BA00390G/00/EN/14.15
71271296

Valid as of software version:
18.0.2 and 18.0.3

Operating Instructions
Tankvision Professional NXA85
System Configuration

Endress+Hauser
People for Process Automation

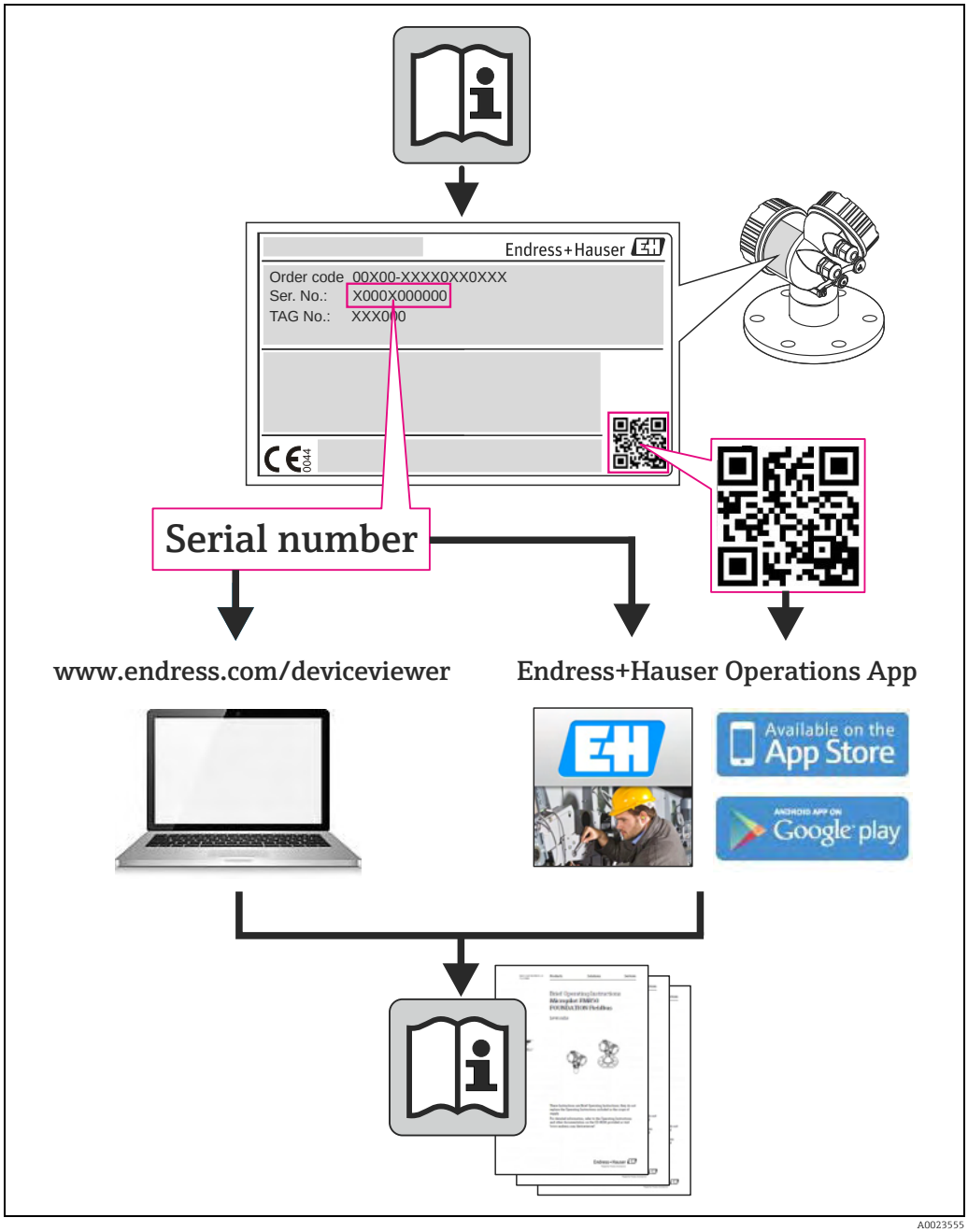

Endress+Hauser
Order code 00X00-XXXX0XX0XXX
Ser. No.: X000X000000
TAG No.: XXX000
0044
Serial number
www.endress.com/deviceviewer
Endress+Hauser Operations App
Available on the App Store
Google play
A0023555

Table of Contents

1 Document information

1.1 Target audience for this manual

This manual should support during the configuration of Tankvision Professional NXA85. Beside basic PC operating knowledge no special training is needed to perform the Tank Gauging System operations. Nevertheless it is recommended receiving a training on the system by Endress+Hauser.

1.2 Version history

Document version	Valid for SW version	Changes to the previous version
BA00390G/00/EN/13.10	18.0.0	Initial version
BA00390G/00/EN/14.15	18.0.2 and 18.0.3	New layout; Enhanced Product, Tank and Movement functionality

Due to the certification process with weights and measures agencies, some of the functionality might not be present in the software version 18.0.3.

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
 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
 A0011187	**Hazardous area** Indicates a hazardous area.
 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 Synchronisation

2 Identification

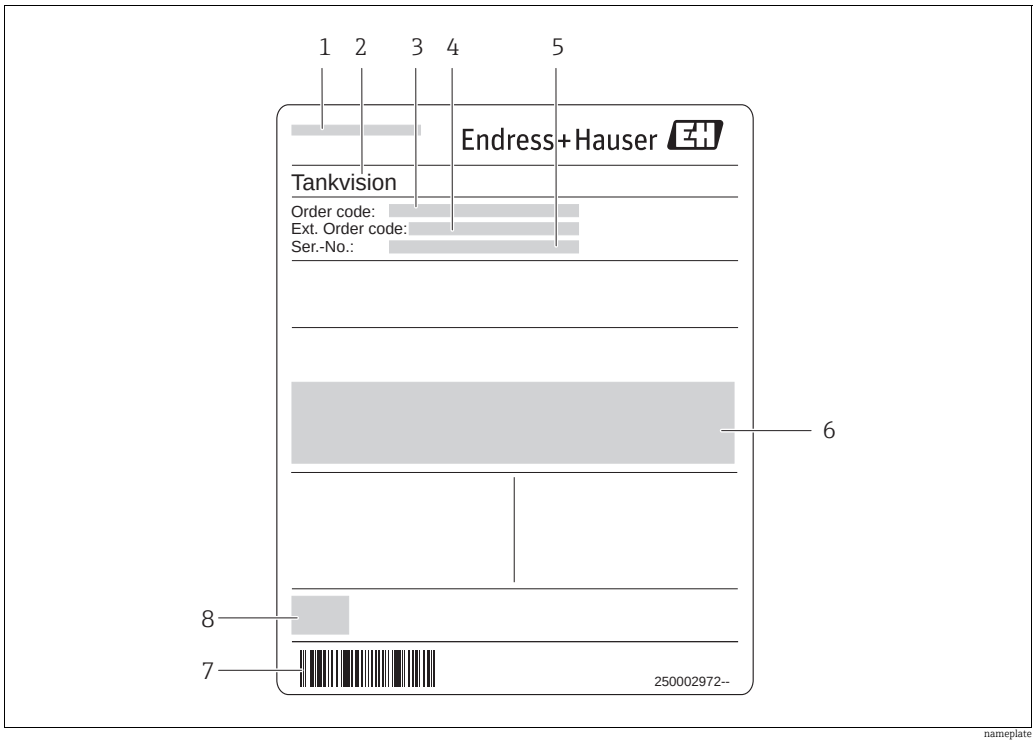
2.1 Product identification

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



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 System Configuration

The System is provided with a suite of configuration tools allowing the user to create and configure their own database to reflect their own site configuration.
It is however recommended that any user wishing to configure a complete system attends a recognised training course at an approved support centre.
This manual assumes that the system software has been correctly installed in accordance with the Installation manual and any other release notes and instructions provided by the manufacturer of the software.
In order to successfully configure a system the following information will be required as a minimum:

- **Tank details** such as:
  - Tank Identity
  - Tank Shape
  - Tank Operating Parameters
  - Alarm set-points
  - Calibration Table
  - Product Name
- **Gauge details** such as:
  - Gauge Type
  - Gauge Address
  - Data Items supported

5 Tank Capacity Data Configuration

5.1 Tank Capacity Data Configuration Introduction

Tank capacity tables are required if the system is to calculate inventory data.
Each capacity table needs to be provided in a comma separated variable text file.

The accuracy of the volumes calculated by the system is only as good as the accuracy of the tank capacity points provided.

The utmost care must be taken when selecting the capacity points to be used. Indeed where possible the original tank strap points should be entered to get the best accuracy.

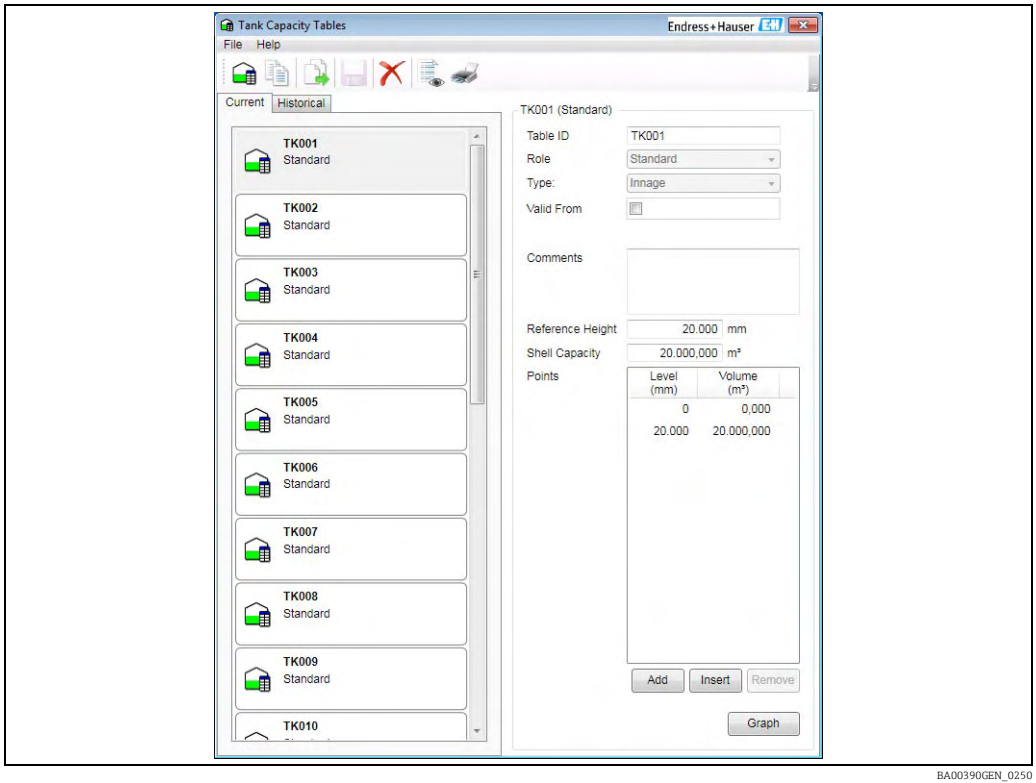
The use of this feature can be controlled by the security system.

5.2 Loading the Tank Capacity Table Module

To load the Tank Capacity Table Module, proceed as follows:

1. Select **Configuration → Tank Capacity Tables** from the main menu.

   The Tank Capacity Table module will be loaded as follows:



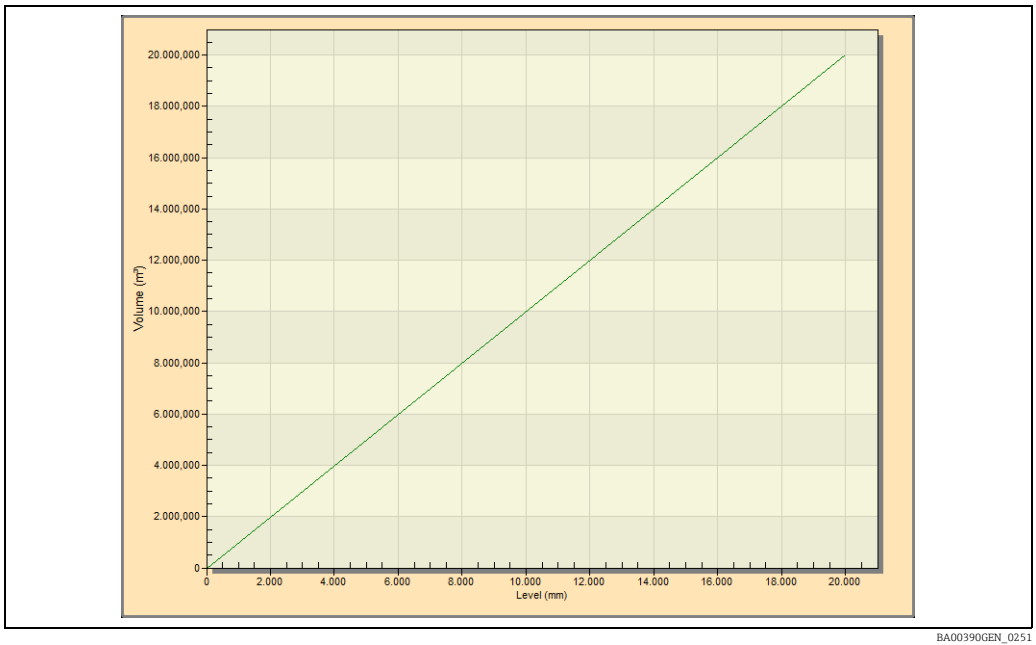
BA00390GEN_0250

The list of tables will be populated with all tank capacity tables currently configured.

Tank Capacity Tables are bound to tanks in the tank characteristics menu option.

- Selecting **File → New** from the menu will allow naming and editing of options and data to create a new tank capacity table.
- Selecting **File → Import Points** will cause the import points screen to be displayed for import of a CSV file.

Clicking the **Graph** button opens a pop-up with the graph of the currently selected tank capacity table. Clicking on the pop-up closes it.

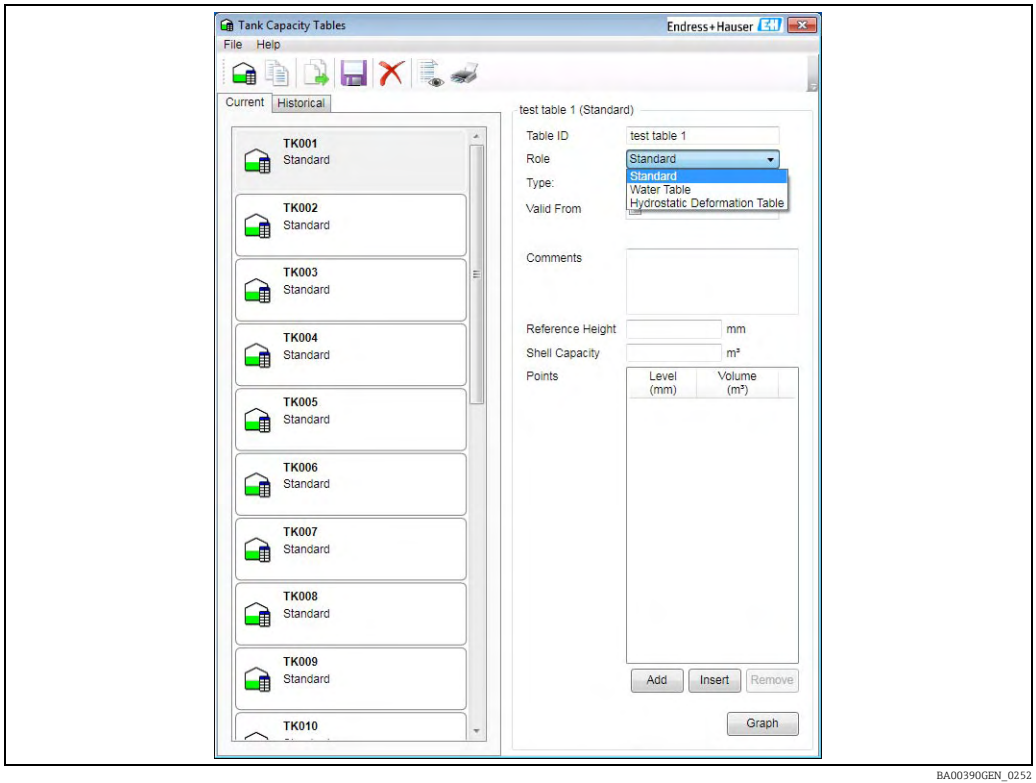


BA00390GEN_0251

5.3 Adding a New Tank Capacity Table

To add a new tank capacity table, proceed as follows:

1. Select the **File** menu followed by the **New** option.

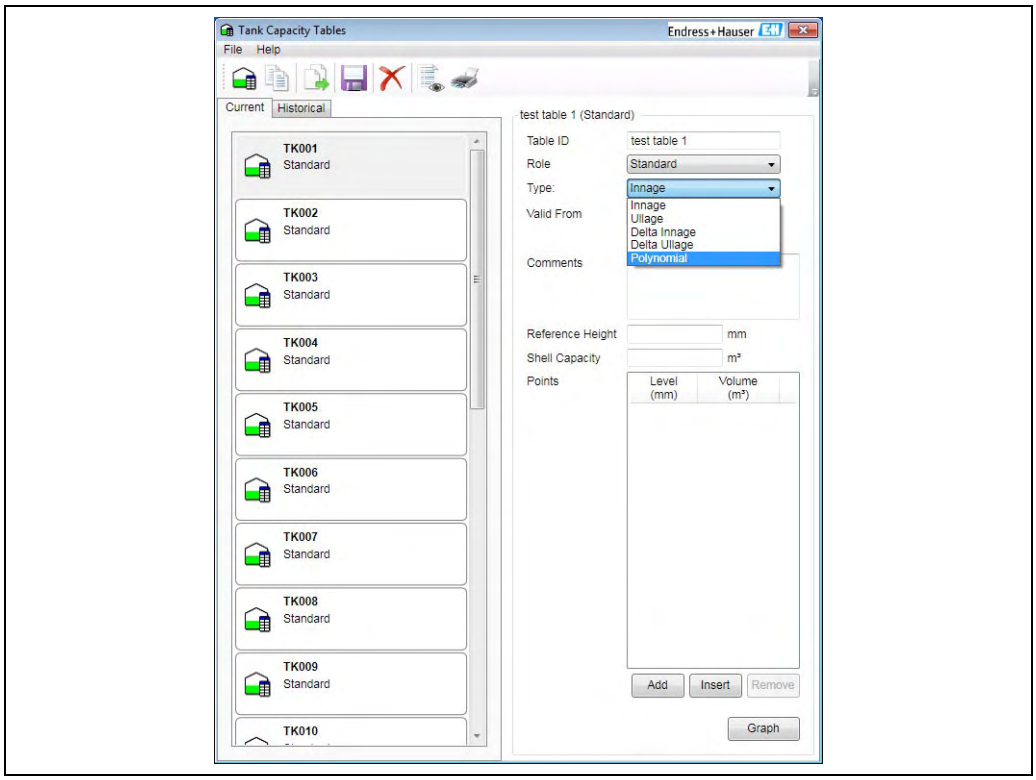


BA00390GEN_0252

2. Enter the name in **Table ID**.

You need to indicate whether the table role is for standard, water or hydrostatic deformation.

3. Then select type from **Innage**, **Ullage**, **Delta Innage**, **Delta Ullage** or **Polynomial**.



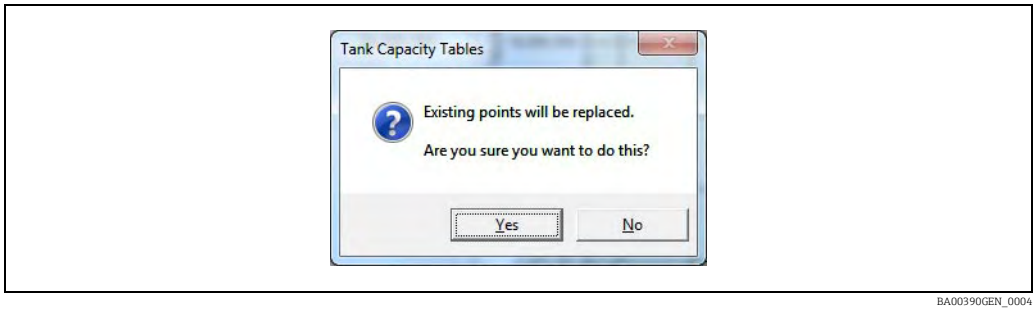
BA00390GEN_0253

4. Enter a valid **From** date in the format 01/04/2011 00:00 (invalid format is ignored).
5. Enter the reference height and shell capacity.
6. Finally enter or import the points (up to 60,000) for the tank and then select **File → Save**.

5.4 Importing a Tank Capacity Table

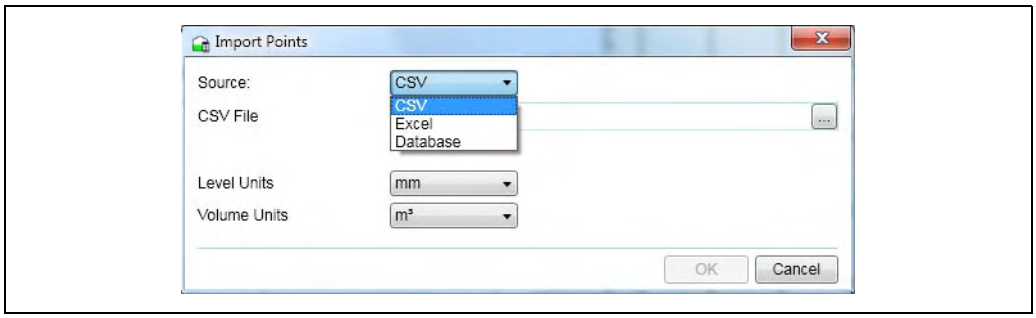
To import a tank capacity table, proceed as follows:

1. Select the **Table** menu followed by the **Import Points** option.
   The following prompt opens. Confirm with **Yes**.

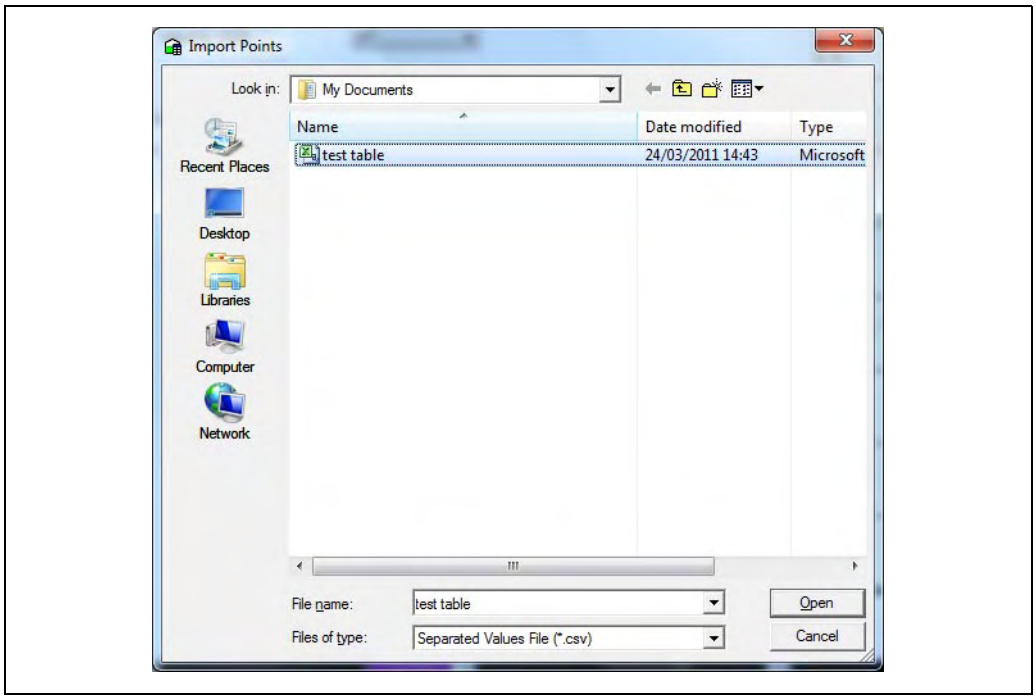


BA00390GEN_0004

You will be prompted to enter a choice of **CSV**, **Excel** or **Database** for the source and given an option to change the engineering units for level and volume.



BA00390GEN_0005



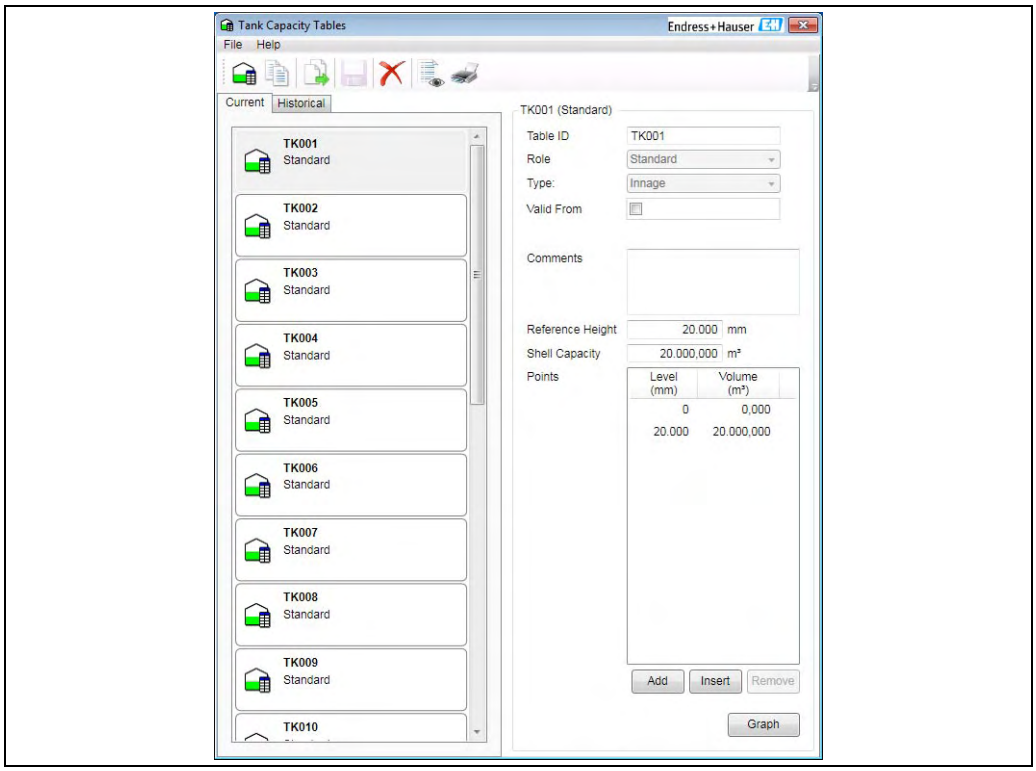
BA00390GEN_0006

2. Select the file for the tank capacity table. Click the **Open** button to load the calibration data into the database.

