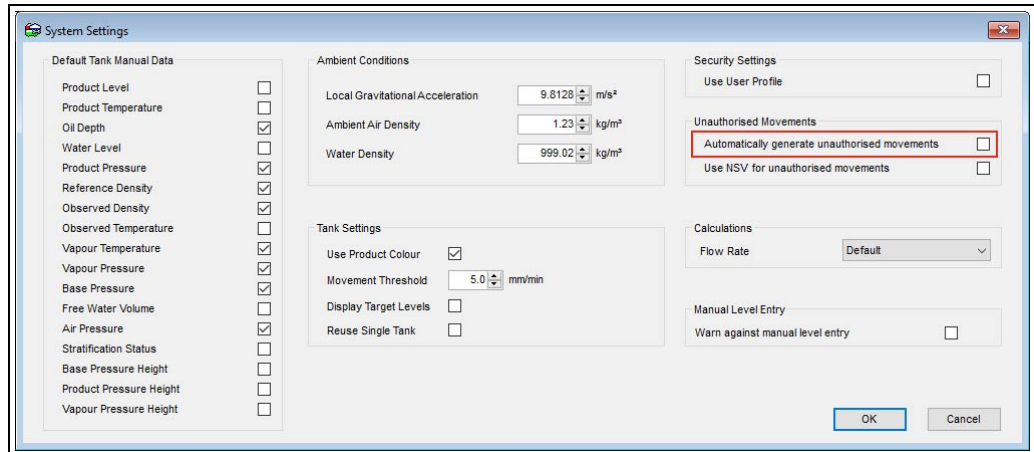
Then on each tank to be monitored for unauthorised movements, enable the appropriate alarms and configure suitable thresholds. When the automatically generate unauthorised movements flag is set the alarm detection algorithm examines the status of the tank to see if it is supposed to be moving or not. If a movement is set, then the unauthorised movement detection is disabled, when you stop the movement the current tank levels are recorded and the alarms are reactivated.

For information on the configuration of unauthorised movement alarms consult the Tankvision Professional System Configuration manual BA00390G.

5   Configuration Manual

5.1   Security Settings

Using security policies it is possible to control access to the Simple Movements features. The settings that affect this are found under **Movements → Operation** in the group security editor.

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- **Simple → View**: Privilege is required to permit user access to the Simple Movements Set Movement Window.
- **Simple → Set**: Grants the user the ability to start a movement on tanks.
- **Simple → Stop**: Grants the user the ability to stop a movement on tanks.
- **Tank Limits → Open Above Max Operating Figures**: If set the users will be able to open movements that have a target level greater than the maximum operative level for the tank. They will be warned about this, and their action will be entered in the audit trail.
- **TankLimits → Open Below Min Operating Figures**: If set the users will be able to open movements that have a target level below the minimum operating level. A warning will be given and the action will be audited.

It is not recommended that customers use both movements packages simultaneously, this can lead to confusion with movement alarms and automatic operation of the unauthorised movement detection. If you have purchased a license for the full movements package it is recommended that you disable the all access to the Simple Movements using these security options.

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