Any problems loading the data will be reported to the user. You will notice that a simple chart is plotted showing the characteristic of the calibration data. This is a useful aid to spot any erroneous data.
The plotted characteristic should be almost linear for Vertical Cylindrical tanks. For spherical and horizontal cylindrical tanks the plotted chart should exhibit a non-linear characteristic.

5.5 Viewing Existing Tables

1. Select **Configuration → Tank Capacity Tables** from the main menu.
The Tank Capacity Table module will be loaded as follows:



BA00390GEN_0250

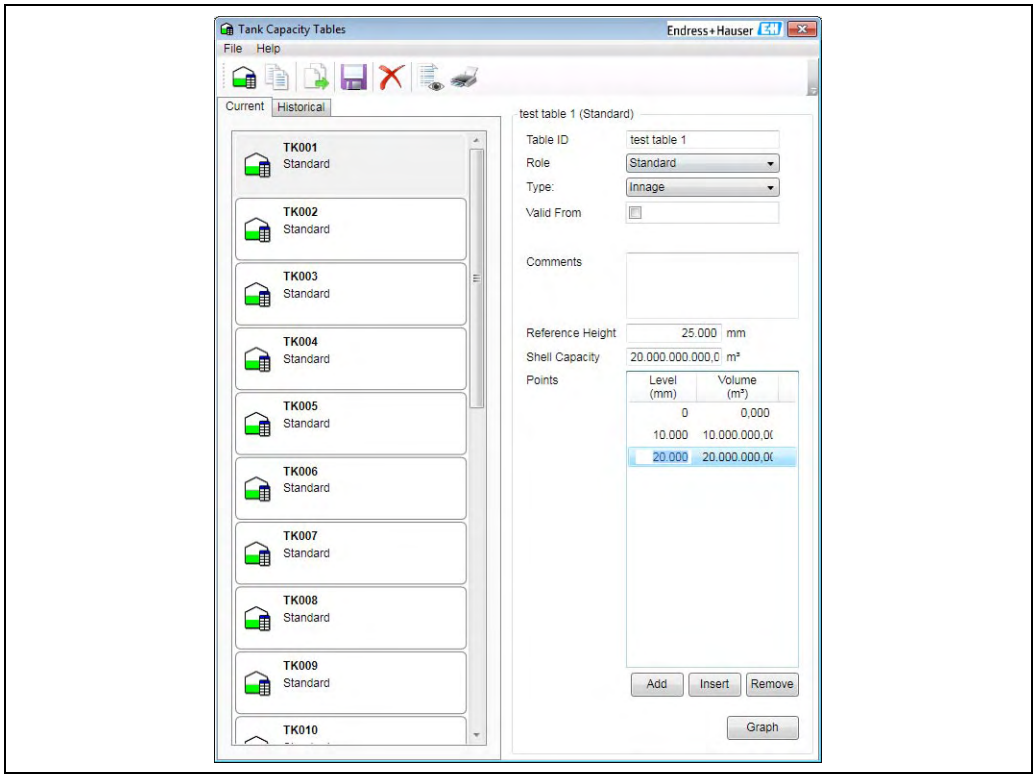
2. Select a Capacity Table to view the points and data.

Tables which have been superseded using the valid from field for the date of the new table to commence can be seen in the history tab.

5.6 Editing Values in an Existing Table

To edit values in an existing capacity table, proceed as follows:

1. Select the table to be edited from the list.
   If you have the necessary security access rights you will be able to edit the table of values.
2. Type in the new value and move off the row to save the changes locally to the table.



BA00390GEN_0254

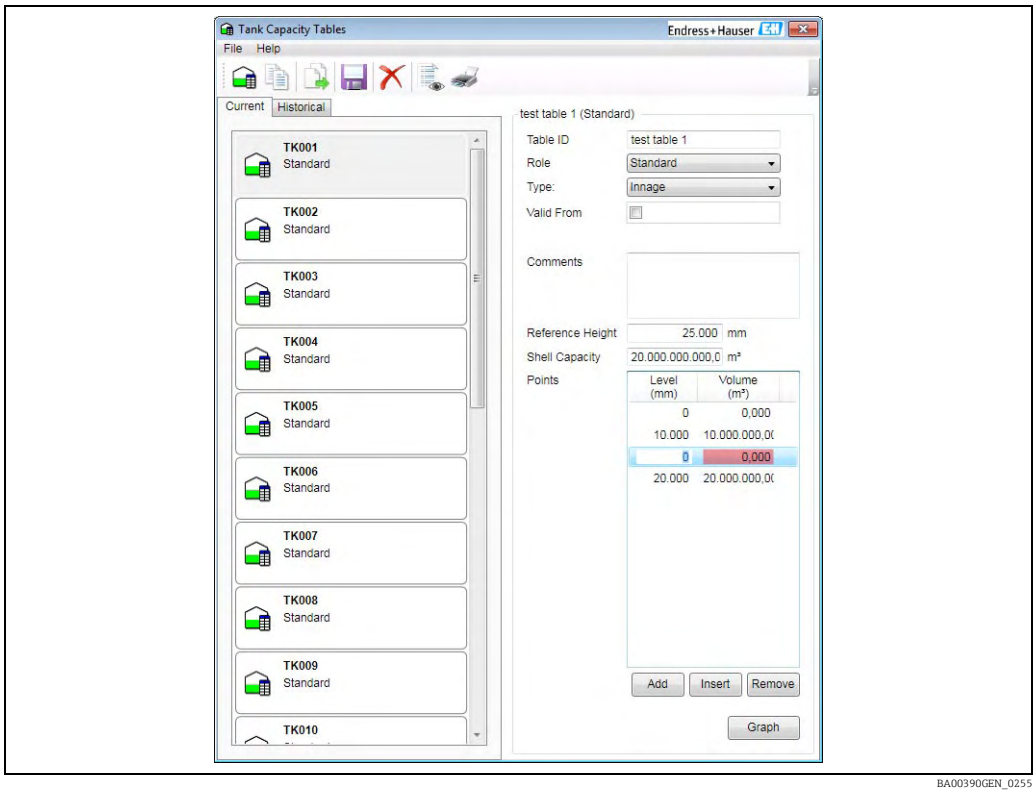
3. To save the changes to the database click the button.

If the application is closed prior to saving the changes you will be prompted to save the changes.

5.6.1 Inserting an Extra Row

To insert an extra row, proceed as follows:

1. Select the row at which a record needs to be inserted by clicking with the left mouse button on the left hand side of the row.
2. Select the **Insert** option.
   A new row will be inserted.



BA00390GEN_0255

3. Enter the data for the new row.
4. To save the changes to the database click the button.

If the application is closed prior to saving the changes you will be prompted to save the changes.

Adding is much the same as inserting but appends a row to the end.

5.6.2 Deleting Rows

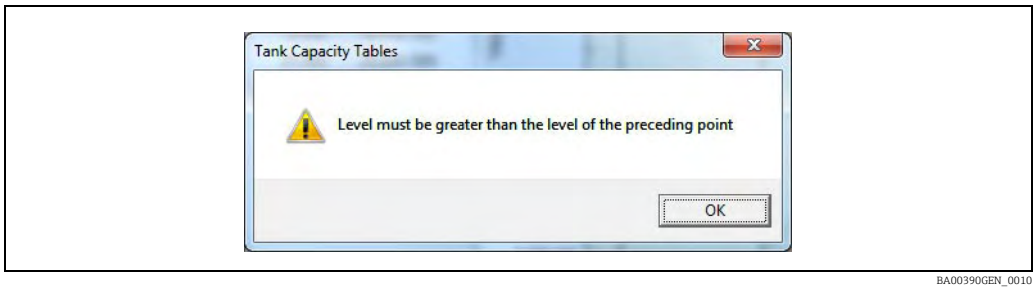
To delete a row, proceed as follows:

1. Select the row at which a record needs to be inserted by clicking with the left mouse button on the left hand side of the row.
2. Select the **Delete** option.
   The row will be deleted.
3. To save the changes to the database click the button.

If the application is closed prior to saving the changes you will be prompted to save the changes.

5.7 Validity of Data

The user is not allowed to enter points in the wrong order all subsequent levels and volumes must be larger than the previous one.



BA00390GEN_0010

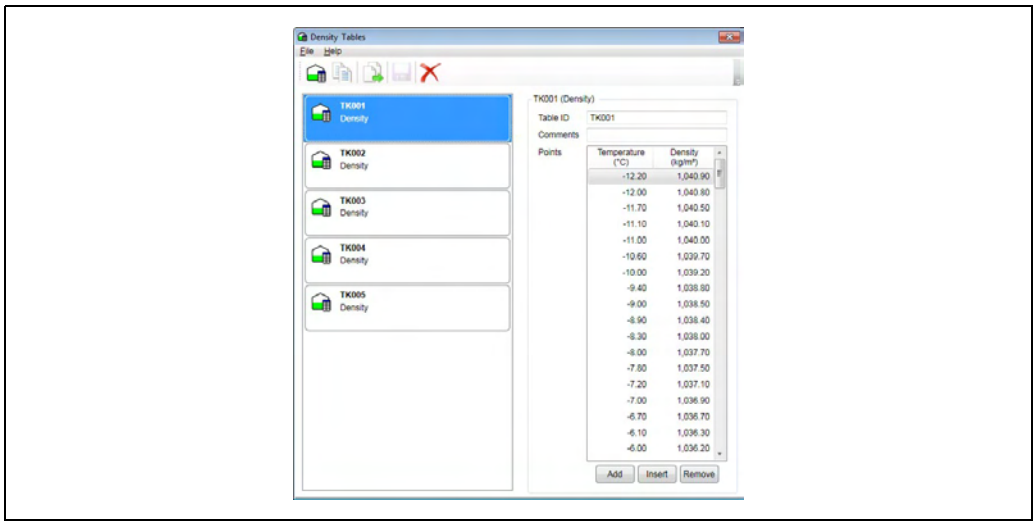
6 Density Table Configuration

6.1 Density Table Configuration Introduction

Density tables are required if the user has selected **Density Table** as a volume correction method.
The utmost care must be taken when selecting the density points to be used to get the best accuracy.
The use of this feature can be controlled by the security system.

6.2 Loading the Density Table Module

1. Select **Configuration → Density Tables** from the main menu.
The Density Table module will be loaded as follows:



BA00390GEN_0011

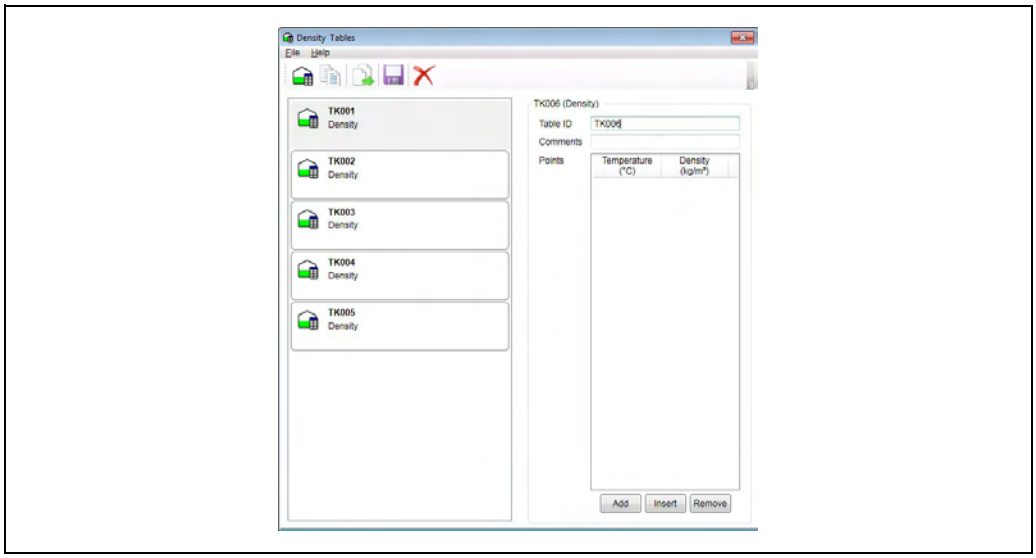
The list of tables will be populated with all density tables currently configured.

Density tables are bound to tanks in the tanks characteristics menu option.

- Selecting **File → New** from the menu will allow naming and editing of options and data to create a new tank density table.
- Selecting **File → Import Points** will cause the import points screen to be displayed for import of a CSV file.

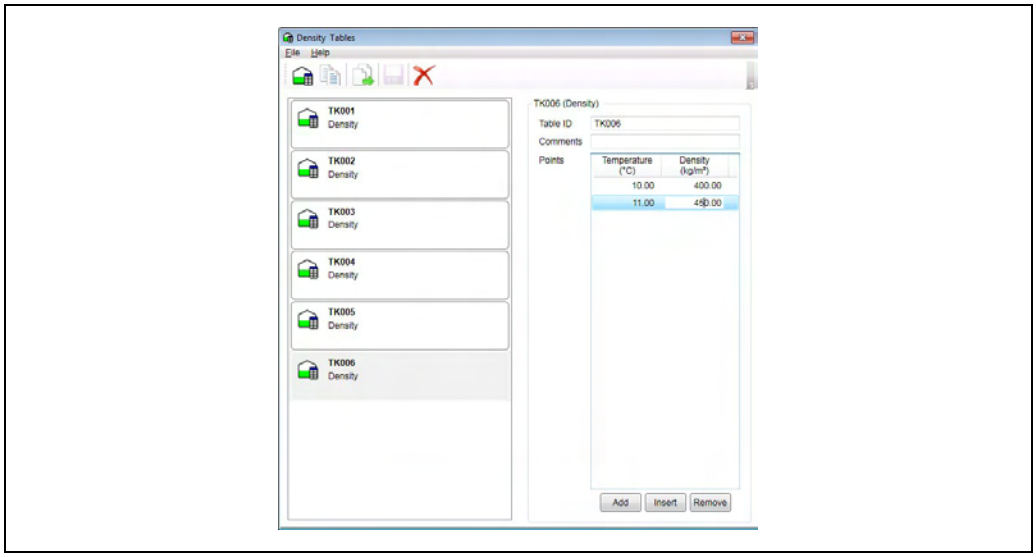
6.3 Adding a Density Table

1. Select the **File** menu followed by the **New** option.



BA00390GEN_0012

2. Put the name in **Table ID**.

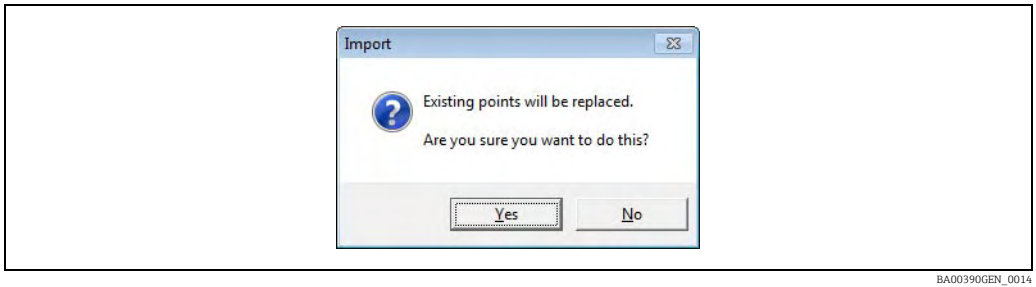


BA00390GEN_0013

3. Finally enter or import the points (up to 200) for the tank and then **File → Save**.

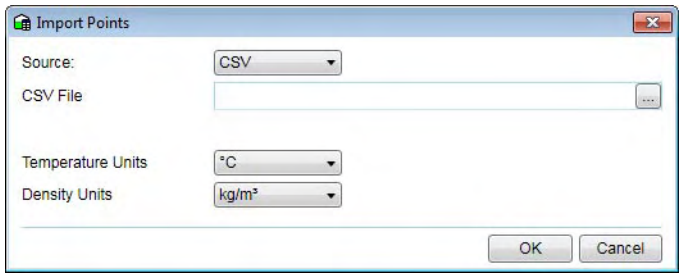
6.4 Importing a Density Table

1. Select the **Table** menu followed by the **Import** option.

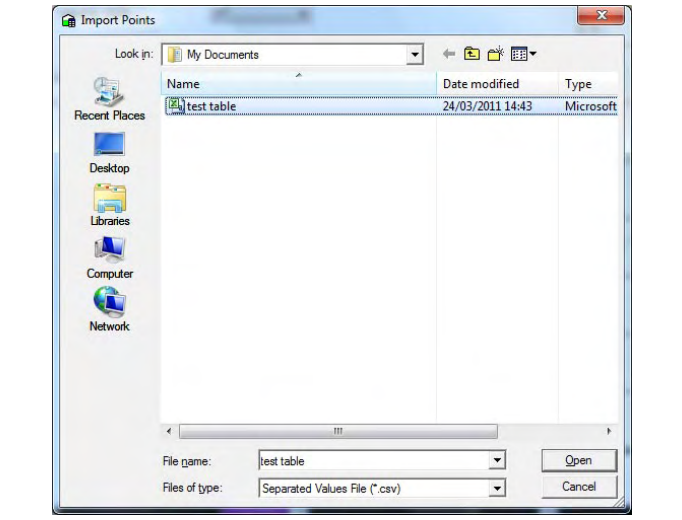


BA00390GEN_0014

You will be prompted to enter CSV for the source and given an option to change the engineering units for temperature and density.



BA00390GEN_0015

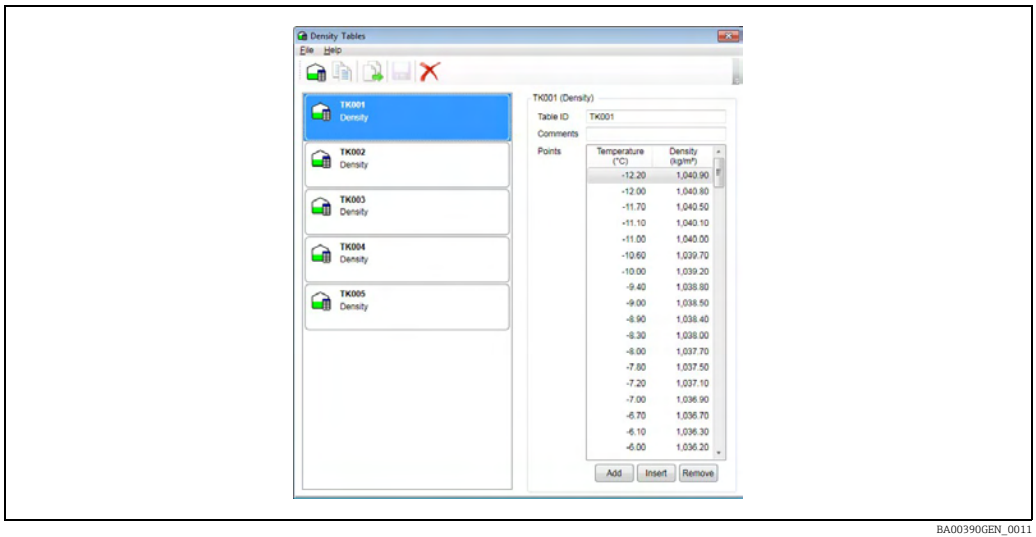


BA00390GEN_0016

2. Click the **OK** button to load the data into the database.
Any problems loading the data will be reported to the user.

6.5 Viewing Existing Tables

1. Select **Configuration → Density Tables** from the main menu.
The Density Table module will be loaded as follows:



BA00390GEN_0011

2. Select a Density Table to view the points and data.

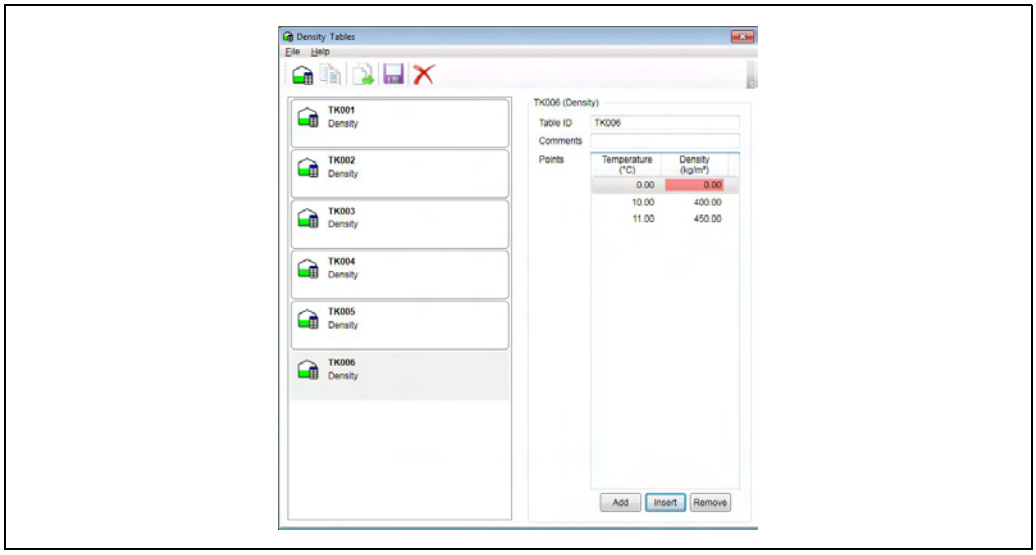
6.6 Editing Values in an Existing Table

1. Select the table to be edited from the list. If you have the necessary security access rights you will be able to edit the table of values.
2. Type in the new value and move off the row to save the changes locally to the table. The row will be deleted.
3. To save the changes to the database click the button.

If the application is closed prior to saving the changes you will be prompted to save the changes.

6.6.1 Inserting an Extra Row

1. Select the row at which a record needs to be inserted by clicking with the left mouse button on the left hand side of the row.
2. Select the **Insert** option.
A new row will be inserted.



BA00390GEN_0018

3. Enter the data for the new row.
4. To save the changes to the database click the button.

If the application is closed prior to saving the changes you will be prompted to save the changes.

Adding is much the same as inserting but appends a row to the end.

6.7 Deleting Rows

1. Select the row at which a record needs to be inserted by clicking with the left mouse button on the left hand side of the row.
2. Select the **Delete** option.
   The row will be deleted.
3. To save the changes to the database click the button.

If the application is closed prior to saving the changes you will be prompted to save the changes.

6.8 Validity of Data

The user is not allowed to enter points that are out of the temperature or density range, values outside this range will be highlighted red.

7 Tank Characteristics

Tank Characteristics allows entry and/or editing of the main tank operating parameters and calculation configuration parameters.
A number of the data items are important to the tank inventory calculations and it is therefore essential that they are configured correctly.

Tank characteristics are divided into several sections:
- Tank Details
- Tank Capacity Tables
- Roof Details
- Tank Correction
- Miscellaneous
- VCF Settings
- Calculation Control Settings
- Input Control Settings

Some values are dependent on other settings. Indeed some fields are not visible or enabled until they are called for by the setting of another parameter.
The use of this feature can be controlled by the security system.

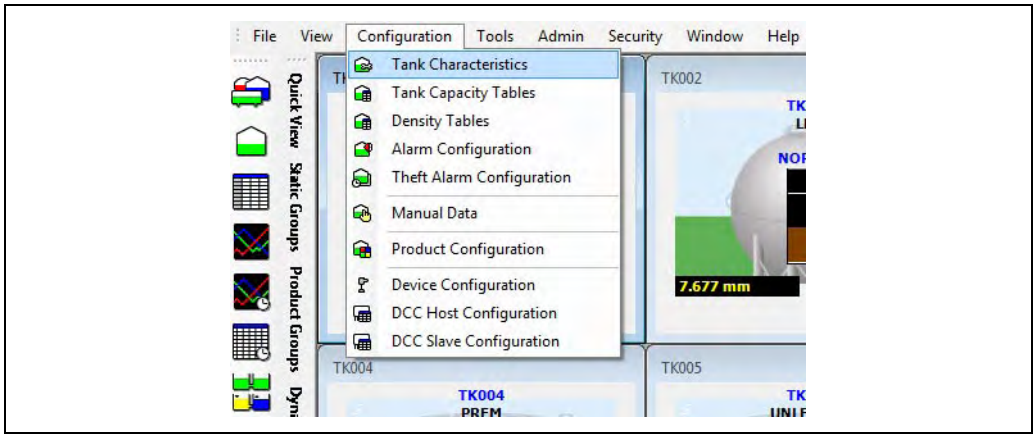
Some settings are specific to certain calculation methods, these are listed below:

Tank Details screen
- JIS (Japanese Industrial Standards) Calculation Method is enabled when a JIS Volume Correction Method and a floating roof tank shape are selected.
- Correction Volume and Calibration density are enabled when a JIS volume correction method is selected.
- Selecting GBT or GBT(Direct_Weight) implies that a Hydrostatic deformation Table is in use. Not applying such a table will result in the failure of calculated values.

VCF settings screen
- Enraf polynomial constants A and B require EnrafChem2Poly or EnrafChemPoly1 volume correction method. C, D and E are only available when EnrafChemPoly1 is selected.
- The label ‘Chemical Concentration’ changes to ‘Alcohol strength by volume’ or ‘Alcohol strength by mass’ depending on the type of chemical calculation selected.
  - HMD, Nitric = Chemical Concentration
  - OIML R22 STRxVOL: Alcohol strength by volume
  - JIS K2250 STRxVOL: Alcohol strength by volume
  - OIML R22 STRxMASS: Alcohol strength by mass

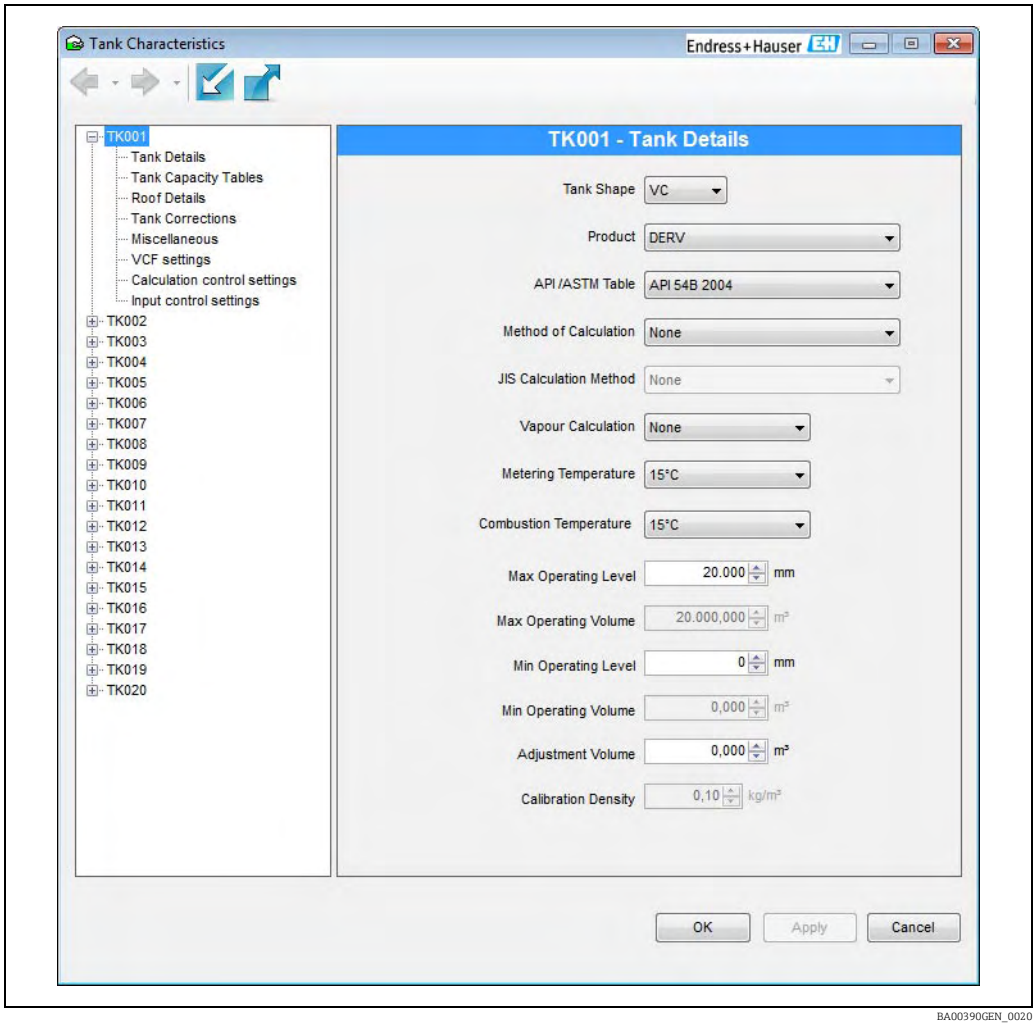
7.1 Launching Tank Characteristics

1. Select the **Tank Characteristics** option from the **Configuration** menu.



BA00390GEN_0019

The following display is typical of what will be loaded.



BA00390GEN_0020

The tree view on the left contains the list of all tanks within the system.
Clicking on any tank in the list automatically expands that tanks details.

2. Expand the tanks tree view in the list and click on the required item.

- **Ok**, **Apply**, and **Cancel** buttons are provided.
- Use the **Forward** and **Back**  buttons to move through the history of edited pages.
- The **Import** / **Export**  buttons provide a means to export data from one tank for backup purposes or to overwrite the settings of another tank.
- When the **Export**  button is clicked, the user is prompted for a path and filename for the exported data. The path defaults to the tank gauging default export directory. All data held in Tank Characteristics except the tank name and associated tank capacity tables are exported.
- To **import**  data, first select the tank to import the data to then click the import button. All data except the tank name and associated tank capacity tables will be overwritten. If an error occurs or the user cancels the operation, the previous data will be restored.

7.2 Modifying Data Within Tank Characteristics

To modify data within the tank characteristics, proceed as follows:

1. Select the tank to be modified from the list.

   The current details for the tank will be displayed.

Take note that if this is the first time Tank Characteristics has been loaded after installing the system it will be displaying **default values**. It is essential that **default value**s are replaced with the correct operating values.

2. Select the field to be edited and enter/select the new data.

   Each field is validated both during data entry and just before the data is saved to the database.
   You can use the TAB key to move to the next data entry field.

3. Press the **Apply** button to save the changes to the database.
   If you want to abandon the changes, press the **Cancel** key.

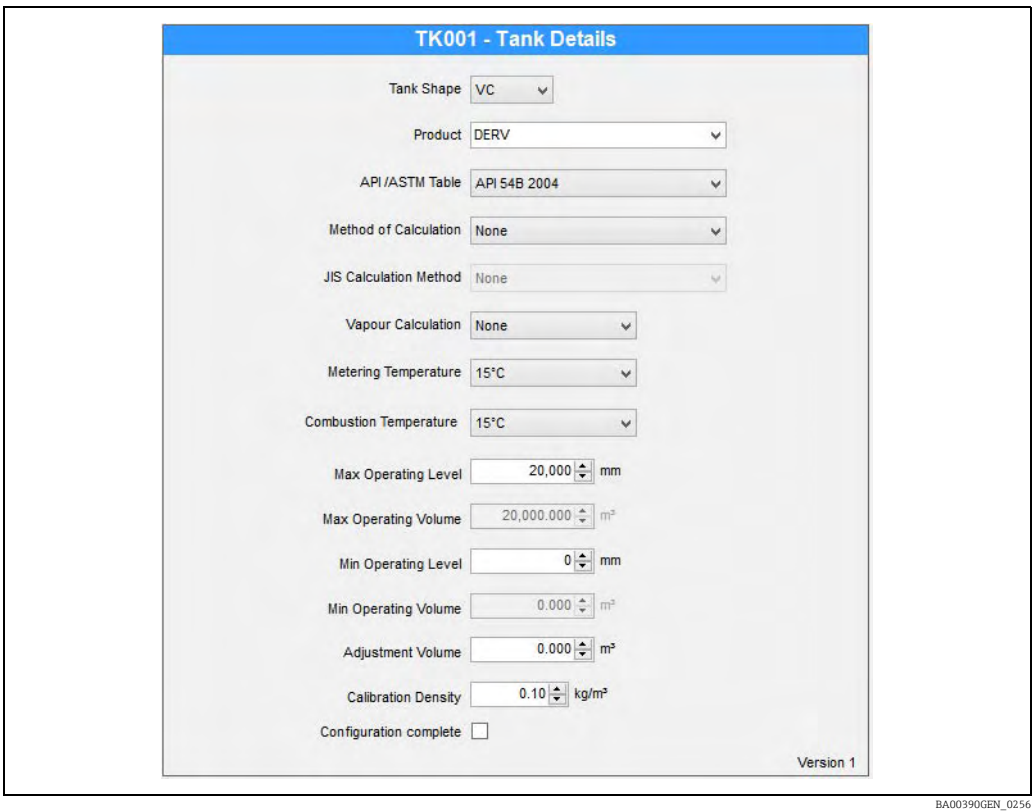
If you attempt to select another tank after making some changes but before they are saved to the database, the system will warn you that changes have been made and request confirmation of whether they need to be saved or cancelled.

4. To edit further tanks follow the same procedure.
5. To exit the module, either close the Window or press the **Cancel** button.

7.3 Data Item Definitions

The following sections provide definitions of each of the data fields within each section of the Tank Characteristics module.

7.3.1 Tank Details



BA00390GEN_0256

Tank Shape (the physical shape of the tank)

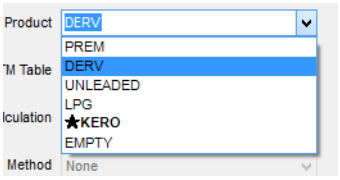
Four principle tank shapes are supported:
- **VC** - Vertical Cylinder
- **VCFR** - Vertical Cylinder with Floating Roof
- **SP** - Sphere
- **HZ** - Horizontal Cylinder

There are other similar tank shapes, however, most should fall into one of the above types. Vertical Cylinders that have internal floating blankets/decks should be configured as VCFR.

It is essential that the tank shape is entered correctly as this affects the inventory calculation algorithms.

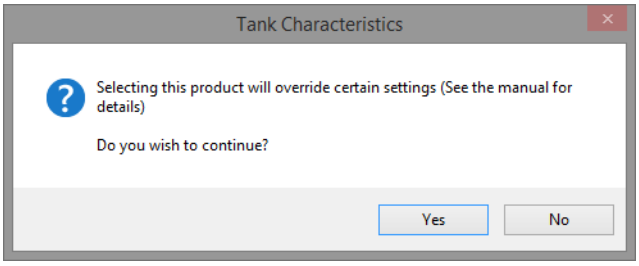
Product

It specifies the pre-configured product to be stored in the selected tank.
Products can be configured to have certain pre-selected characteristics attached to them. Products with characteristics are identified by being prefixed with an asterisk and being presented in bold font such as the **KERO** product shown below.



BA00390GEN_0163

Selecting a product with characteristics will override and disable certain settings within Tank Characteristics – an alert message is displayed to warn the user of this.



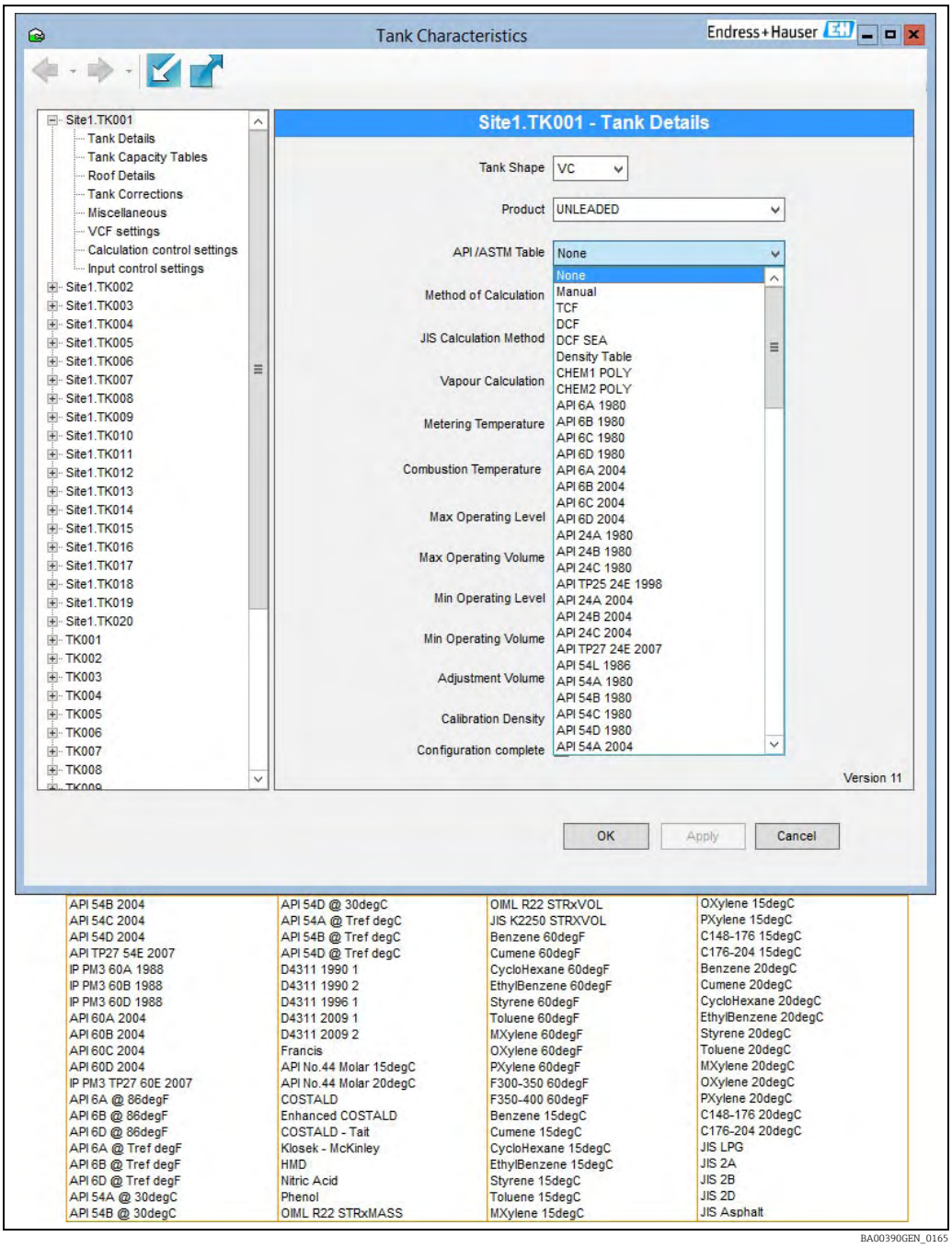
BA00390GEN_0164

The values that will be overridden are those configured as product characteristics in the **Product Configuration**.

If a tank has previously had a product WITH characteristics applied to it and this is changed to a product WITHOUT characteristics then the restricted settings will be re-enabled but their value will remain unchanged.

Volume Correction Method

The table is related to the product that will be stored in the tank. It defines the method and operating ranges for certain characteristics of the product.

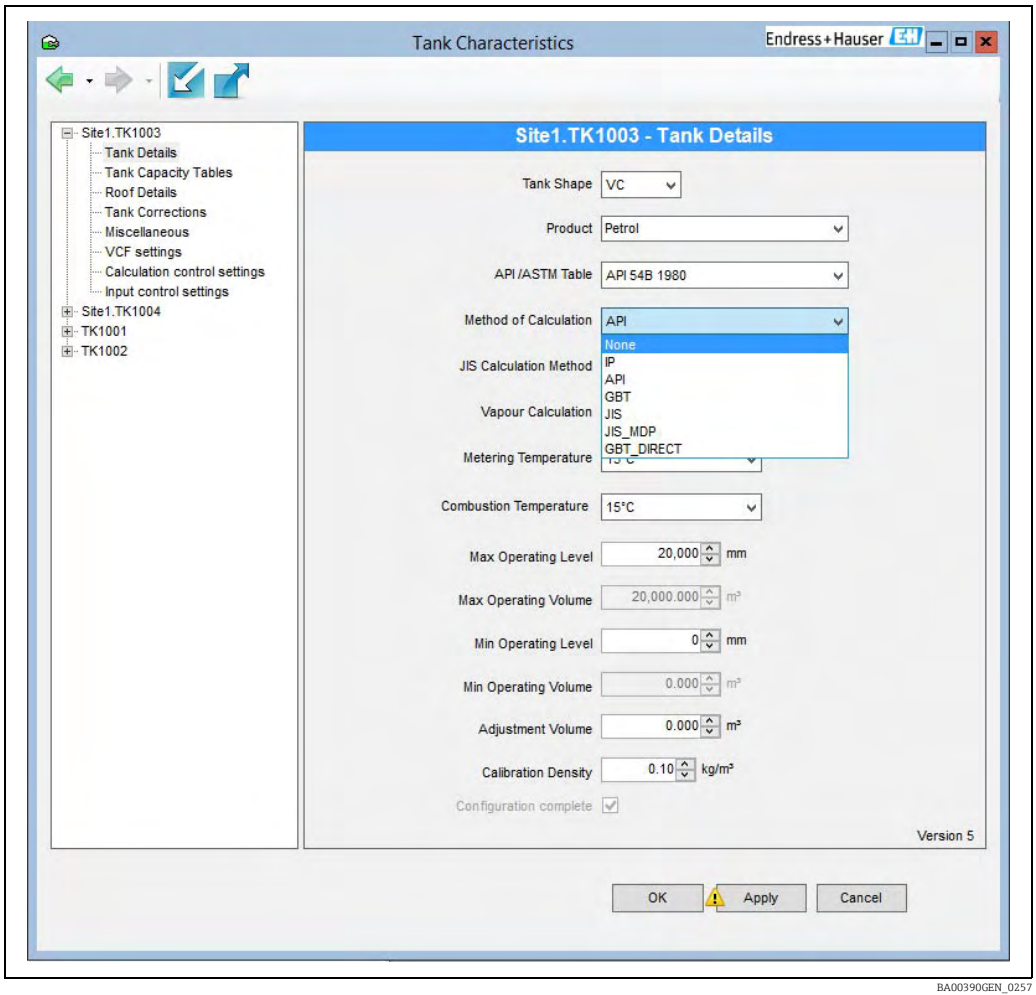


BA00390GEN_0165

It is essential that the volume correction method is selected correctly as this affects the inventory calculation algorithms.

Method of Calculation

By selecting a suitable calculation method, the user can cause the Calculation Control settings and Input Control Settings to be preset to values which are the accepted (or defined) default for the relevant standards body or type. These settings are then locked. If the user wishes to change these locked values, the Method of Calculation must be reset to **None**. The table below shows which settings are affected.



BA00390GEN_0257

Industry standard	Flag
IP	▪ Enable tank shell correction ▪ Use IP calculation of TOV/GOV ▪ Include suspended sediment & water ▪ Combined sediment and water calculation ▪ VCF is normal
API	▪ Roof weight specified in air ▪ Enable tank shell correction ▪ WCF uses main Table 56 ▪ Use API calculation of TOV/GOV ▪ Include suspended sediment & water ▪ Separate sediment & water calculation ▪ Net values calculated from gross ▪ VCF is normal
GB/T	▪ Roof weight specified in air ▪ Enable tank shell correction ▪ WCF uses main Table 56 ▪ Use API calculation of TOV/GOV ▪ Include suspended sediment & water ▪ Separate sediment & water calculation ▪ Net values calculated from gross ▪ VCF is normal

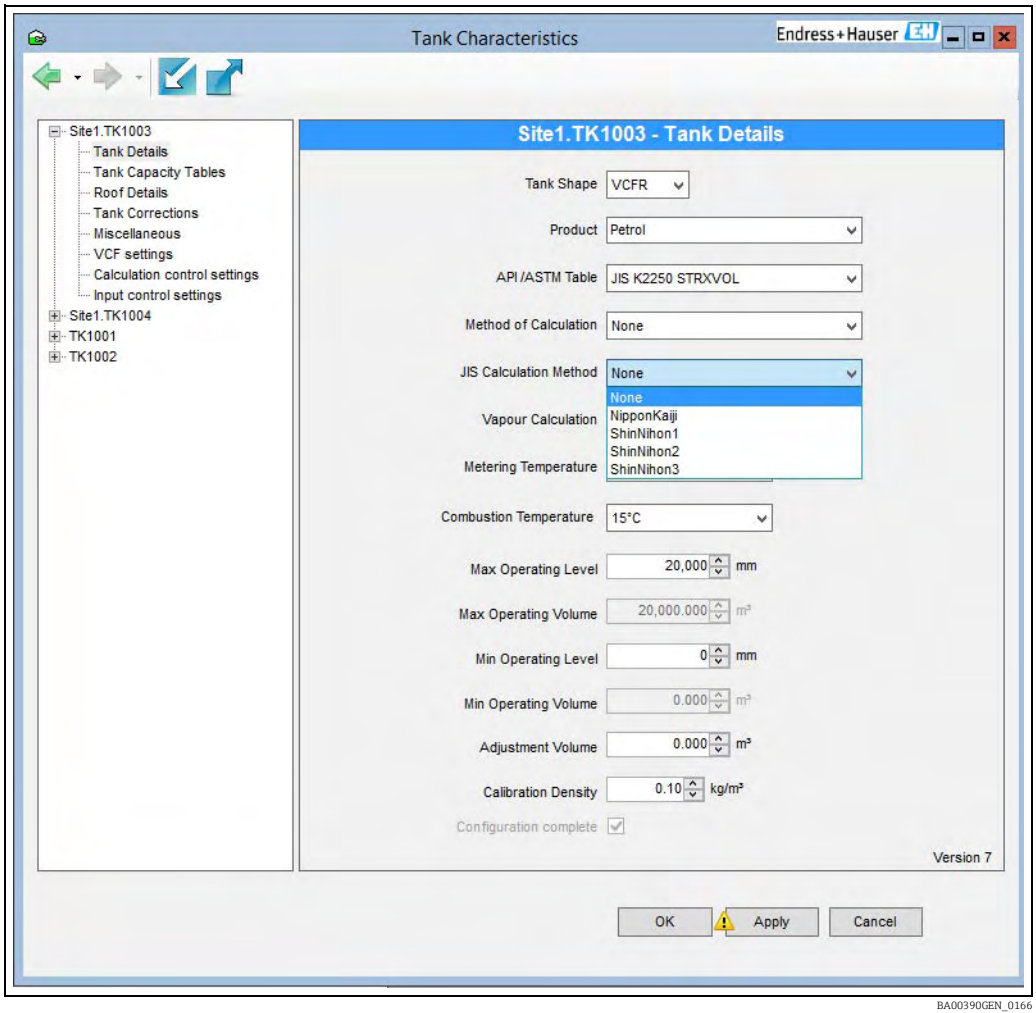
Industry standard	Flag
JIS	▪ Roof weight specified in air ▪ Gauge reads reference density ▪ Use API calculation of TOV/GOV ▪ Disregard suspended sediment and water ▪ Combined sediment and water calculation ▪ Water density 1.0 kg/l for fresh water ▪ Net values calculated from gross ▪ Tank shell is not insulated ▪ VCF is normal
JIS-MPD	▪ Roof weight specified in air ▪ Gauge reads reference density ▪ Use API calculation of TOV/GOV ▪ Disregard suspended sediment and water ▪ Combined sediment and water calculation ▪ Water density 1.0 kg/l for fresh water ▪ Net values calculated from gross ▪ Tank shell is not insulated ▪ VCF is normal

Certain calculation types rely on this setting.

- For example, Hydrostatic Deformation will only be included if the Method of Calculation has been set to GBT or GBT (Direct_Weight).
- In the case of JIS_MDP calculations' setting the control flag 'VCF is restricted' forces the rounding of input data to use +/- 0.002 kg/l and +/-0.25 °C.

JIS Calculation Method

Specifies the handling of floating roof corrections within JIS calculations. This option is only available upon selection of a floating roof tank shape and a JIS volume correction method.



BA00390GEN_0166

Vapour Calculation

Specifies the vapour correction calculations that will be performed as part of the inventory calculations. **None** means that no vapour correction will be performed.

Metering Temperature/Combustion Temperature

Is the specified temperature at which the amount of fuel to be burned is notionally determined for calorific calculations.

Maximum Operating Level (the defined maximum operating level of the tank)

The accuracy of this value is important as it is also used to determine the maximum operating volume and consequently the amount of Ullage Volume (Available Room) in the Tank.

Minimum Operating Level (the defined minimum operating level of the tank)

The accuracy of this value is important as it is also used to determine the minimum operating volume and consequently the amount of Usable Volume in the Tank.

Min & Max Operating Volume

Are read-only fields provided for your reference.

Adjustment Volume

Is a fixed volumetric adjustment (either +ve or –ve) applied to the volume obtained from the Tank Capacity table. This accounts for any manifold or pipeline volume to be added or any deadwood to be removed.

Calibration Density

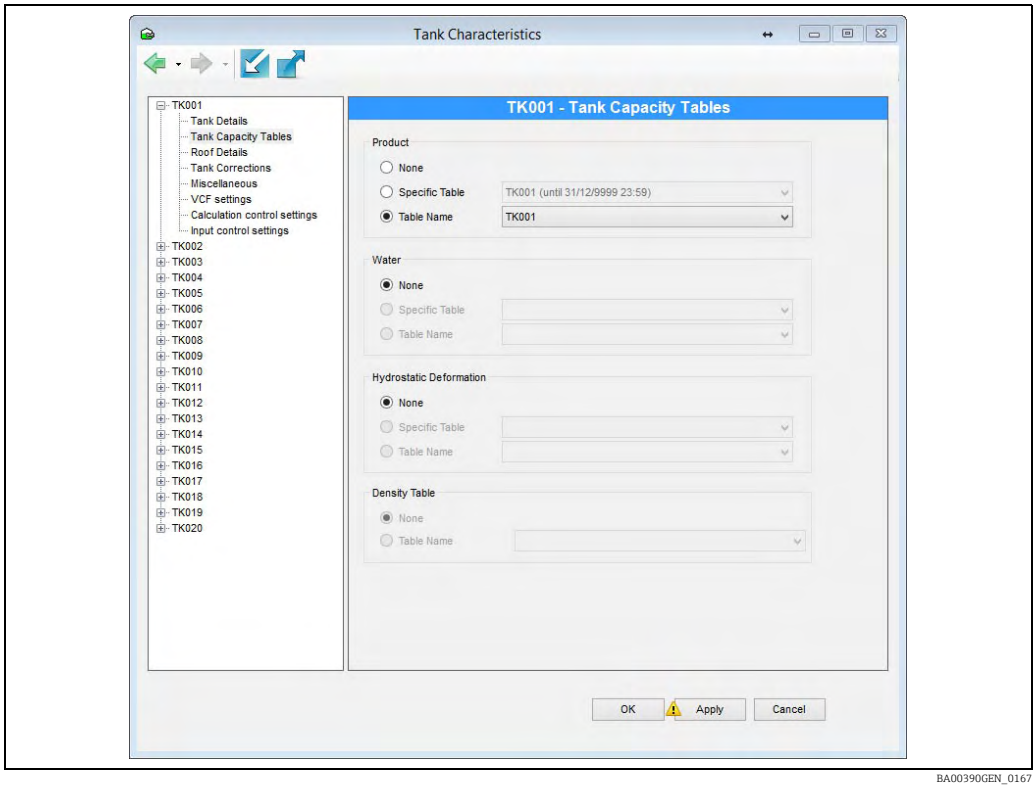
The density of the medium in a tank when that tank was calibrated. This setting is only used in JIS based calculations.

Configuration Complete

Determines when data exchange can be carried out using the data exchange service. See the Product and Tank Data Synchronization manual BA01363G.

7.3.2 Tank Capacity Tables

This section allows the user to choose the Tank Capacity Tables and Density tables to be bound to each tank.



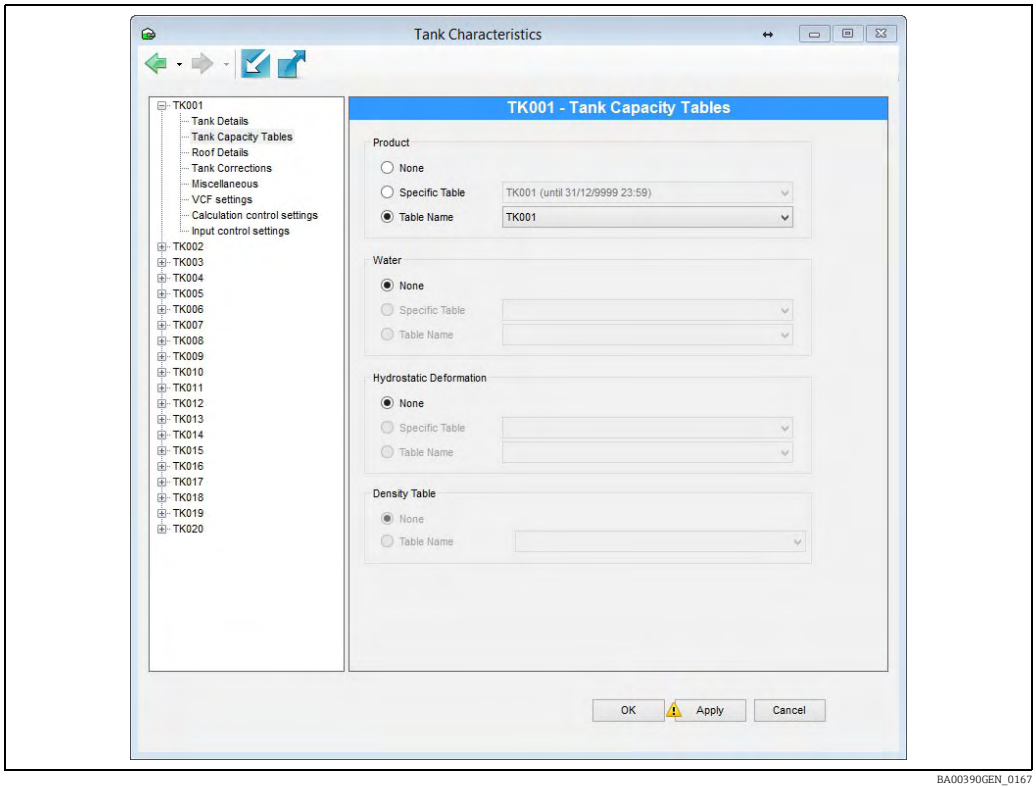
BA00390GEN_0167

The user may bind any of four types of table to each tank: **Product**, **Water**, **Hydrostatic Deformation** and **Density**. The density table option is only available for tanks that are set to use a density table as the volume correction method.
Furthermore, each table type can be selected by either the Table Name or by selecting a specific historical table.
In the figure above tank **TK001** has been bound to the product capacity table named **TK001** which was previously defined in the Tank Capacity Table utility and saved to the Tank Capacity Table database.

It is not necessary to use the same name for the Tank and the Table but this nomenclature has been used for the default tables for historical reasons.

7.3.3 Density Tables

In this section the chosen Density Table is bound to the selected tank.



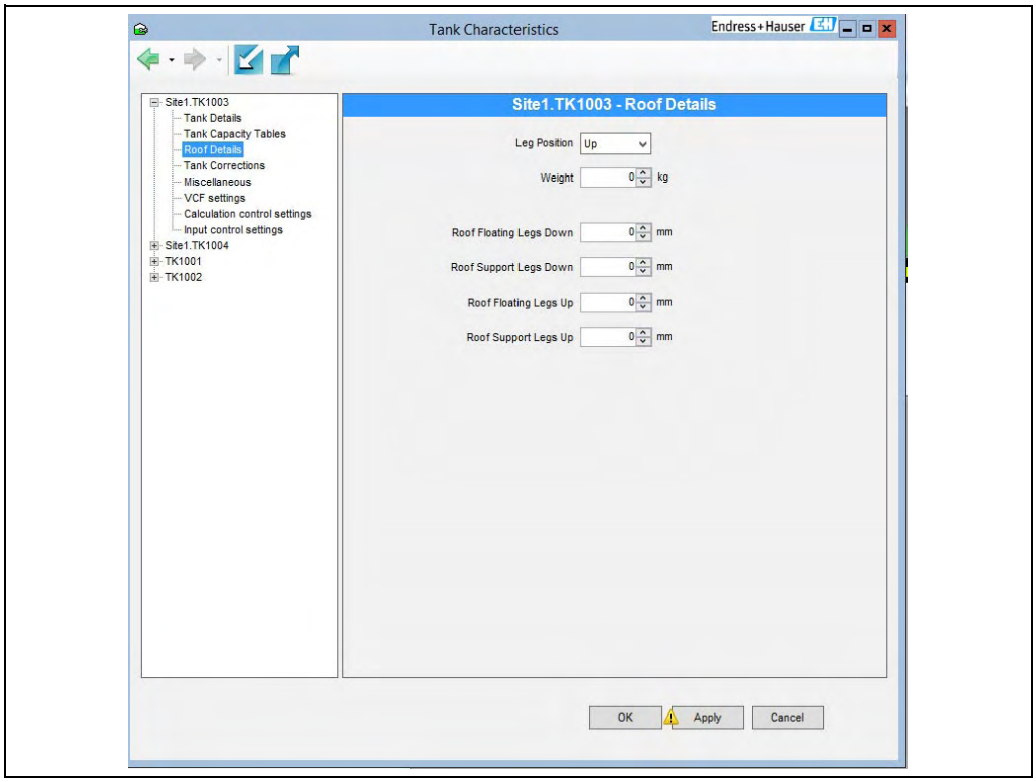
BA00390GEN_0167

In this case tank **TK002** is bound to density table **DensityTable1** which has been previously defined in the **Density Table** option and has been saved to the Density Table database.

It is not necessary to use the same name for the Tank and the Table but this nomenclature has been used for the default tables for historical reasons.

7.3.4 Roof Details

The Roof Details section contains data that is relevant to floating roof tanks i.e. those that have been defined with a tank shape of VCFR.



BA00390GEN_0168

Leg Position

Some floating roofs have legs which may be set at two positions, thus altering the level at which the roof floats or is supported on the legs. Since the legs are usually attached to the floating roof, the **up** position of the legs allows the roof to descend to a lower level in the tank, and is the setting used in normal operation, whereas the **down** position causes the roof to become supported on it's legs at a higher level and is the setting used for maintenance purposes.
Where a tank has a floating roof with fixed or one-position legs, it is advisable to set the **Legs Up** and **Legs Down** levels to be the same, so that the Legs **Up/Down** selection becomes irrelevant.

Fully Floating Level, Legs Up

The point at which the roof just ceases to be resting on its legs when the legs are in the **up** or operational position, such that the whole weight of the roof is being supported by its buoyancy in the product. Above this level, compensation is made for the displacement of the product by the full weight of the roof.

Fully Floating Level, Legs Down

The point at which the roof just ceases to be resting on its legs when the legs are in the **down** or maintenance position, such that the whole weight of the roof is being supported by its buoyancy in the product. Above this level, compensation is made for the displacement of the product by the full weight of the roof.

Fully Supported Level, Legs Up

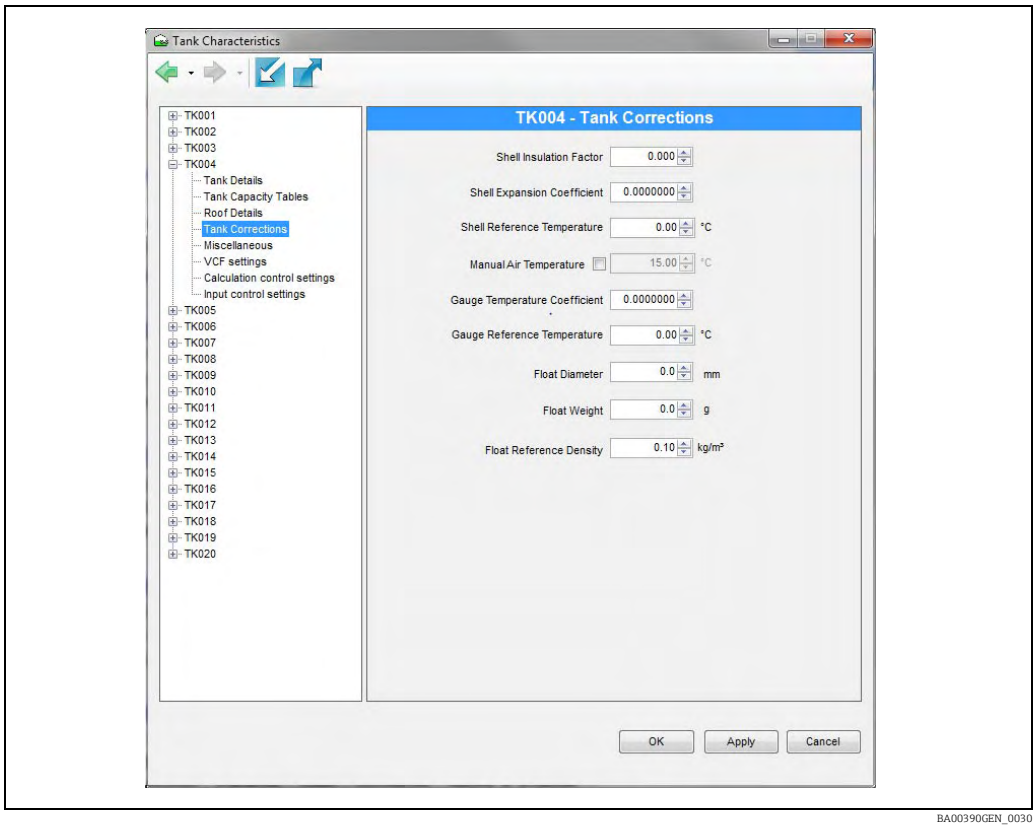
The point at which the roof legs are supporting the full weight of the roof when the legs are in the **up** or operational position. Below this level, no compensation is made for product displacement caused by roof weight.

Fully Supported Level, Legs Down

The point at which the roof legs are supporting the full weight of the roof when the legs are in the **down** or maintenance position. Below this level, no compensation is made for product displacement caused by roof weight.

The area between the Fully Supported and Fully Floating levels is generally referred to as the roof transition zone. Between these levels it is difficult to determine the proportion of the roof's weight which is being held by the legs and therefore difficult to calculate the displacement of product by the roof. For this reason this region of the tank is normally avoided during normal operation.

7.3.5 Tank Correction



BA00390GEN_0030

This page details various settings used for tank / gauge corrections.

Shell Insulation Factor

1 for completely insulated storage, 0 for un-insulated storage, 0.875 is a typical value.

Shell Expansion Coefficient

Expansion coefficient of the material your tank is constructed of, e.g. 0.0000112 for mild steel.

Shell Reference Temperature

Normally the same reference temperature used for your VCF calculations (normally either 15 ˚C or 30 ˚C).

Manual Air Temperature

The manual air temperature setting, if your gauge can provide an automatic air temperature, then leave it unchecked.

Gauge Temperature Coefficient

The linear coefficient of thermal expansion for the gauge and it's mountings. The typical values are the same as those for Shell Expansion Coefficient.

Gauge Reference Temperature

The temperature at which the gauge was calibrated.

Float Diameter

Diameter of the gauge float.

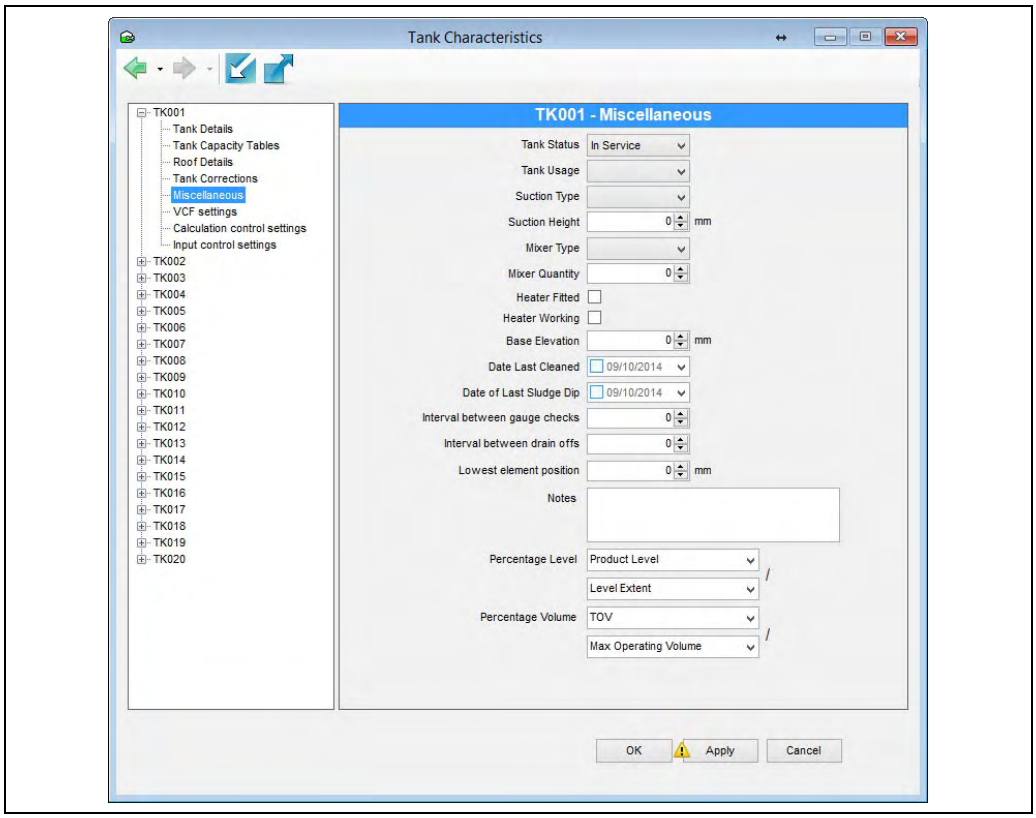
Float Weight

Weight of the gauge float.

Float Reference Density

The density of the fluid in which the float was calibrated.

7.3.6 Miscellaneous



BA00390GEN_0169

This section contains various housekeeping features that for the most part do not affect the behavior of the system, but are provided for operators to note additional information about the tank.
The exceptions to this are as follows:

Lowest Element Position

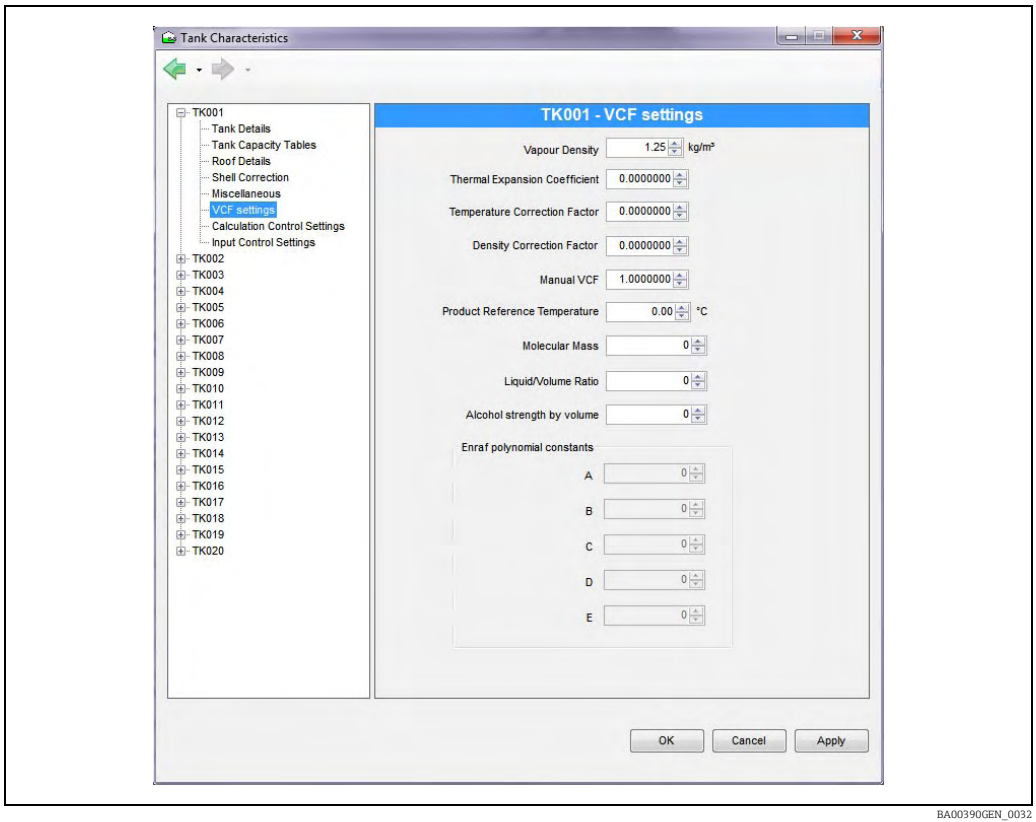
Is the level of the lowest temperature element. If the level falls below this value, then the Product Temperature is marked as invalid – represented by a DN99 error code on screen.

Percentage Level and Volume Settings

Determine what data parameters are used to produce the percentage level and percentage volume values.

In the screenshot above:
Percentage Level = (Product Level)/(Level Extent)
and
Percentage Volume = (Total Observed Volume)/(Maximum Operating Volume)

7.3.7 VCF Settings



BA00390GEN_0032

This section contains various settings applicable to Volume Correction Factor calculations. In previous versions, some of these settings were available in 'Manual Data'.

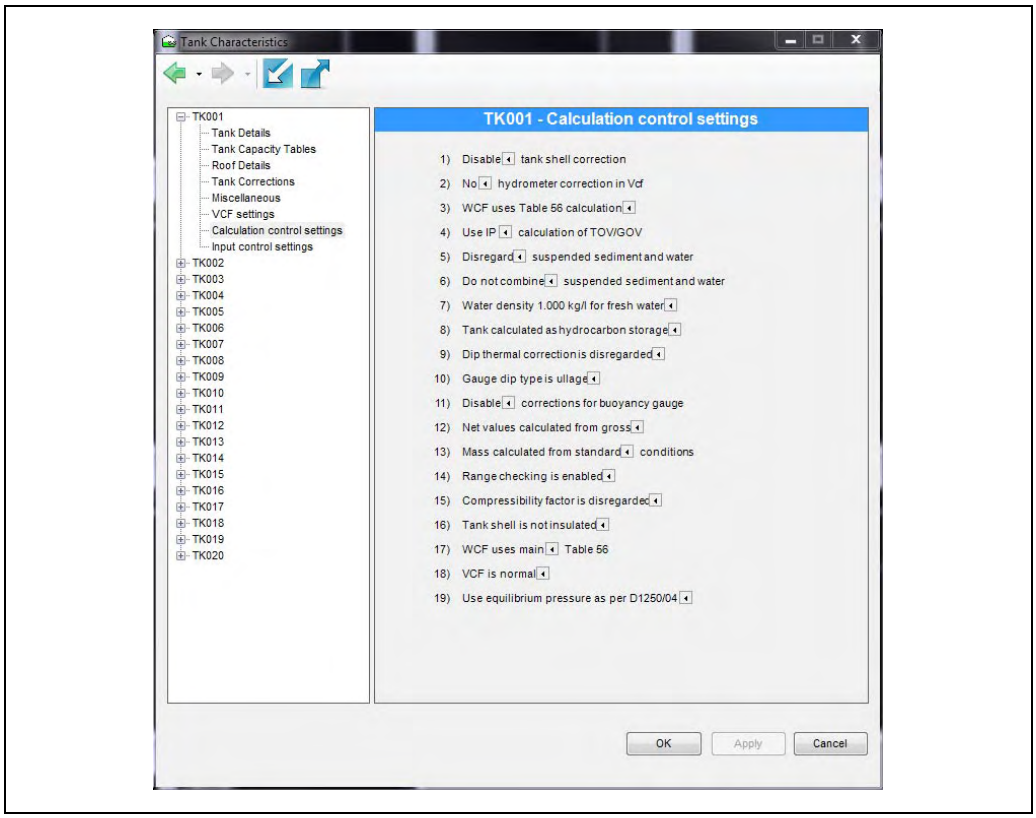
For example:

- The 'Enraf polynomial' constants are only made available when an Enraf volume correction method is selected.
- Alcohol strength by volume (→ 25).

7.3.8 Inventory Control Settings

Calculation control settings

The settings on these pages control the way the inventory calculations are performed. The default settings are modified by clicking on the arrow, and selecting the new setting from dialog.

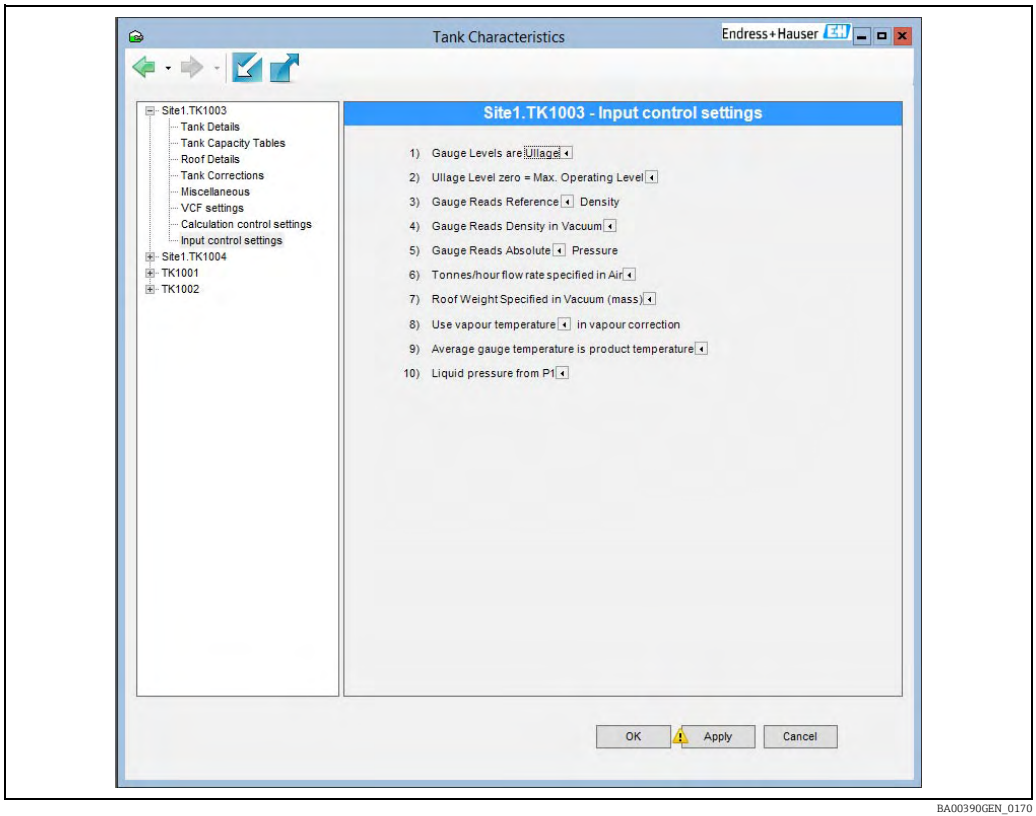


BA00390GEN_0033

Setting 1 (unset)	Setting 2 (Set)	Explanation
Disable tank shell correction.	Enable tank shell correction.	When checked the tank shell correction calculation will be performed, enter shell correction information on the relevant tab in this module.
Do not apply hydrometer correction in VCF.	Apply hydrometer correction to VCF.	Set according to whether hydrometer correction is required or not.
WCF uses Table 56 correction.	WCF uses fixed 0.0011 kg/l.	Select this to use a calculated WCF, which gives better accuracy when calculating WCF.
Use IP calculation of TOV/GOV.	Use API calculation of TOV/GOV.	Set if you wish to use American (US) style calculations, which perform the floating roof and free water corrections at a different stage to the British calculations..
Disregard suspended sediment and water.	Include suspended sediment & water.	Set if you want include sediment and water correction in your inventory calculations.
Combined sediment and water calculation.	Separate sediment & water calculation.	Set if you want sediment and water correction calculated separately.
Water density 1.0 kg/l for fresh water	Water density 1.020 kg/l for sea water	Set according to whether the water you have in your tanks is fresh or sea water.
Tank calculated as hydrocarbon storage.	Tank calculated for ballast/slops storage.	When set movements in and out of the tank are assumed to leave a constant oil depth and vary the amount of water in the tank.
Dip thermal correction is disregarded.	Dip thermal correction is enabled.	Set if correction for temperature is applied to dip.
Gauge dip type is Ullage.	Gauge dip type is Innage.	If 'Dip thermal correction' is enabled, selects which type of gauge to apply correction to.
Disable correction for Buoyancy gauges.	Enable correction for Buoyancy gauges.	When set, correction is applied for buoyancy type gauges.

Setting 1 (unset)	Setting 2 (Set)	Explanation
Net values calculated from gross.	Net values calculated from NOV-NSV chain.	If set, net values are calculated from gross, otherwise from prior calculated NOV and NSV values. Only applicable to IP calculation methods.
Mass calculated from standard conditions.	Mass calculated from observed conditions.	–
Range checking is enabled.	Range checking is disabled.	If set, checks to ensure input values are within acceptable range are turned off.
Compressibility factor is disregarded.	Compressibility factor is applied.	If set, the compressibility factor will be applied to calculations.
Tank shell is not insulated.	Tank shell is insulated.	If set, tank shell insulation will be included in calculations.
WCF uses main Table 56	WCF uses short Table 56.	Weight correction factor calculations use 'Table 56'. This exists in a 'short' or 'main' version. If set, the short version will be used.
VCF is normal.	VCF is restricted.	When set, VCF output is restricted to 4 decimal places.
Use equilibrium pressure as per D1250/04.	Use equilibrium pressure as per D1250/04 addendum 1.	When set, the 2007 addendum to MPMS 11.1 D1250/04 regarding equilibrium pressure is applied.

Input Control Settings



BA00390GEN_0170

Setting 1 (unset)	Setting 2 (Set)	Description
Gauge levels are innage.	Gauge levels are ullage.	The levels returned by the gauge are innage (referenced from the bottom) or ullage (referenced from the top).

Setting 1 (unset)	Setting 2 (Set)	Description
Ullage level zero = Max. Operating Level.	Ullage level zero = Reference Height.	Zero ullage is taken as the highest safe working level or the maximum height of the tank.
Gauge reads reference density.	Gauge reads observed density.	Use this setting with care! When set the inventory calculator derives the reference density from the observed density information, if you enter manual densities be aware of whether you enter a reference density or an observed density.
Gauge reads density in vacuum.	Gauge reads density in air.	When set an allowance for the density of air will be made during inventory calculations.
Gauge reads relative pressure.	Gauge reads absolute pressure.	Internally pressures are stored in Bar absolute, checking this option will cause the pressure stored to be calculated from the gauged value.
Tonnes/hour flow rate specified in air.	Tonnes/hour flow rate specified in vacuum.	Check this if you want a mass flow rate as opposed to a weight flow rate.
Roof weight specified in air.	Roof weight specified in vacuum.	If you know the mass of your floating roof, set to Roof Weight Specified in vacuum.
Use product temperature in vapour correction.	Use vapour temperature in vapour correction.	Sets which temperature is used by vapour correction.
Average gauge temperature is product temperature.	Average gauge temperature is vapour temperature.	Selecting vapour temperature as the source of average temperature disables product temperature.
Liquid pressure is from P1.	Liquid pressure is from P2.	Determines where liquid pressure is read from.
Debug output is enabled.	Debug output is disabled.	When set, debug logging is enabled. **Not available to users, internal flag only.**

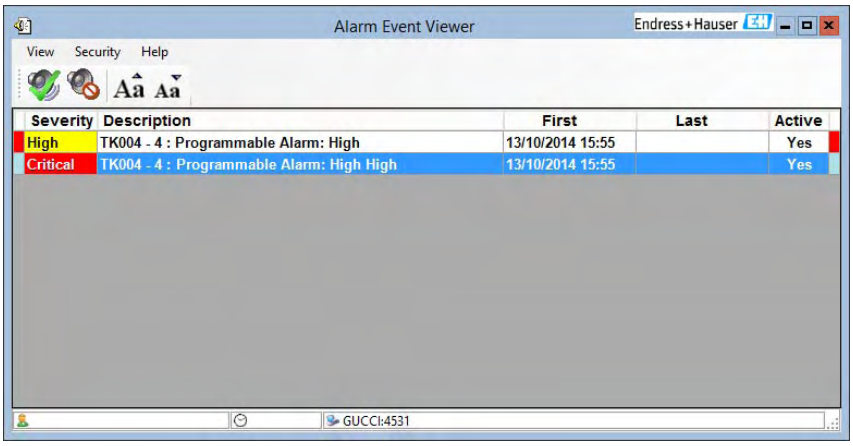
8 Alarm Configuration

A very configurable alarm/event sub-system comes with the system.

The use of this feature can be controlled by the security system.

8.1 Alarm Overview

The alarm/event sub-system is based upon a Windows service.
The alarm system consists of an EventServer which distributes alarms and events as they occur to any connected AlarmEventViewer clients.
The EventServer may be configured to distribute only a sub-set of alarms to individual AlarmEventViewer clients and each client may be configured to display and annunciate alarms as required.
The AlarmEventViewer is the principle way of viewing alarms and only one instance runs per machine, although multiple client machines may connect to a single EventServer.
The following is typical of an Alarm Event Viewer:



BA00390GEN_0171

8.2 Event Server Configuration

The Event Server's role is to send new alarm notifications to any Alarm Event Viewer clients connected to the system. These could be locally on the same PC or on networked client PCs.

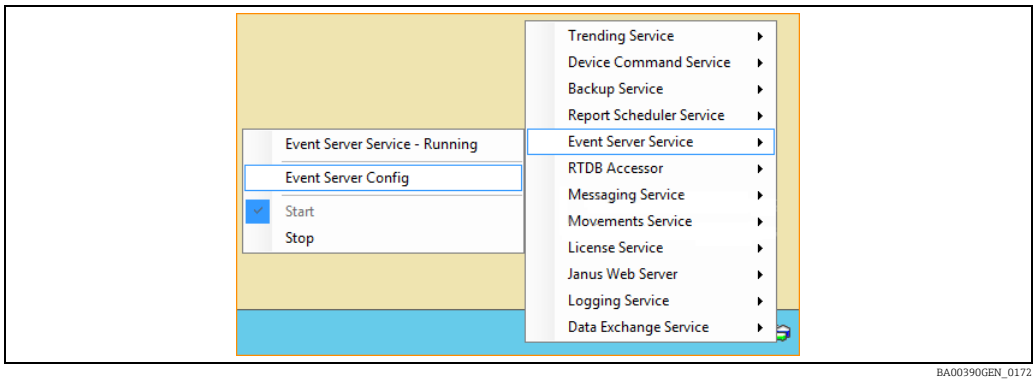
The Event Server may be configured for a range of functions, including:
- Defining the severity of alarms.
- Defining what text to display for an alarm.
- Determining what alarms are sent to individual clients.

The Event Server also monitors the health of the alarm sub-system and if any of the following services fail, then an Event Subsystem Failed alarm will be sent to all client viewers:
- Hermes
- DCCHost
- RTDBAccessor

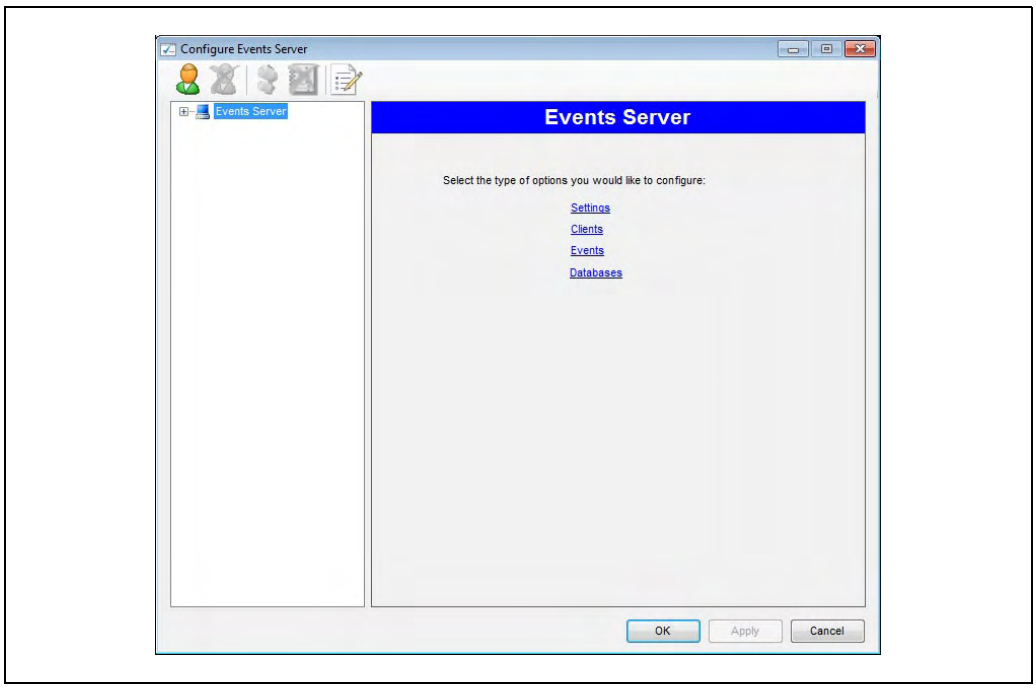
8.2.1 Configuring the Event Server

To configure the Event Server, proceed as follows:

1. Right click on the **Service Manager** icon in the Windows system tray and selecting the **Event Server Service** → **Event Server Config** option.



BA00390GEN_0172



BA00390GEN_0036

2. Expand the left hand panel to select one of the areas to edit, or click on the underlined item in the right hand panel.

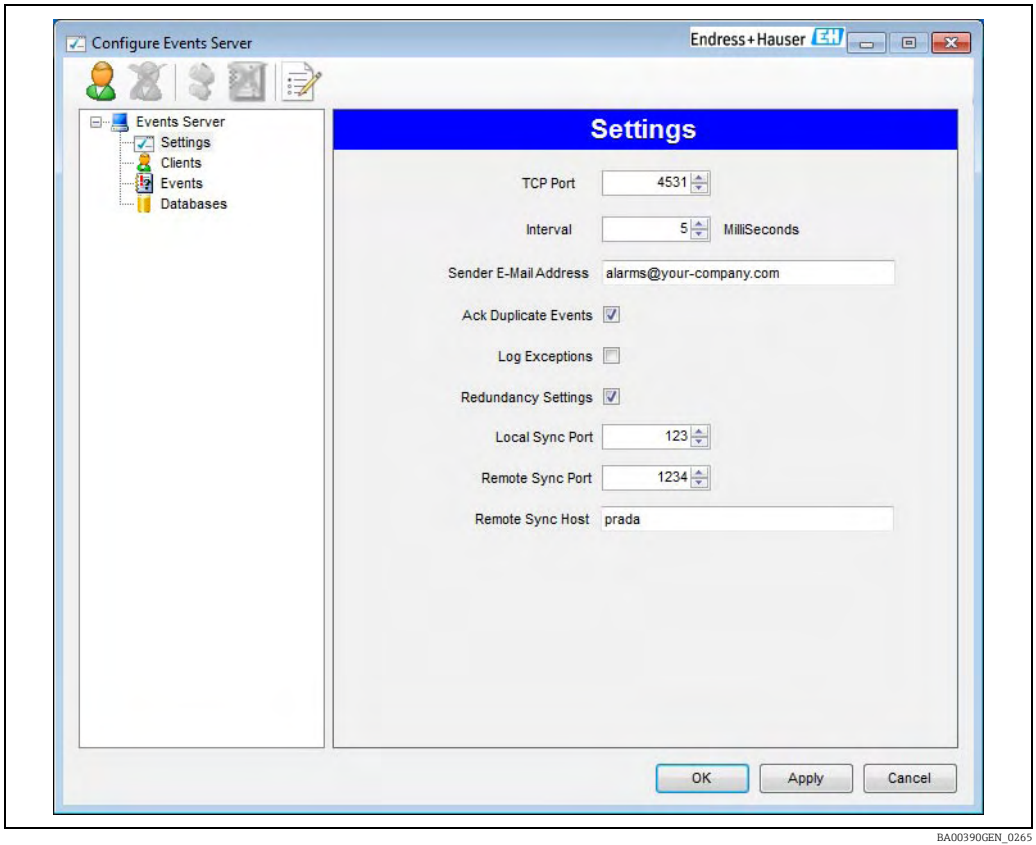
The four selections are:

- **Settings**: Configure the internal settings for the Event Server
- **Clients**: Configure any unique client definitions
- **Events**: Configure the definition for each alarm/event type
- **Databases**: Configure the database maintenance parameters

There are toolbar icons to add/remove a client, override or remove over-ride for an alarm and to change event options.

8.2.2 Settings

This page allows various settings for the Event Server itself to be configured. Generally speaking, most of these should be left as their default values.



BA00390GEN_0265

The following settings may be configured:

TCP Port

This is the network port used to listen for connections from Alarm Event Viewer clients. If this is changed then any Alarm event Viewer client should have their configuration changed to match it. This value should only be changed if there is a clash with some other software running on the PC.

Interval

This is the update time for the server, increasing it will slow down alarm updates. It should not be changed unless the PC is running at a very slow speed.

Sender E-Mail Address

This is the e-mail address displayed in the sender field of any e-mails that are sent containing alarm details.

Ack Duplicate Events

By default this item is ticked, in which case if there are multiple occurrences of the same alarm in the database then acknowledging one will acknowledge all of them. If this item is unticked then each alarm has to be individually acknowledged. This should only be unticked if clients are using the Legacy Mode for events.

Log Exceptions

If this is ticked then any problems that the server encounters will be logged to a file on the hard drive. The file will be called Event.Server.Exceptions.txt and will be located in the standard install directory for tankgauging.
It may be useful to log errors to assist in diagnosing network access problems.
For instance if a remote client on the network is not receiving automatic updates of events then it may be due to a number of problems such as the Windows firewall blocking on the client. This would show up in the log file on the server.

Redundancy Settings

This setting needs to be configured to create alarm synchronization among the redundant pairs. Alarm synchronization means that acknowledging alarms on one server automatically acknowledges the alarms on the second server. By default this option is unticked. Selecting this option enables the following options.

Local Sync Port

Port number used by the local Event Server to listen for connections from the remote Event Server on the redundant partner machine. This can be any number and that needs to be provided as the **Remote Synch Port** in another server.

Remote Sync Port

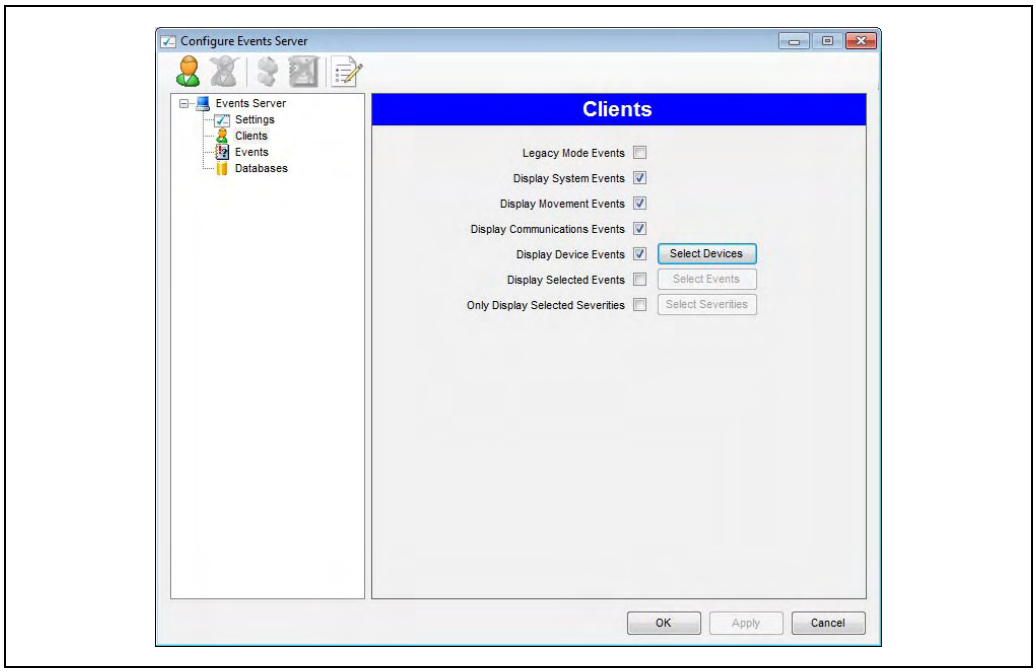
Remote port number used by the local event server to listen for connections from the local Event Server on the redundant partner machine. This number should be same as the **Local Sync Port** on the other server.

Remote Sync Host

Host Name of the redundancy partner.
The above settings need to be completed on both servers.

8.2.3 Client Definitions

This page allows the alarm/event sources for clients to be configured. For example, clients can be configured to only receive alarms for a sub-set of the tanks, or to receive nothing at all.



BA00390GEN_0039

Show settings for

To display a client definition, select it from the **Show settings for** list. All parameters on the screen will be set to the selected client.

The client name is either:
- The name of the client PC on the network (including the name of the PC that the server runs on, as the Alarm Event Viewer on that machine counts as a client), and must be unique.
- The telephone number of a mobile telephone which is to be used as an SMS client.
- The e-mail address which is to be used as a client for e-mailing alarms.
- The port name which is connected to an ASCII printer which is to be used to output alarms.
- The telephone number of a telephone which is to be used as a voice client.
- The name of a radio network (configured in the messaging service) which is to be used to broadcast alarms as radio messages.

Add Client

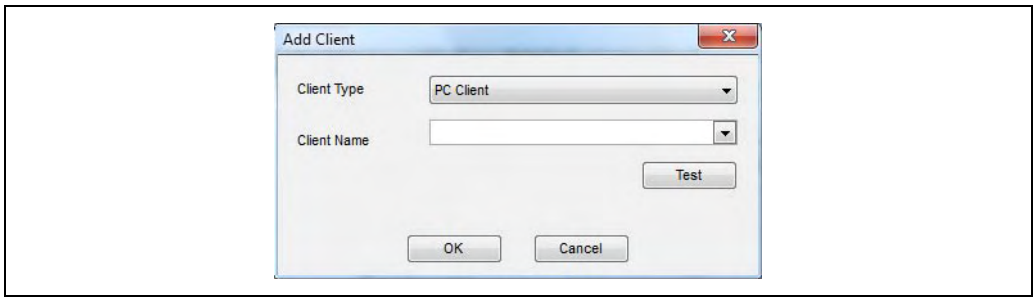
Clients may be added or deleted as required.
There is always a client called **default** which cannot be deleted and this is used as the definition for a connecting client if one does not exist. For most standalone systems no extra client definitions are required, as the default will be used.

To display a client definition:

1. Select it from the **Show settings for** list. All parameters on the screen will be set to the selected client.

To add a new client definition:

1. Click on the **Add Client** button



BA00390GEN_0040

2. Select the type of client required:

Client Type	Identity	Details
PC Client	Client Name	The name of the client PC on the network. This can either be typed in, or selected from the dropdown list of available PCs.
Mobile Phone (SMS)	Phone Number	Only available if the feature is licensed. The telephone number of the mobile phone which is to act as an SMS client.
E-Mail (Plain Text)	E-Mail Address	The e-mail address which is to act as a recipient of plain text e-mail messages containing alarm details.
E-Mail (HTML)	E-Mail Address	The e-mail address which is to act as a recipient of HTML e-mail messages containing alarm details.
ASCII Printer	Port Name	The name of the COM port the ASCII printer is connected to.
Radio	Radio	Only available if the feature is licensed. Selected from a dropdown list of the radio networks configured in the messaging configuration.
Telephone	Phone Number	Only available if the feature is licensed. The telephone number of a phone which is to act as a voice client. There is an additional field (Use Outside Line) which indicates if an outside line is to be used as configured in the messaging service configuration.

3. Click **OK** and the new client will be displayed in the list and the parameters will be cleared.

Delete Client

To delete a client definition:

1. Select the client in the list and click on the **Delete Client** button.

Deleting a PC client definition will not stop the client from receiving alarms. It will simply use the default definition.

For each client the following parameters may be configured:

Legacy Mode Events

This sets the client in the same mode as used on older versions of the tank gauging system, where multiple occurrences of the same alarm will each have their own entry displayed and will have to be acknowledged individually.

Display System Events

Certain alarms or events are defined as system events, such as system failure events etc. The annunciation of these can be prevented on a client by unticking this box.

Display Movement Events

Events generated by the Movement Server service can be stopped from being annunciated on a client by unticking this box.

Display Communications Events

The DCC Host service generates a range of communication events, such as Communication Failure events, or Failed to Connect events etc. These can be stopped from being annunciated on a client by unticking this box.

Display Device Events

Device events are the main set of alarms generated for tanks, such as Level Alarms, Temperature alarms etc. These can be stopped from being annunciated on a client by unticking this box. These represent the main events in the tank gauging system and generally should not be disabled.

Display Selected Events

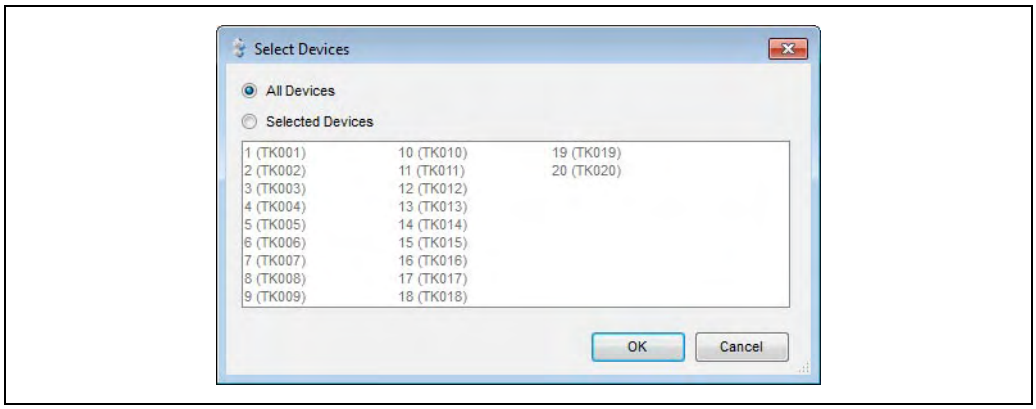
This allows the filtering of events so that only specified events are sent to the client.

Only Display Selected Severities

This allows the filtering of events so that only events of specified severities are sent to the client.

Select Devices

It is possible to configure a client to only receive events from specific devices/gauges. These can be specified by clicking on the **Select Devices** button.
This will launch the **Select Devices** screen:

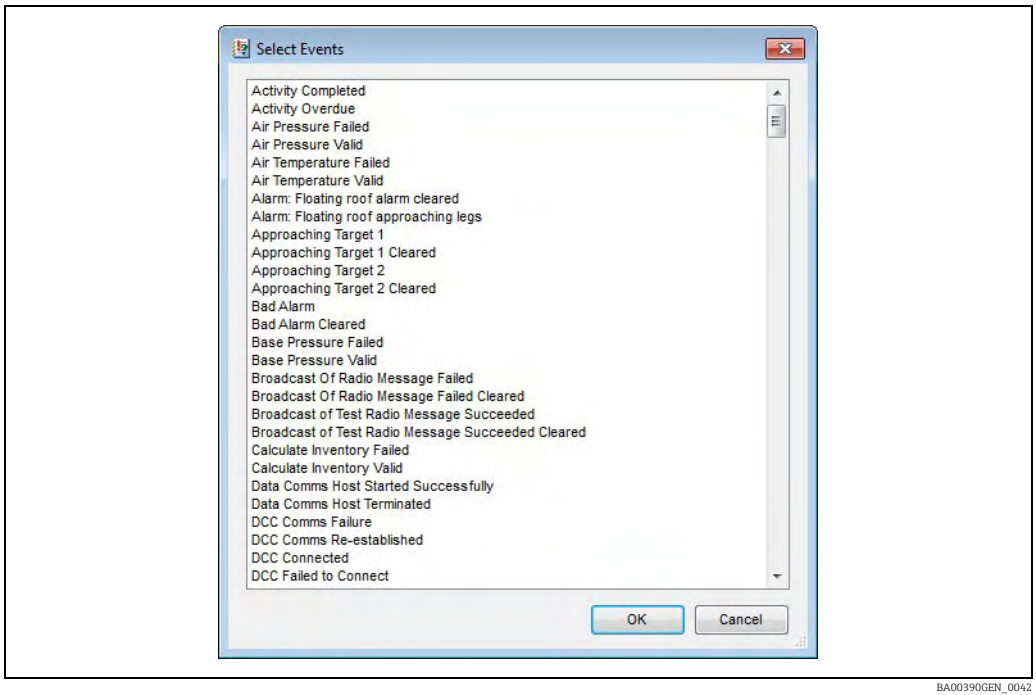


BA00390GEN_0041

To add a device, choose the Selected Devices button highlight it on the list and click the **OK** button. To delete a device, deselect it in the list and click the **OK** button.

Select Events

It is possible to configure a client to only receive specified events. These can be specified by clicking on the **Select Events** button (only available when the **Display Selected Events** field has been ticked).
This will launch the **Select Events** screen:

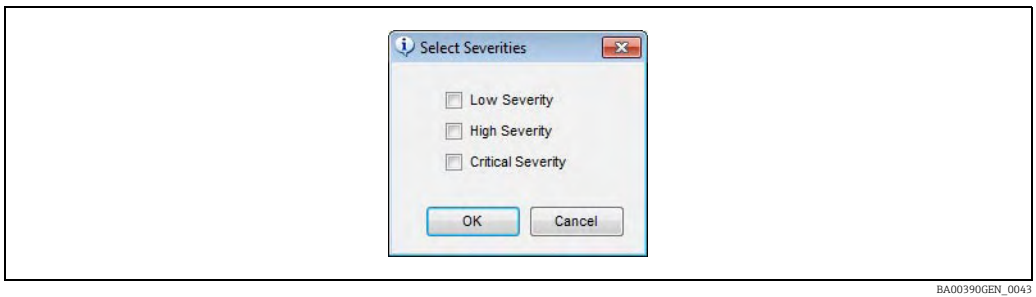


BA00390GEN_0042

To add an event, select it from the list and click **OK** button. To delete an event, deselect it in the list and click the **OK** button.

Select Severities

It is possible to configure a client to only receive events of specified severities. These can be specified by clicking on the **Select Severities** button (only available when the **Only Display Selected Severities** field has been ticked).
This will launch the **Select Severities** screen:

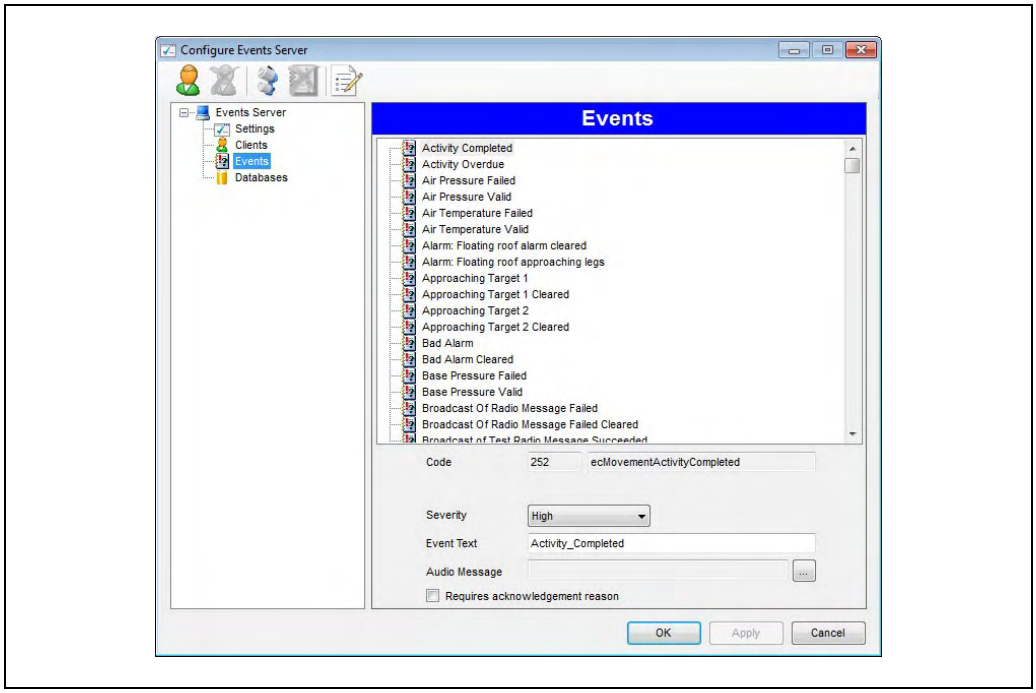


BA00390GEN_0043

To add a severity, select it in the list and click the **OK** button. To delete a severity, select it in the list and click the **OK** button.

8.2.4 Event Definitions

This page allows the definition for each event (an alarm is just a type of event) to be configured. This includes the event/alarm text to be displayed on screen and its severity.



BA00390GEN_0044

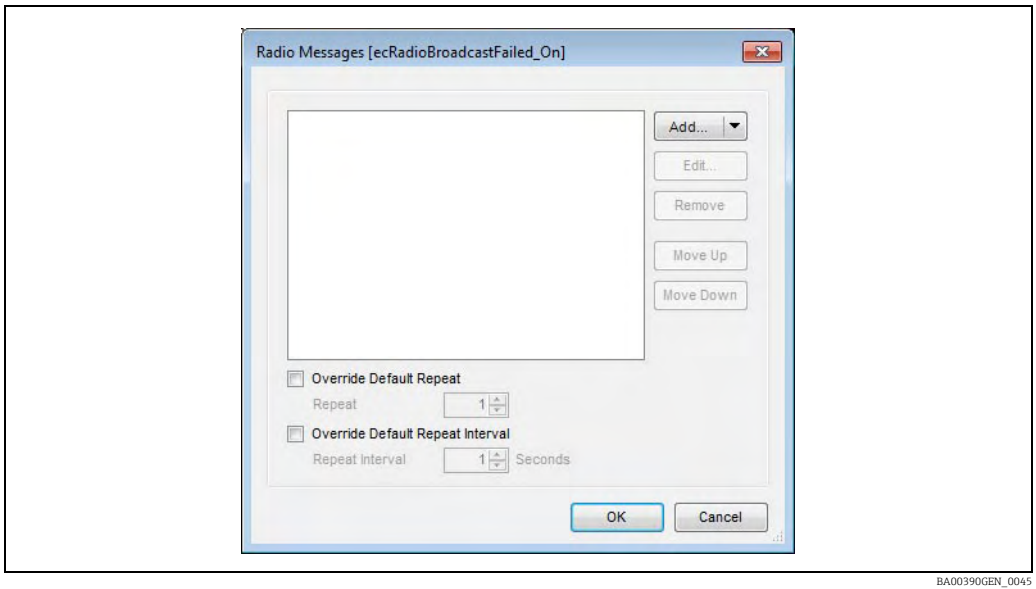
All the possible events that the system can generate are displayed in the list.
Selecting an event will show its settings in the fields below.
For each event the following may be configured:

Event Text

This is the text that will be logged to the events database and displayed on the **EventViewer** screen.

Audio Message

This is the message which will be annunciated for radio and telephone voice clients. If no message is set up, the event will not be annunciated. To edit the message click on the ... button next to the field. This will bring up an audio messaging edit screen:



BA00390GEN_0045

For more details on configuring audio messages, → 171. The number of times that the message is repeated and the interval at which the message is repeated can be overridden (only relevant for radio messaging, not telephone messaging). To override the number of times the message is repeated, tick the **Override Default Repeat** field and then select the number of times the message is to be repeated. Similarly to override the repeat interval for the message, tick the **Override Default Repeat Interval** and select the interval at which the message is to be repeated. Telephone messages will only ever be annunciated once regardless of these settings.

Severity

There are four options:
- Critical
- High
- Low
- Log Only

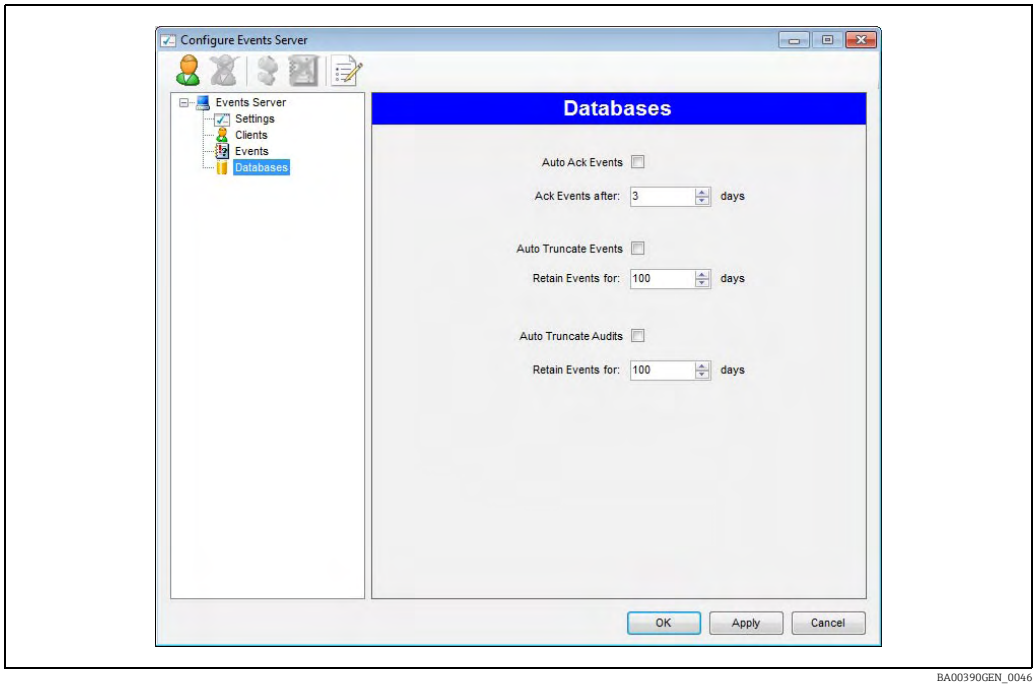
These refer to the priority given to the alarm.
LogOnly alarms will never be displayed in any **Alarm Event Viewer** clients, but will be saved in the events database and may be viewed in the **Event Search** screen. They are automatically acknowledged by the system.

Requires acknowledgement reason

If this box is ticked, the user will be required to enter an acknowledgement reason when they acknowledge this type of alarm.

8.2.5 Database Maintenance

This page allows parameters to be specified to prevent the events database growing to an unmanageable size.



BA00390GEN_0046

Auto Ack Events

This field is to be ticked if events are to be automatically acknowledged after a given time period. This should only really be used on redundant systems where it is possible that no client machines are connected to a particular server and hence the events will never be acknowledged, or the user may be swamped with events when a server changeover occurs.

Ack Events after

This field is used to specify the number of days after which events should be acknowledged.

Auto Truncate Events

This field is to be ticked if events are to be deleted from the events database after a given period.

Retain Events for

This field is used to specify the number of days after which events should be deleted from the events database.

Auto Truncate Audits

This field is to be ticked if audit events are to be deleted from the events database after a given period.

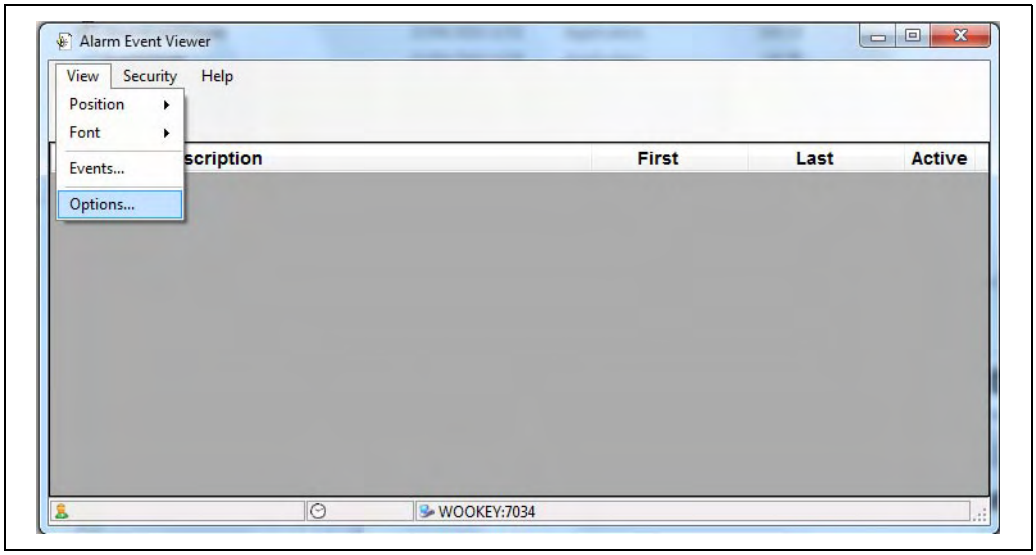
Retain Events for

This field is used to specify the number of days after which audit events should be deleted from the events database.

8.3 Alarm Event Viewer Configuration

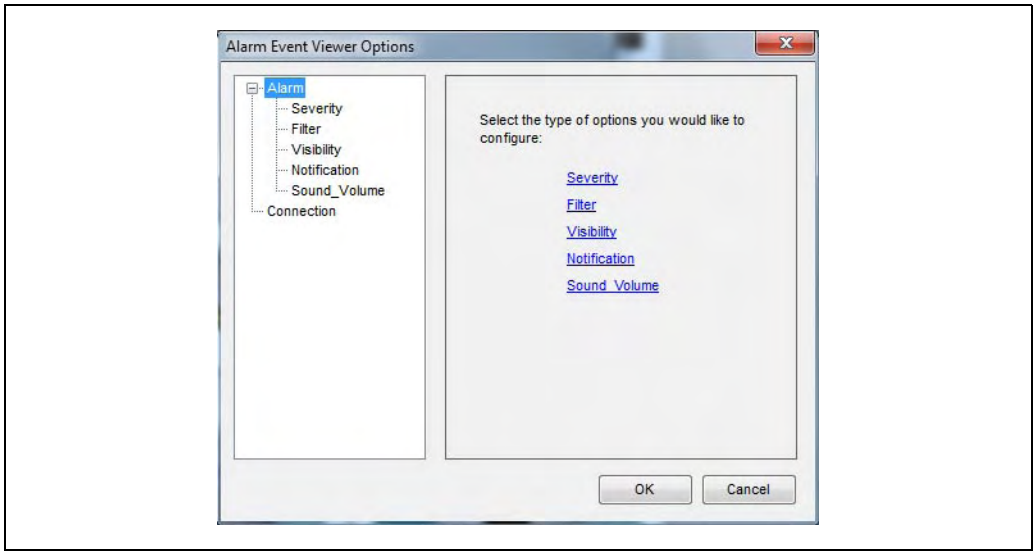
To configure the Alarm Event Viewer, proceed as follows:

1. Choose **View → Options** from the menu.



BA00390GEN_0047

The following screen will be displayed:

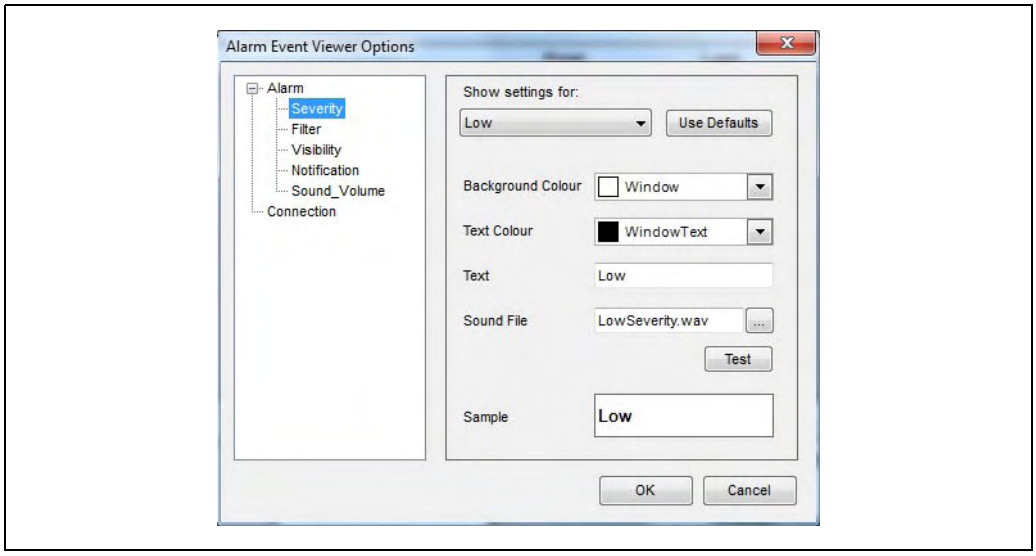


BA00390GEN_0048

2. To choose the type of options to configure, either select them from the list on the left or click on the relevant text on the right.

8.3.1 Severity Options

The screen for severity options is shown below.



BA00390GEN_0049

Show settings for

The drop down list at the top of the page is used to select the severity of the alarm for which the options are to be set. Changing the options will only affect the alarms of that severity.

Use Defaults

Reverts all the options for the severity back to their default values.

Background Colour

The background colour to be used to display the severity of an alarm.

Text Colour

The text colour to be used to display the severity of an alarm.

Text

The text to be displayed to indicate the severity of an alarm.

Sound File

The sound file to be played when an alarm of this severity is the highest priority and sound is enabled (see Notification Options). If no directory is supplied the file must exist in the Media directory contained in the application directory.

- To browse for a new sound file click on the button to the right of the sound file field.

Test

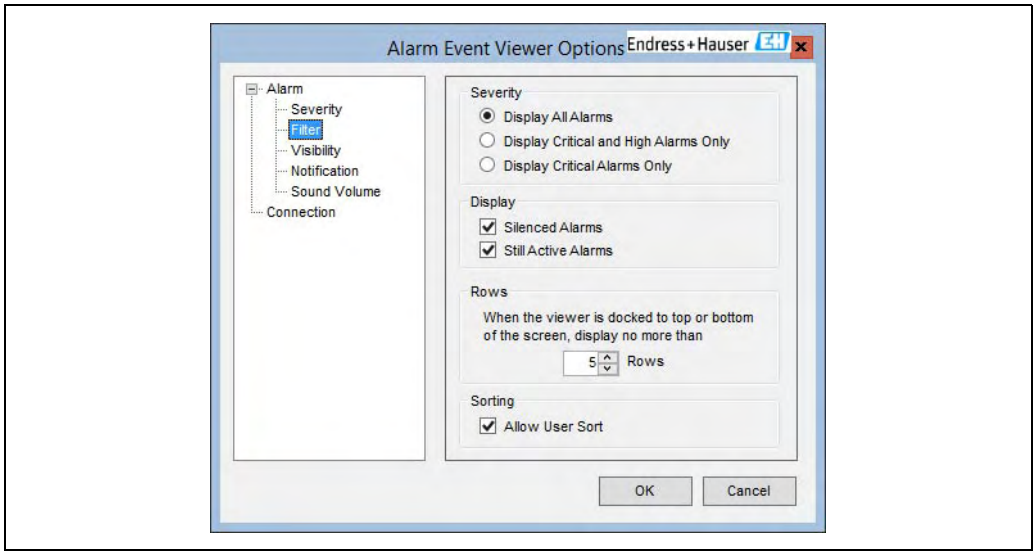
To play the currently selected sound file click on the **Test** button.

Sample

Indicates how the severity of the alarm will be displayed in the list of alarms.

8.3.2 Filter Options

The screen for filter options is shown below:



BA00390GEN_0174

These options specify how the alarms will be filtered within the alarm event viewer.

Severity

This section allows the filtering of alarms based on their severity.

Display → Silenced Alarms

If this option is ticked, alarms that have been silenced but not acknowledged will be displayed in the list. Otherwise the alarm will be removed from the list when it has been silenced even if it has not been acknowledged.

Display → Still Active Alarms

If this option is ticked, alarms that have been acknowledged but are still active will be displayed in the list. Otherwise the alarm will be removed from the list when it has been acknowledged even if it is still active.

Rows

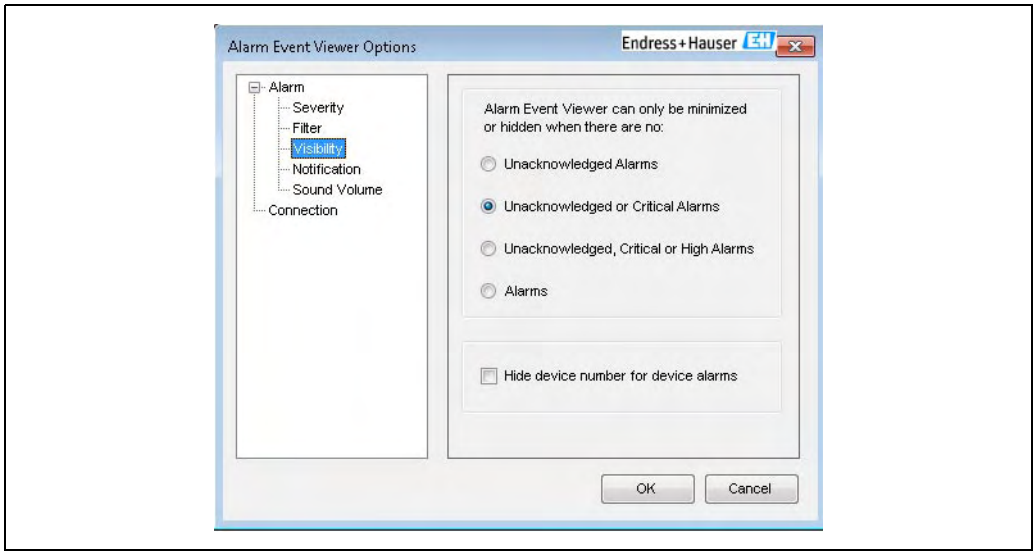
Allows the user to specify the maximum number of rows to be visible in the list when the alarm event viewer is docked at the top or bottom of the screen. All alarms will still be present in the list and if the number of alarms is more than the value entered a scroll bar will be displayed to allow the user to view details of all the alarms.

Sorting

Allows the user to sort the alarms by Severity, Description, First, Last and Active.

8.3.3 Visibility Options

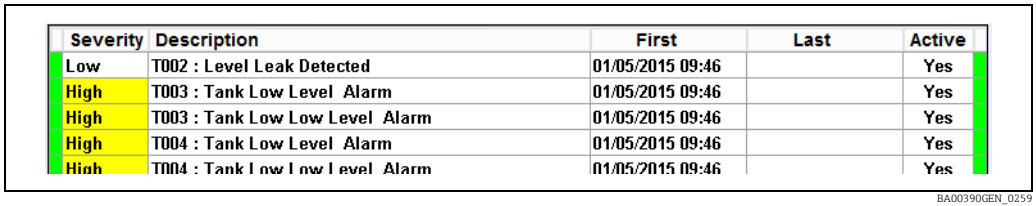
The screen for Visibility Options is shown below:



BA00390GEN_0258

The first panel on this page allows the user to specify the conditions under which the **Alarm Event Viewer** can be minimized or hidden. This also works in reverse, in that if a new alarm is raised which does not meet these conditions the **Alarm Event Viewer** is redisplayed on the screen if it is hidden or minimized.

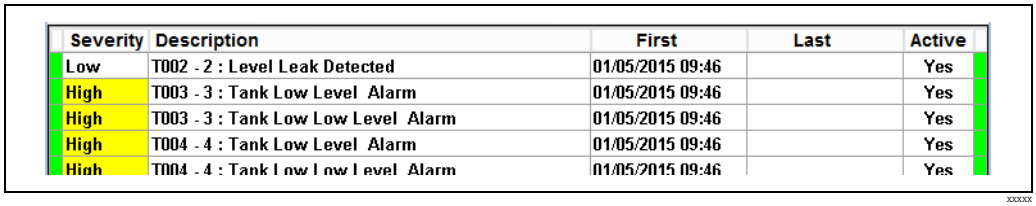
Hide device number for device alarms alters the description displayed on the main **Alarm Event Viewer** window to either show or hide the Device ID. See screenshots below. If your site has only one level gauge per tank, then showing the Device ID may not be necessary.



Severity	Description	First	Last	Active
Low	T002 : Level Leak Detected	01/05/2015 09:46		Yes
High	T003 : Tank Low Level Alarm	01/05/2015 09:46		Yes
High	T003 : Tank Low Low Level Alarm	01/05/2015 09:46		Yes
High	T004 : Tank Low Level Alarm	01/05/2015 09:46		Yes
High	T004 : Tank Low Low Level Alarm	01/05/2015 09:46		Yes

BA00390GEN_0259

Alarm Event Viewer with Device ID hidden



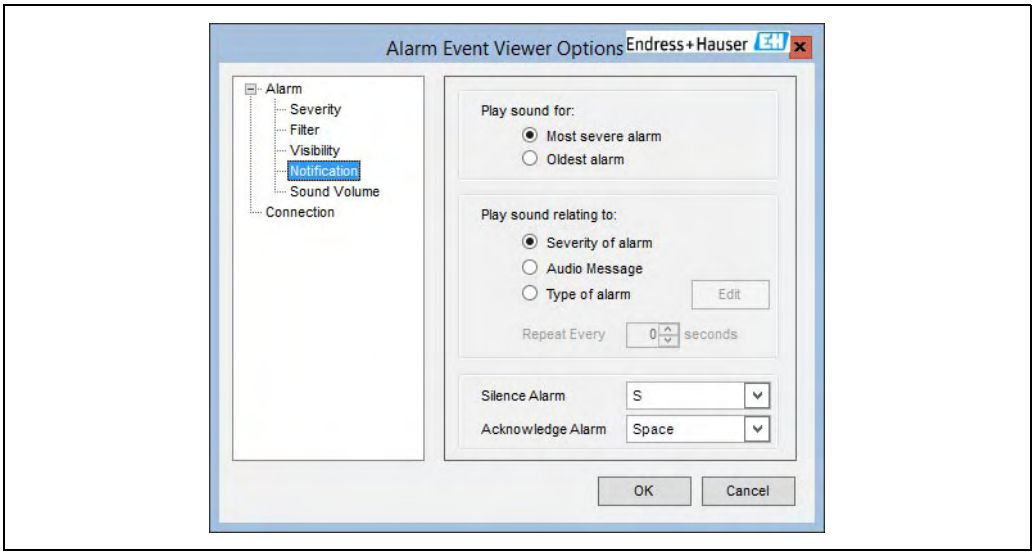
Severity	Description	First	Last	Active
Low	T002 - 2 : Level Leak Detected	01/05/2015 09:46		Yes
High	T003 - 3 : Tank Low Level Alarm	01/05/2015 09:46		Yes
High	T003 - 3 : Tank Low Low Level Alarm	01/05/2015 09:46		Yes
High	T004 - 4 : Tank Low Level Alarm	01/05/2015 09:46		Yes
High	T004 - 4 : Tank Low Low Level Alarm	01/05/2015 09:46		Yes

xxxxx

Alarm Event Viewer with Device ID shown

8.3.4 Notification Options

The screen for Notification Options is shown below:



BA00390GEN_0175

Play sound for → Most severe alarm

The 'active' alarm is considered to be the oldest unacknowledged alarm of the highest severity, i.e. there may be older unacknowledged alarms but these are of a lower severity than the 'active' one.

Play sound for → Oldest alarm

The 'active' alarm is considered to be the oldest unacknowledged alarm irrespective of severity.

Play sound relating to → Severity of alarm

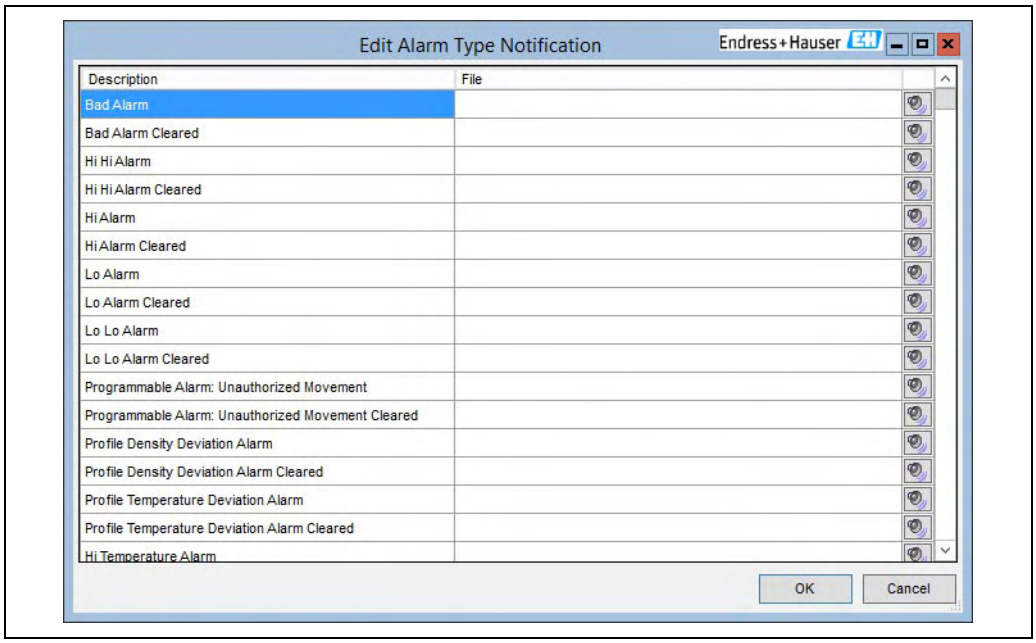
The sound relating to the severity of the 'active' alarm (→ 56) is continuously played until the alarm is acknowledged.

Play sound relating to → Audio message

The audio message configured for the alarm (see events configuration) is played once.

Play sound relating to → Type of alarm

The sound relating to the type of the 'active' alarm is played once. This is typically an annunciation of the alarm type. These sounds can be edited by pressing the **Edit** button (which is only available when this option is selected). Pressing the **Edit** button causes the following screen to be displayed:



BA00390GEN_0176

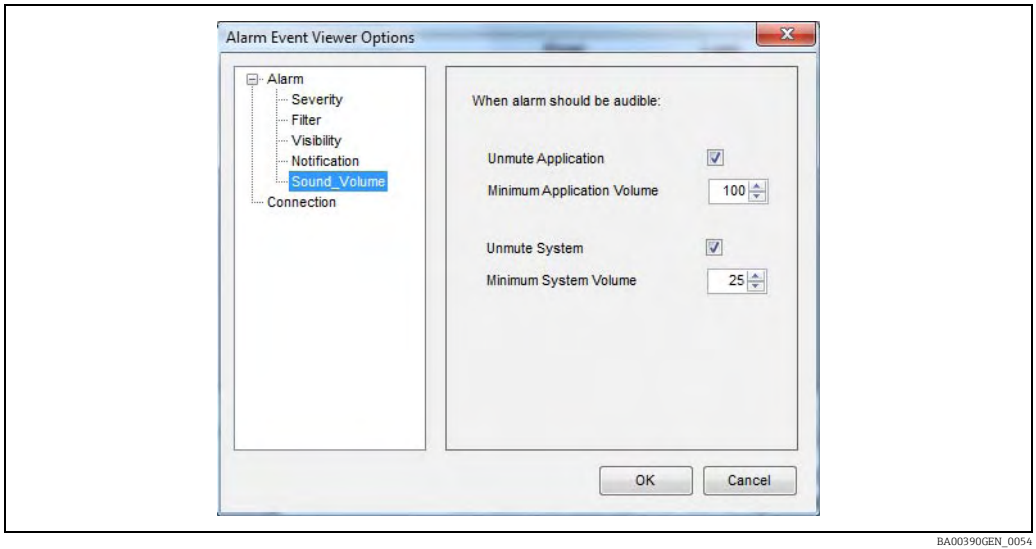
This list indicates the sound file that will be used for each type of alarm. The file can be changed by typing the new file name into the relevant field. Alternatively a new file can be selected by clicking on the ... button which is available when a file name is being edited. If no file is entered for an alarm type, the text for the alarm type will be annunciated using the Windows Speech Engine. To test the sound that will be played for an alarm type click on the button in the row for that alarm.

Silence Alarm

Allows the user to change the combination of keys that can be used to silence the currently selected alarm.

Acknowledge Alarm

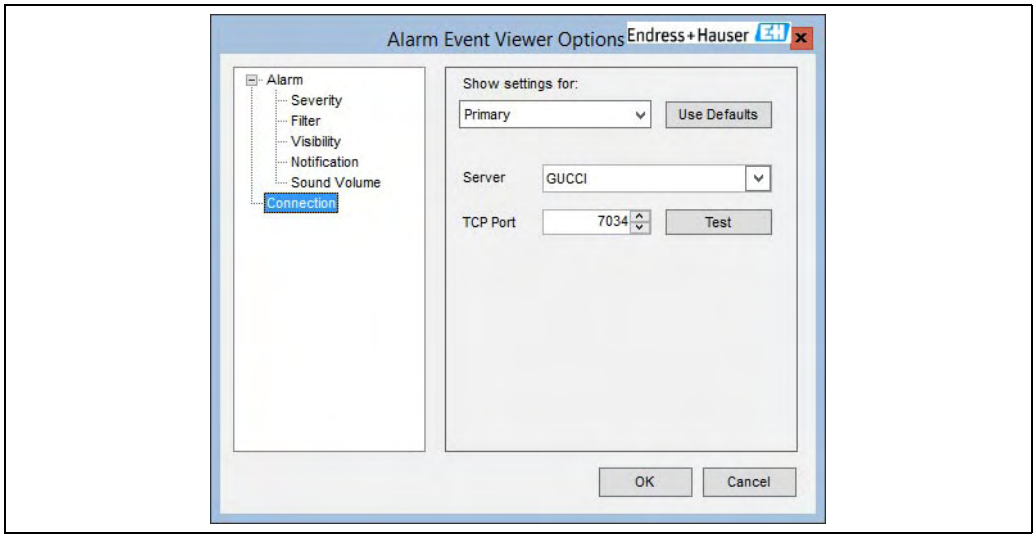
Allows the user to change the combination of keys that can be used to acknowledge the currently selected alarm.
The alarm volumes can be altered or muted using the next screen option.



BA00390GEN_0054

8.3.5 Connection Options

The screen for Connection Options is shown below:



Show settings for

The drop down list at the top of the page is used to select the server type for which the options are to be set. Changing the options on the page will only affect the settings for that server type.

Use Defaults

Reverts all the options for the server type back to their default values.

Server

The name of the server to be used for this server type. This can either be typed in directly, or selected from the drop down list. Depending on the speed and configuration of the network this list can take some time to be fully populated.

TCP Port

The TCP port on which the events service is running on the specified server.

Test

Tests that the events service can be found on the given combination of server and tcp port.

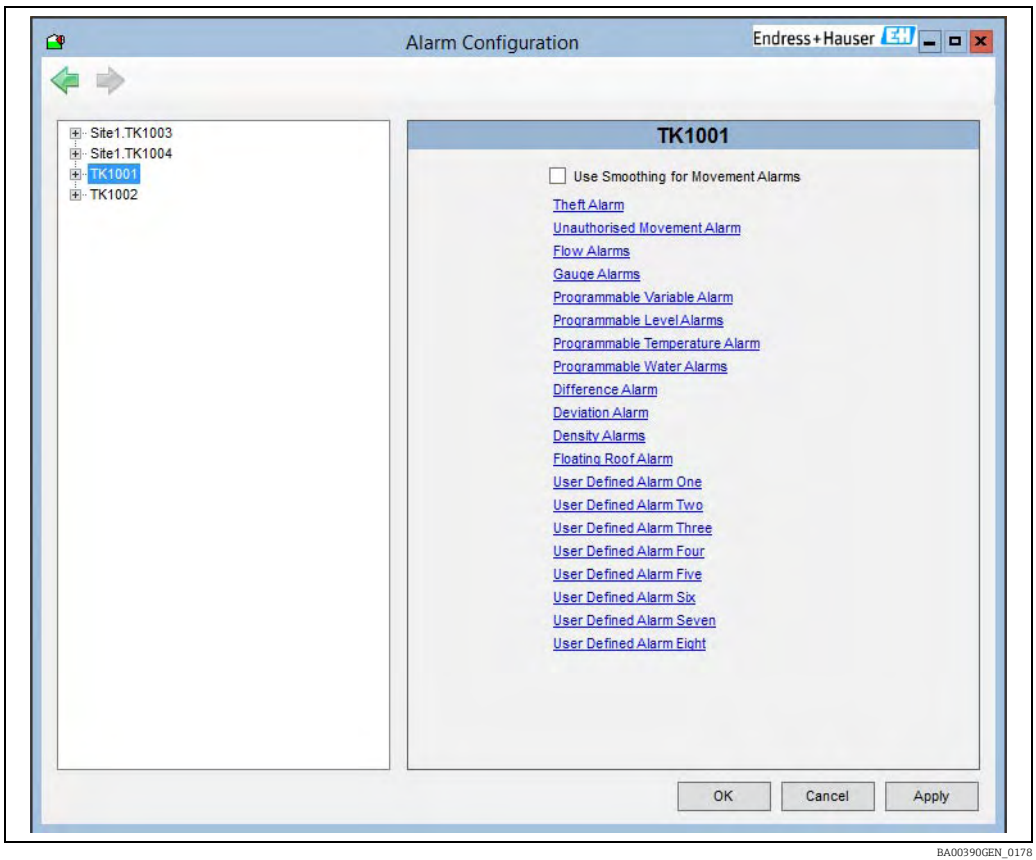
8.4 Programmable Alarm Configuration

An integrated part of the system is the Alarm Configuration module.
A wide range of programmable alarms are provided allowing the operator/user to have control over product movement.

8.4.1 Launching Alarm Configuration

To launch the Alarm Configuration module, proceed as follows:

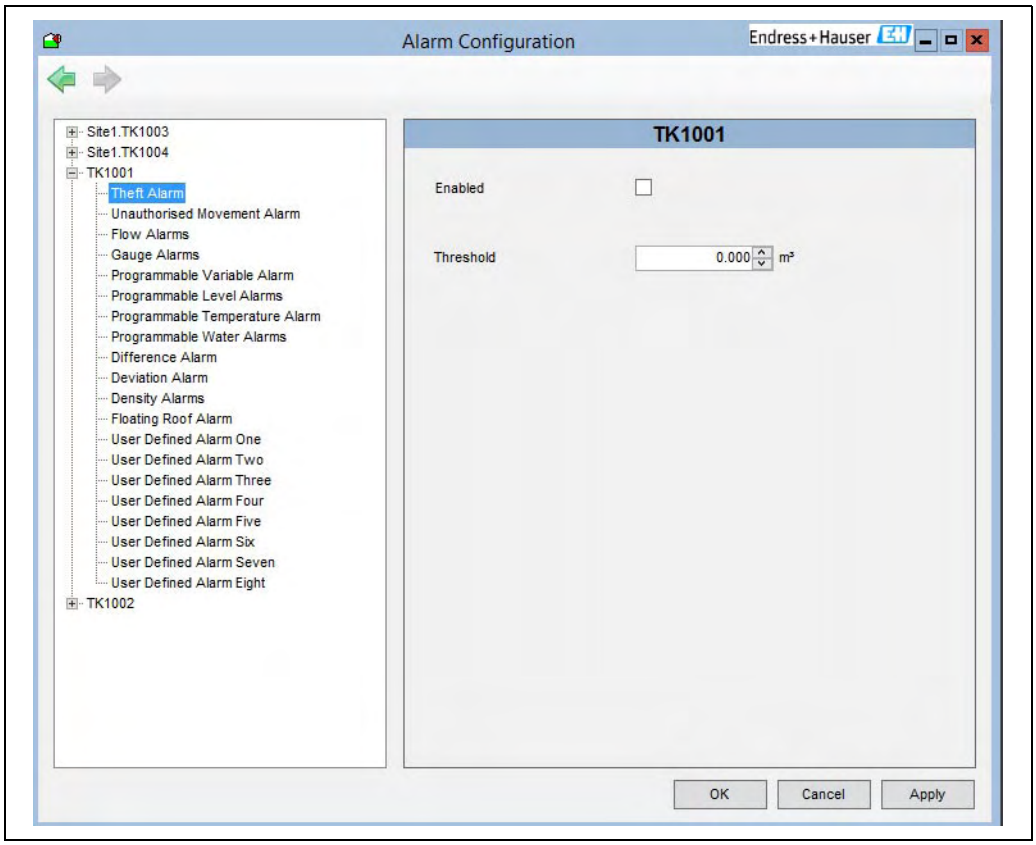
1. Select the **Alarm Configuration** option from the **Configuration** menu.
   The following display is typical:



BA00390GEN_0178

2. Expand the Tank to show the different types of alarms that can be configured.
3. Select one of the alarm groups.

Theft Alarm



BA00390GEN_0179

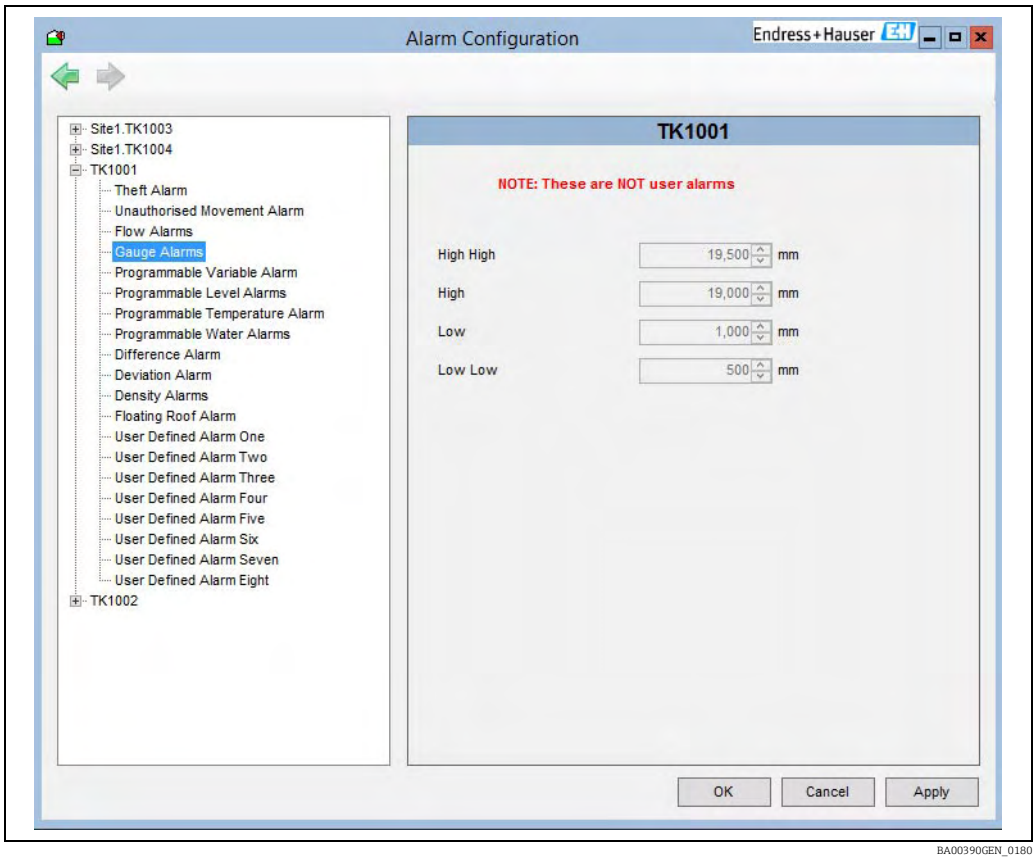
The **Theft Alarm** is similar to the **Unauthorised Movement Alarm** except that it only detects a loss of product and ignores gains. It also has a number of extra features, specific to theft monitoring. When the alarm is enabled the current GSV is stored as a starting value and any reduction in the volume greater than the threshold figure will then trigger the alarm. If the GSV increases then the starting value will be set to the new GSV value, thus it will automatically take account of any receipts of product. Once a Theft Alarm has been triggered it will reset itself after a user defined period and re-arm with the current GSV as a starting value. Note that after using this tool it is necessary to start and stop services using DCC Config to set up the alarm.
The **Theft Alarm** will only be monitored during user defined periods (i.e. during nights and weekends); outside of these periods no alarm will be generated even if the theft alarm is enabled. To configure the monitoring periods and the alarm reset period, the software tool "Theft Monitor Config.exe" is used. This is located in the standard installation directory: **C:\program files\Common Files\Tank Farm automations\Server**.

It has three configuration screens:
- Alarm reset – minutes and seconds (time before alarm is reset)
- Day of week - Timed (between x and y hours) / on all day / off all day
- Day of Year - Timed (between x and y hours) / on all day / off all day
  These allow for holidays to be programmed into a theft alarm schedule.

After using this tool it is necessary to start and stop services using DCC Config to set up the alarm.

- **Threshold** - an operator configurable threshold to determine when a **Theft alarm** should be raised.

Gauge Alarms



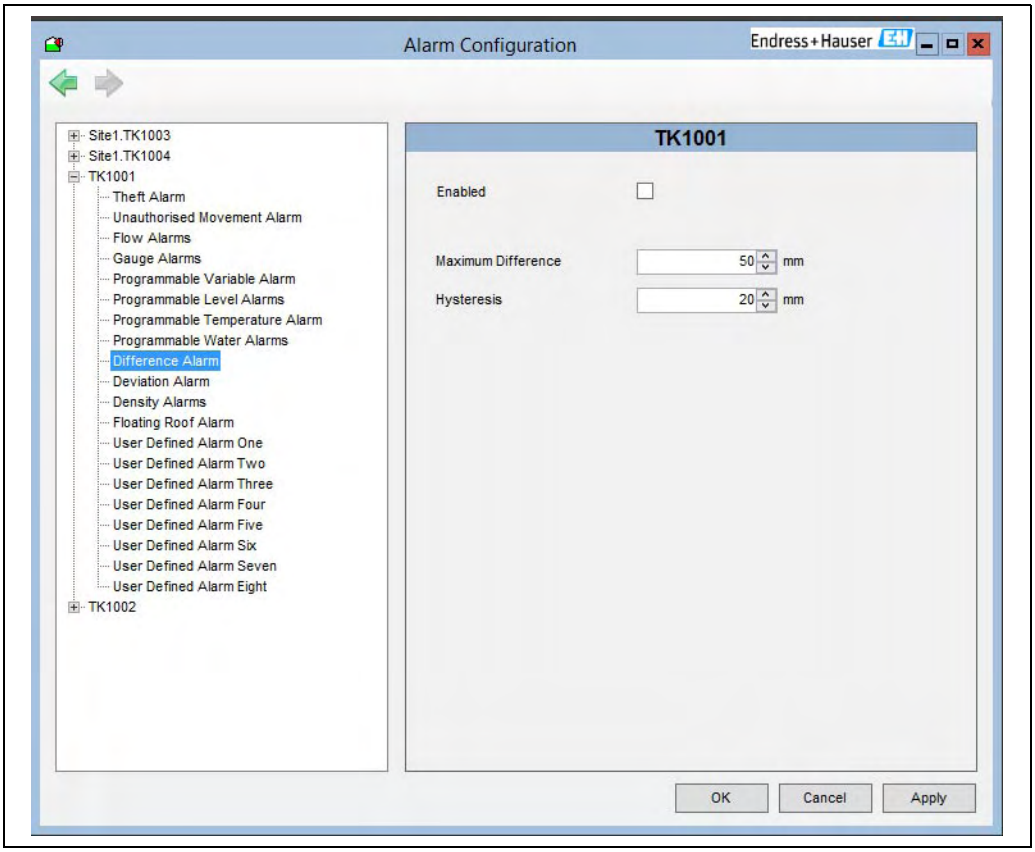
BA00390GEN_0180

Gauge alarms are those alarms that are generated by the gauging instrument itself. The alarm levels displayed here are normally only there for reference purposes.
On some modern technology gauges it is possible to read the gauge alarm settings from the gauge automatically.
On older gauges this is not possible and provision is made to enter these manually within through this module.

Detection of gauge alarms is done by the gauging instrument and not by the Tankvision Professional software. Tankvision Professional merely reads the status of the alarm bits transmitted to it by the gauge.
Gauge alarm settings are normally set by the gauge commissioning engineer.

- **Gauge Alarm High High** - The gauge high high level alarm setting.
- **Gauge Alarm High** - The gauge high level alarm setting.
- **Gauge Alarm Low** - The gauge low level alarm setting.
- **Gauge Alarm Low Low** - The gauge low low level alarm setting.
- **Gauge Alarm Enable** - An operator configurable enable flag.

Difference Alarm



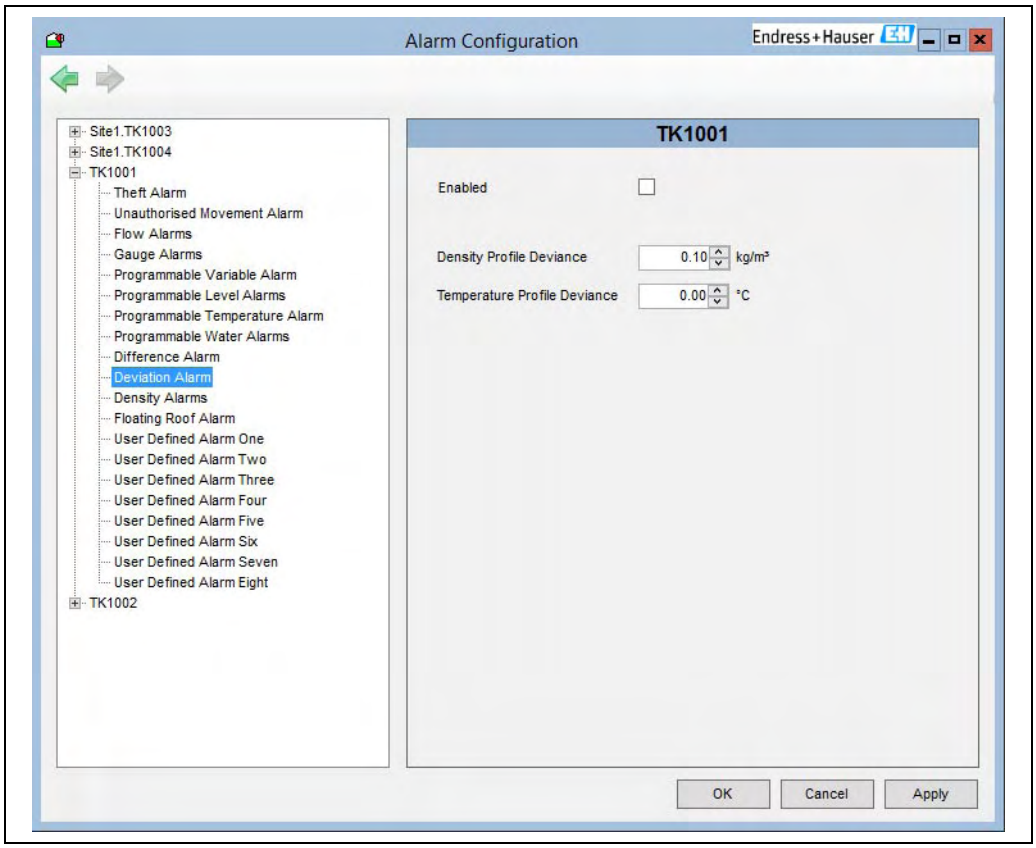
BA00390GEN_0181

For example a tank fitted with two gauges will have one nominated as the primary gauge and the second as a secondary gauge. The system can then monitor the difference between the two gauge levels, and compare the difference to the allowable tolerance set by the user. If the difference exceeds the tolerance a difference alarm will be generated.

- **Difference Alarm Enable** - an operator settable signal to determine if the alarm is enabled or not.
- **Difference Alarm** - an operator configurable difference alarm.
- **Difference Alarm Hysteresis** - operator configurable hysteresis for difference alarm. If a hysteresis value above the Allowable Tolerance is entered then the following warning message is displayed:
  Hysteresis is above the Allowable Tolerance!

1. Click the **OK** button to clear the warning.
   A hysteresis value below the Allowable Tolerance must be entered.

Deviation Alarm

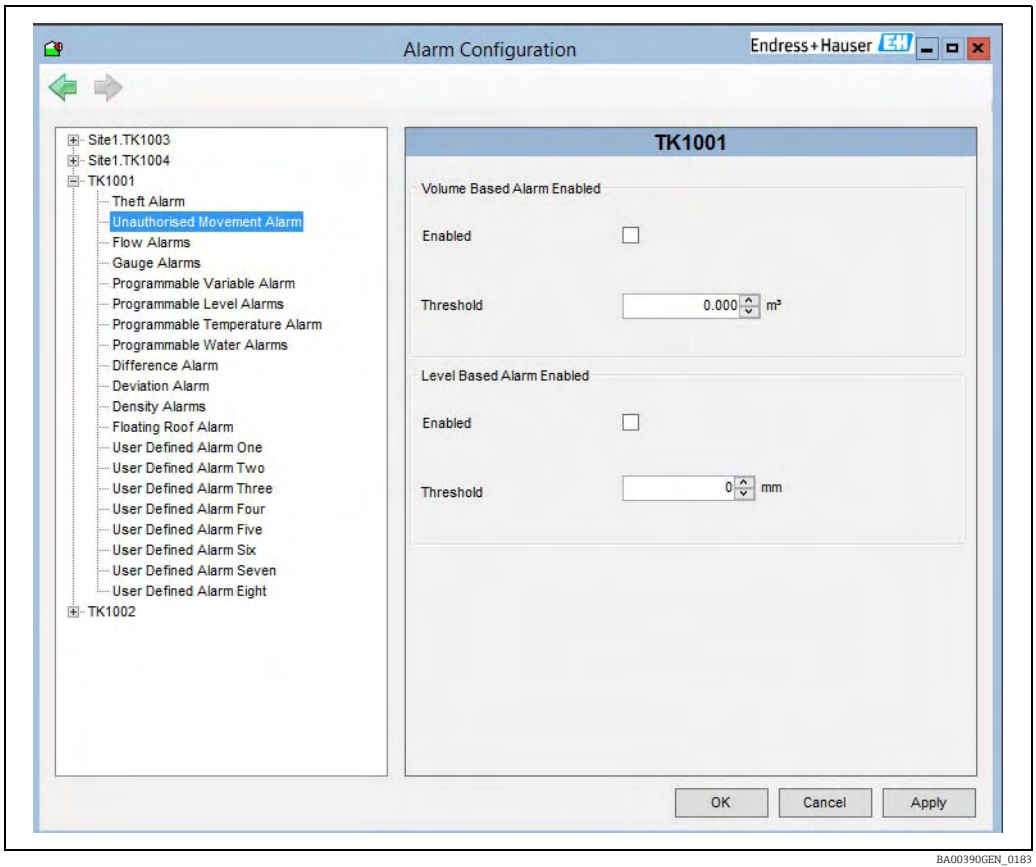


BA00390GEN_0182

The deviation alarm is used to alert operators to layering occurring in the tank. When two consecutive profile points deviate by the specified amount, either in their density readings or temperature, an alarm will be generated. This alarm requires the use of gauges capable of returning density profiles.

- **Deviation Alarm Enable** - enables and disables the alarm.
- **Density Profile Deviation** - deviation amount, for density points.
- **Temperature Profile Deviation** - Deviation amount, for temperature points.

Unauthorised Movement Alarm



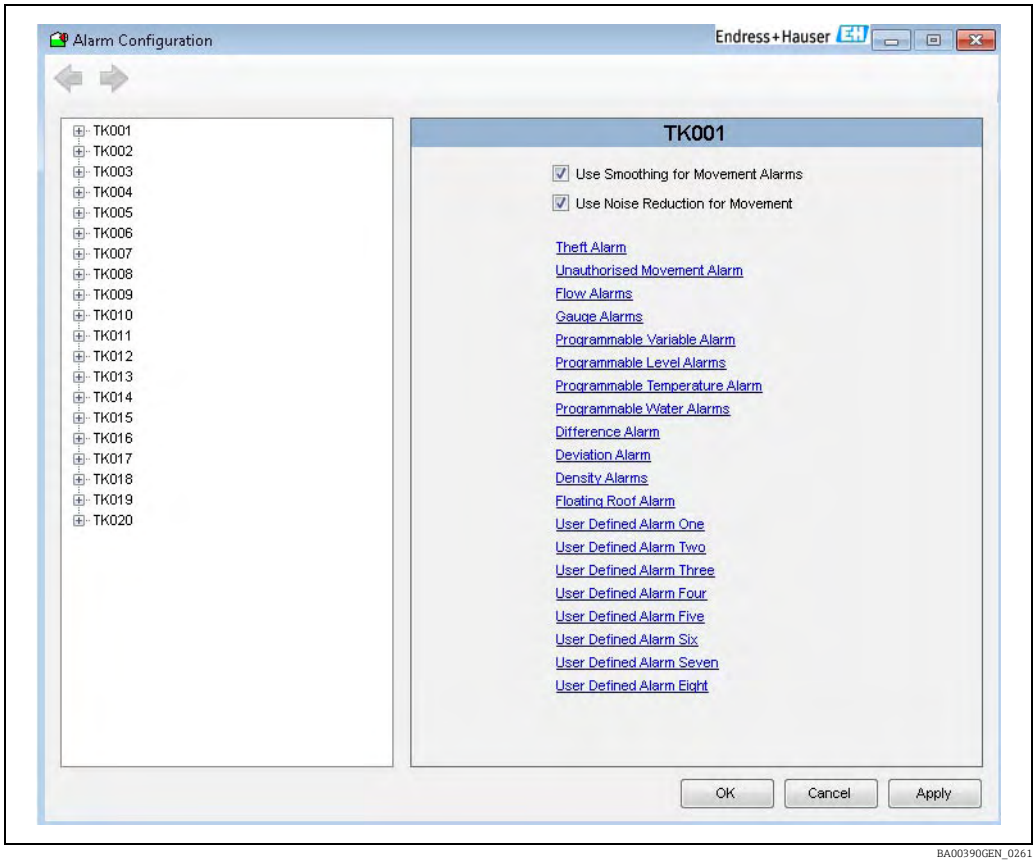
BA00390GEN_0183

The unauthorised movement alarm is intended to protect against inadvertent movement of product in static tanks. The "Unauthorised Movement by Volume/Level" or Leak Alarm can be enabled on systems where the Movements sub-system is not in use. This alarm should be enabled when the tank is to remain static, this has the action of internally storing the current GSV for the tank, should the GSV in the tank change beyond the predefined threshold limit, then the alarm will be triggered. The alarm should be disabled when movement of product into or out of the tank is being done.
This alarm is often referred to as a Leak Alarm although it equally refers to a gain of product as well as a leak. The application refers to these as unauthorised movements.

- **Threshold** - an operator configurable threshold to determine when an Unauthorised Movement alarm should be raised.

Movement Alarms

In some circumstances it is necessary to reduce the sensitivity of the Unauthorized Movement and Theft Alarms. Typical reasons are that radar gauges on empty tanks can give spurious jumps in level that would be detected as an Unauthorized Movement or that high winds acting on a floating roof tank cause the levels to "swing". In such situations the Unauthorized Movement and Theft Alarms can become a nuisance, distracting the operators from the real dangers on their site.

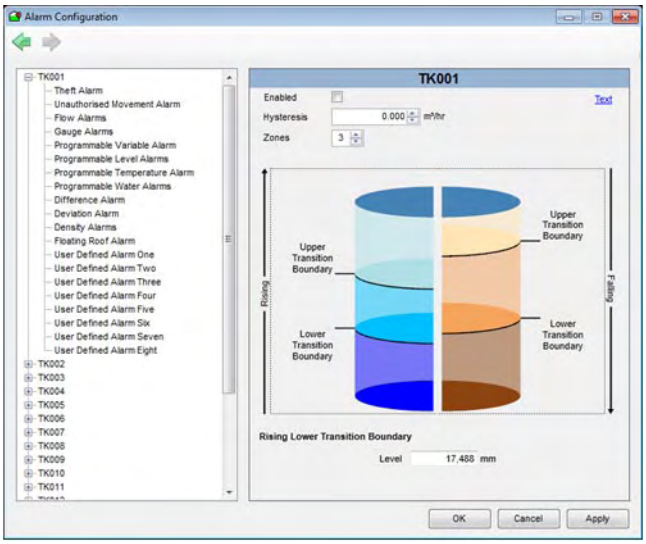


BA00390GEN_0261

Use Smoothing for Movement Alarms – apply smoothing to the volume and level used to test for the **Unauthorised Movement Alarm** and the **Theft Alarm**. The smoothing uses the same parameters entered for the flow calculations, i.e. Flow Rate Damping and Flow Rate Integration. These are entered in the **Device Configuration** screens.
Use Noise Reduction for Movement – is similar to the above, but employs a two out of three voting mechanism to discard "jumps" in level which can be caused by radar gauges. Each successive level reading from the gauge is compared with the previous two readings, the most extreme reading is discarded and the level in the tank is considered to be the average of the two remaining. In this way outlier readings (i.e. jumps in gauged level) are discarded.

These settings have no effect on the product level and dependent inventory volumes and masses, it is only the levels and volumes used by the Unauthorised Movement and the Theft Alarm detection mechanism that are altered.

Flow Alarms

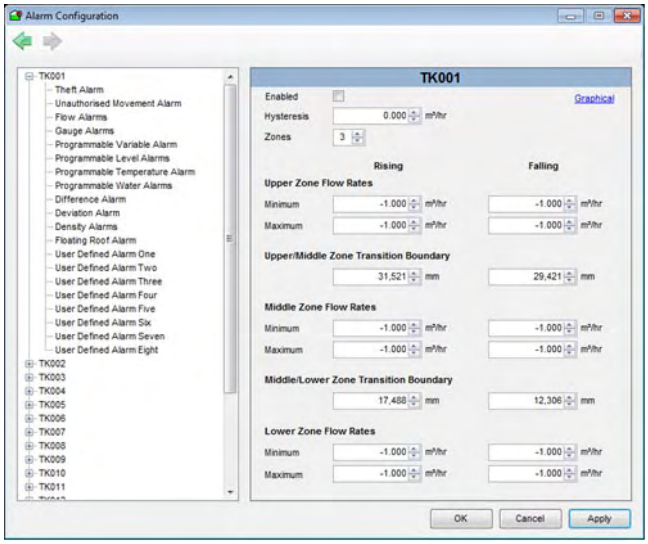


BA00390GEN_0063

The flow alarms are intended for use when tanks are moving. They are useful to detect that flow has exceeded a tank or pipeline design limit or that flow has reduced or stopped perhaps due to some fault.
The alarms are configurable for up to 3 zones. The zone transition boundaries for Rising level alarms and Falling level alarms can be independently configured.
Transition boundaries may be dragged to the required level or selected and the required level typed into the **Level** entry field.
Flow rates for each zone may be entered by selecting the required zone and typing the **Min Flow Rate** and **Max Flow Rate** into the appropriate entry field.

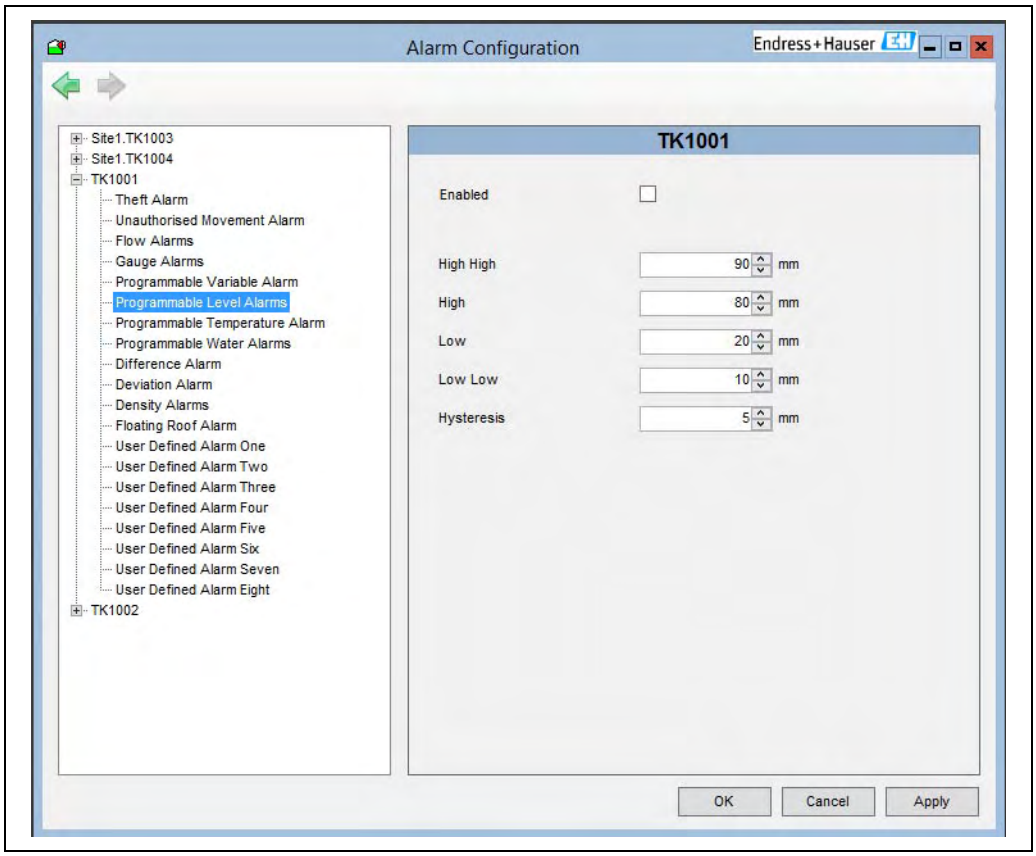
Entering a negative value disables an alarm.

Alternatively, clicking the **Text** link in the top right of the window switches from Graphical to Text entry.



BA00390GEN_0064

Programmable Level Alarms



BA00390GEN_0185

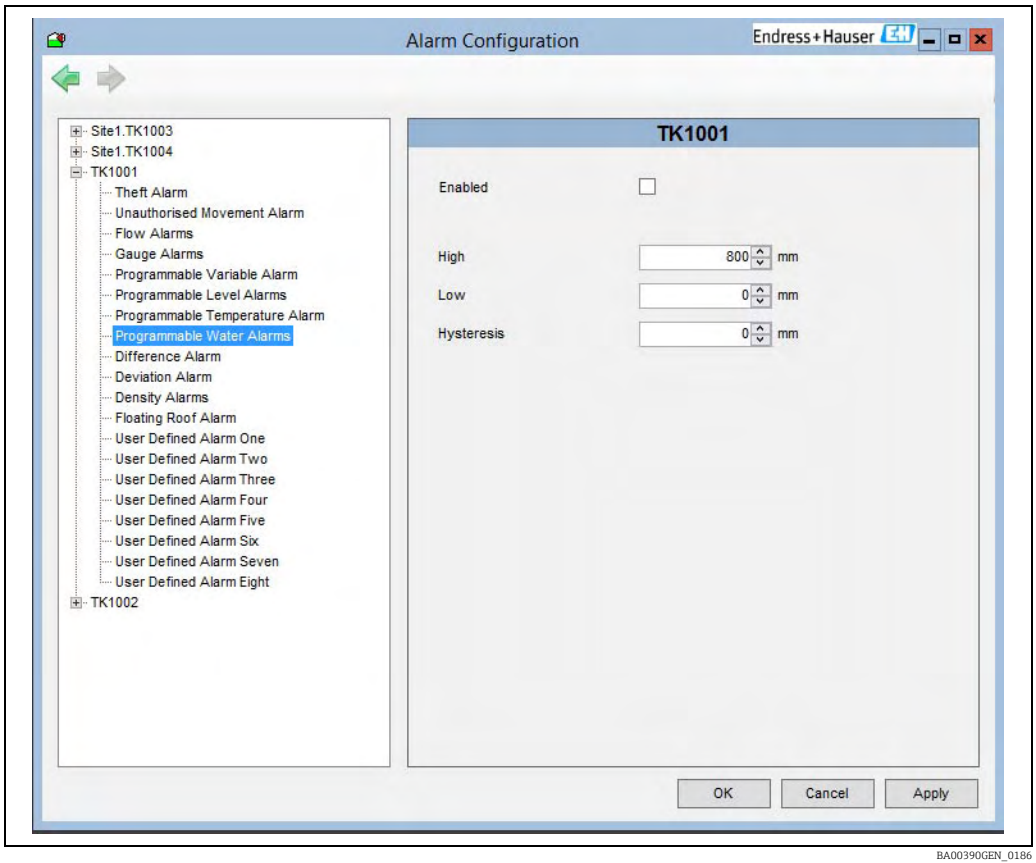
Programmable level alarms are triggered according to the gauged level, they can be used on gauges where hardware alarms are not available or used in addition to the gauge hardware alarms.

- **Level Alarm High High** - an operator configurable level alarm denoted High High.
- **Level Alarm High** - an operator configurable level alarm denoted High.
- **Level Alarm Low** - an operator configurable level alarm denoted Low.
- **Level Alarm Low Low** - an operator configurable level alarm denoted Low Low.
- **Level Alarm Hysteresis** - an operator configurable hysteresis value.
- **Level Alarm Enable** - an operator configurable enable flag.

The term **High High** is normally associated with the extreme upper limit to which a tank would be filled. Under normal operating conditions it would be unusual to trigger this alarm.
Consequently the term High is not as extreme as **High High** and is normally set a small distance below the **High High** limit.
The term **Low Low** is normally associated with the extreme lower limit to which a tank would be emptied. Under normal operating conditions it would be unusual to trigger this alarm.
Consequently the term Low is not as extreme as **Low Low** and is normally set a small distance above the **Low Low** limit.
Clearly it is essential that all the alarms being used are configured correctly.

The programmable level alarms have equivalent gauge alarms. The programmable alarms would normally be set slightly below and slightly above there respective gauge alarm values. The programmable alarms would normally be used as early warnings to the gauge alarms. However the user can choose to use them as required although it is recommended that they are used within the context of the definition of the alarm to avoid confusion.

Programmable Water Alarms

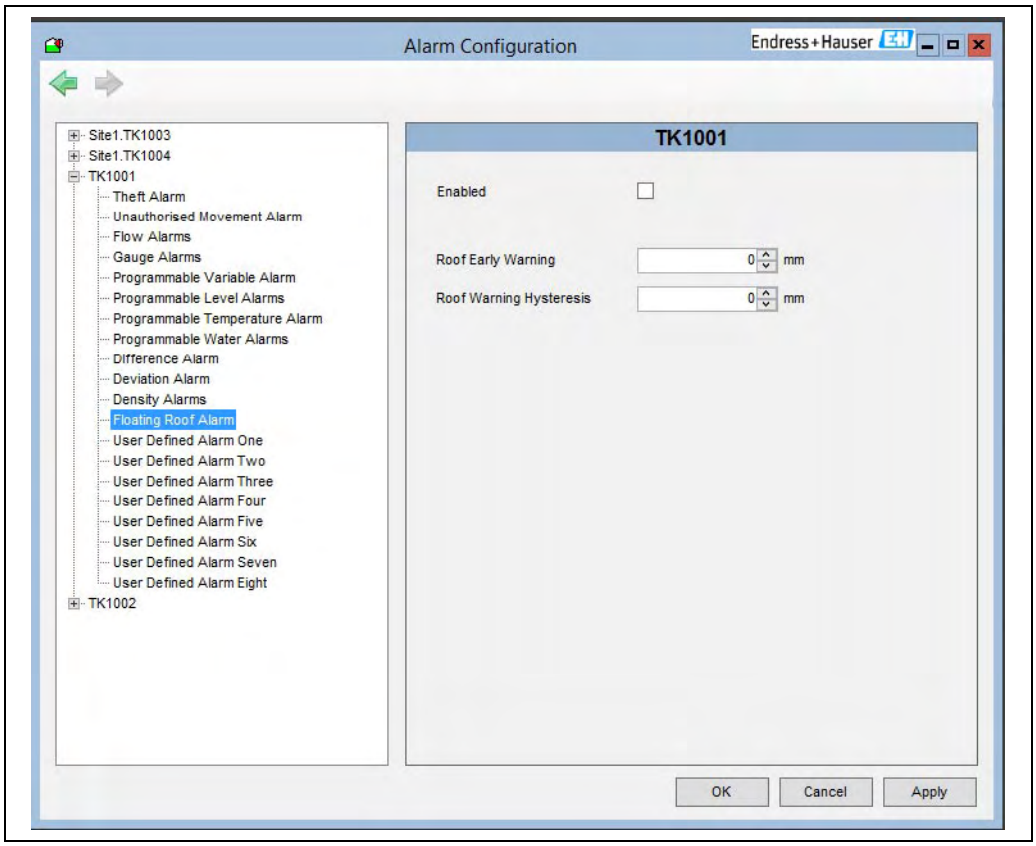


BA00390GEN_0186

Water alarms are triggered when tank water levels exceed the limits specified. If you do not require a low water alarm, set the low level to a negative value.

- **High Water Level** - an operator configurable free water level, above which the alarm will be triggered.
- **Low Water Level** - an operator configurable free water level, below which the alarm will be triggered - If a low water warning is not required set this to a negative value, to prevent it occurring.

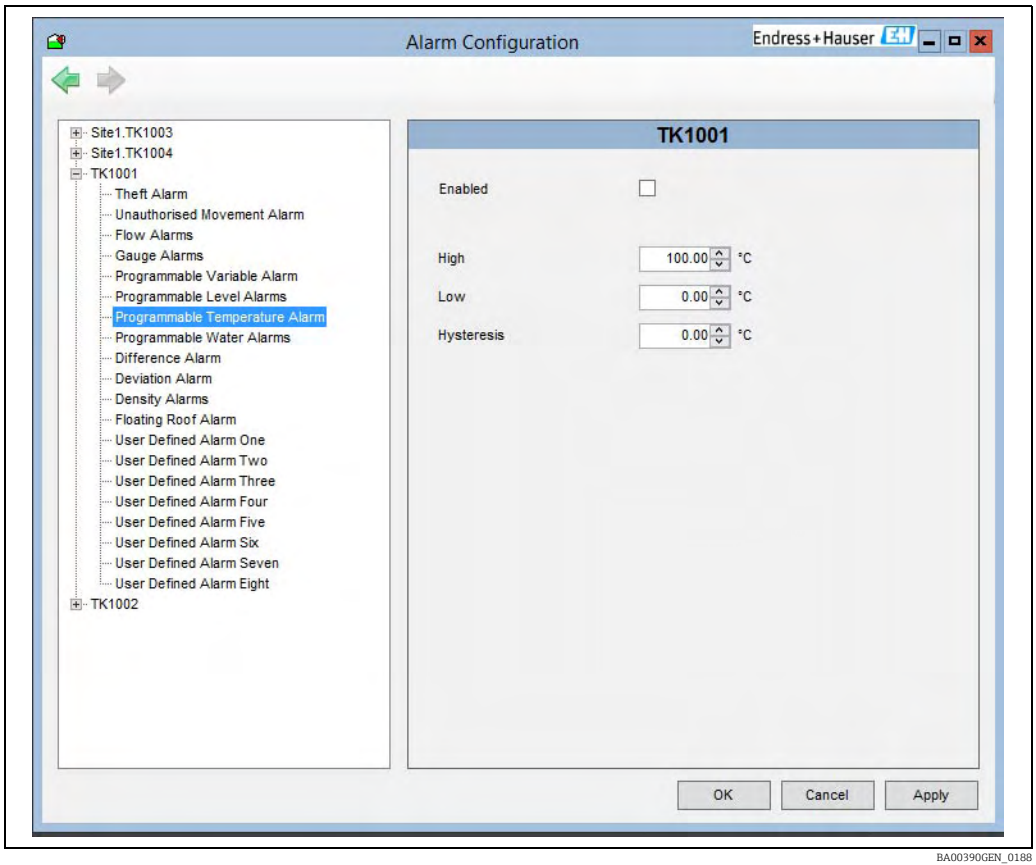
Floating Roof Alarm



The purpose of the Floating Roof alarm is to provide the operator with the option of generating a warning when the product level starts to approach the point where the roof starts to rest on its legs. Under normal operating conditions this is generally undesirable; therefore the alarm has been provided for that purpose.

- **Enabled** - when selected, the Floating Roof Alarm will be activated when the product level falls below the Roof Early Warning Level. The alarm will be cleared when the product level rises above the Roof Early Warning Level by more than the Roof Warning Hysteresis.
- **Roof Early Warning** - an operator configurable set point determining at what level the alarm will be generated. The level would normally be programmed above the Roof Fully Floating level set in the Tank Characteristics module.
- **Roof Warning Hysteresis** - the operator configurable distance by which the product level must return above the Roof Early Warning Level in order to clear the Roof Early Warning Alarm.

Programmable Temperature Alarms

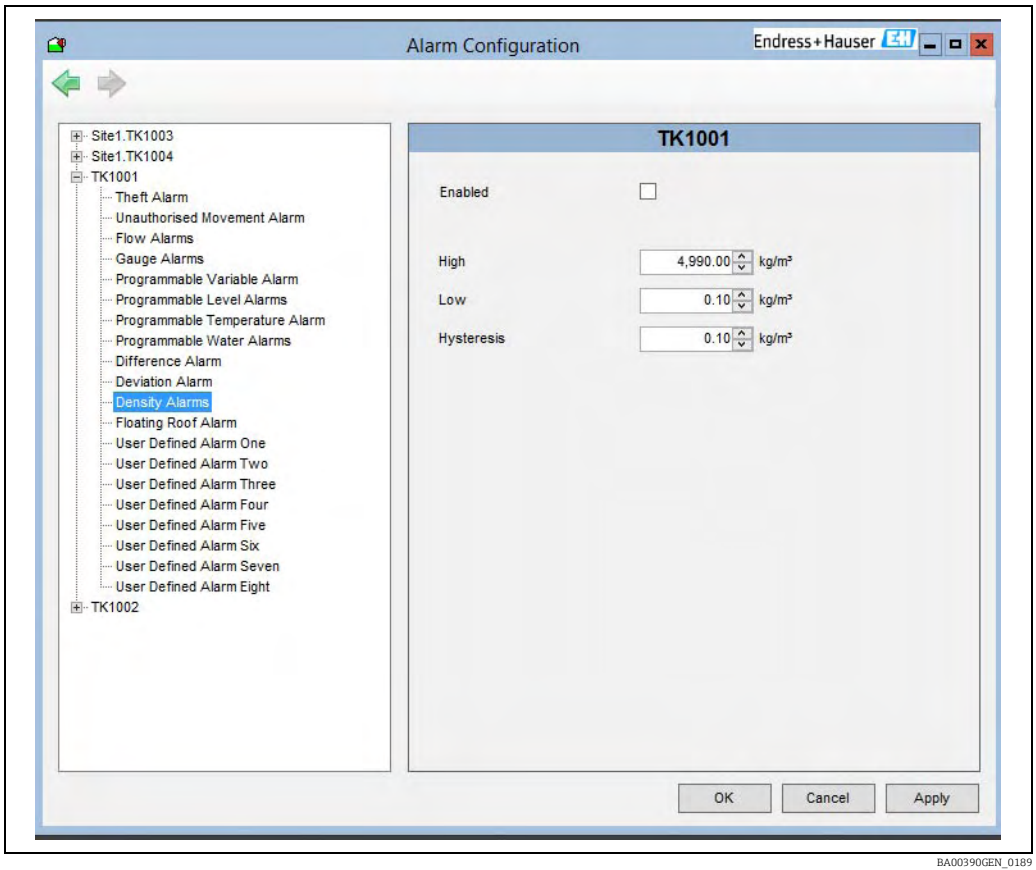


BA00390GEN_0188

These are operator programmable temperature alarms.

- **High** - an operator configurable high temperature alarm.
- **Low** - an operator configurable low temperature alarm.
- **Hysteresis** - an operator configurable temperature hysteresis.
- **Enabled** - an operator configurable temperature alarm enable.

Density Alarms



BA00390GEN_0189

These are operator programmable density alarms.

- **High** - an operator configurable high density alarm.
- **Low** - an operator configurable low density alarm.
- **Hysteresis** - an operator configurable density hysteresis.
- **Enabled** - enables and disables the alarm

8.4.2 Modifying Data within Alarm Configuration

To modify data within the Alarm Configuration module, proceed as follows:

1. Select the tank to be modified from the list and the type of alarm to be modified.
   The current details for the alarm for that tank will be displayed.

Take note that if this is the first time Alarm Configuration has been loaded after installing the system it will be displaying default values. It is essential that default values are replaced with the correct operating values.

2. Select the field to be edited and type in the new data values.

Each field is validated both during data entry and just before the data is saved to the database.
You can use the **TAB** key to move to the next entry field.

3. If the changes made are correct and you want to save them, press the **Apply** button to save the changes to the database.

To edit further tanks follow the same procedure.

4. If you want to abandon any changes made since the last time the **Apply** button was pressed, press the **Cancel** key.
   This will also exit the application.
5. To exit the application, either close the Window or press the **Cancel** or **OK** buttons.

8.4.3 Generation of Alarms

Normally in a standalone configuration the alarms are detected and generated by the Data Communications Control module. It is this module that sees the changes in gauge data first. In a client-server system it is the same module that detects and reports the alarms although it is important to note that this module will only be running on the server.
Any client connected to the server will therefore see the same alarms.
Some events may be generated locally by each client. These are normally events in response to abnormal operating data or transient or irrecoverable data access errors.

8.4.4 Enabling and Disabling Alarms

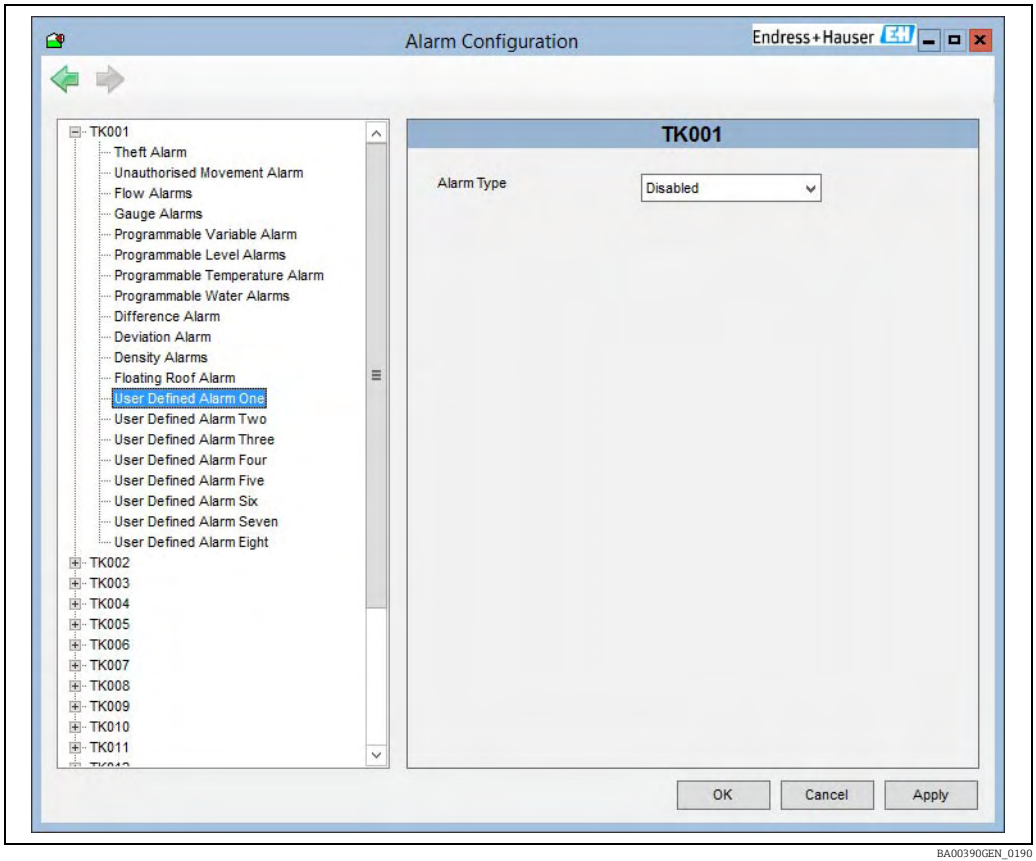
Enabling an alarm means that the variable associated with the alarm will be monitored against its set limits and when it deviates outside of those set limits an alarm will occur. Disabling an alarm means that no alarm processing will take place for the disabled alarm and therefore no event, audible signal or otherwise will be generated if the variable goes outside of its set limits.

Alarms can generally be enabled or disabled in one of two ways:
- The alarm configuration display provides a check box within each tab for enabling or disabling the alarm.
- Alternatively, the pop-up menu allows the user to enable and disable the alarms.

The enabling and disabling of alarms is logged to the audit trail file.

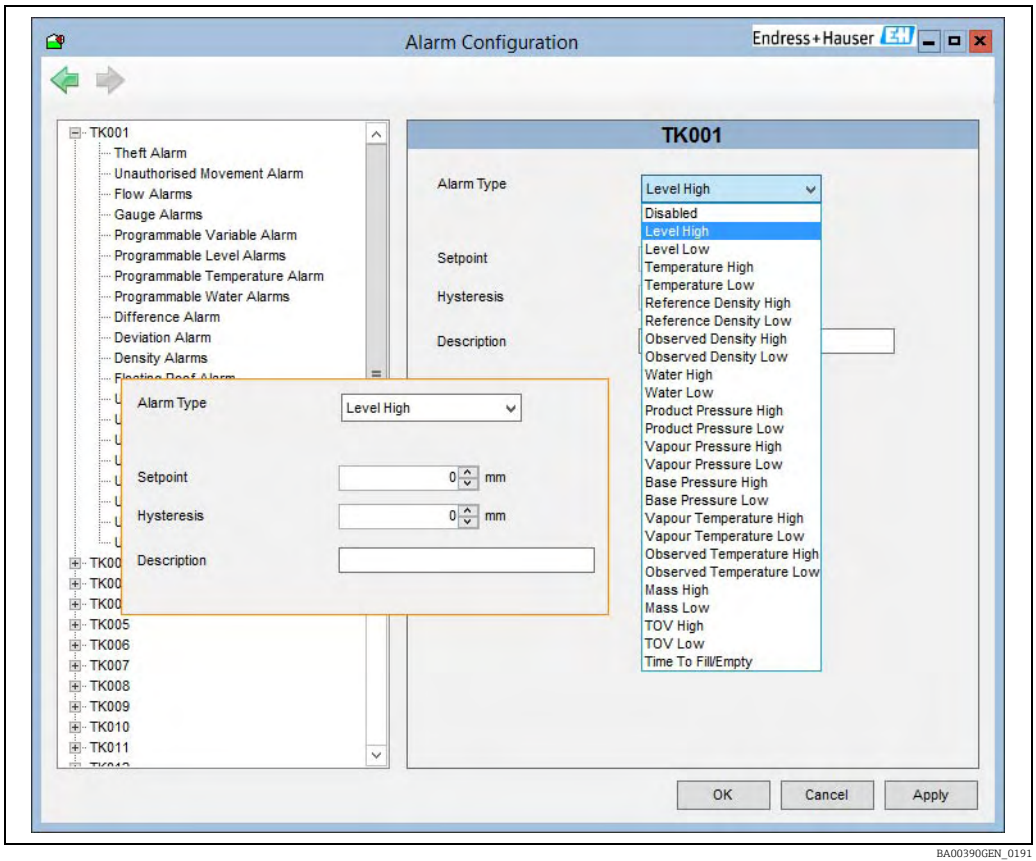
8.5 User Defined Alarms

User Defined Alarms (Programmable) are a set of alarms which the user may configure based on a set point and hysteresis. There are eight alarms **User Defined Alarm One** to **User Defined Alarm Eight**.



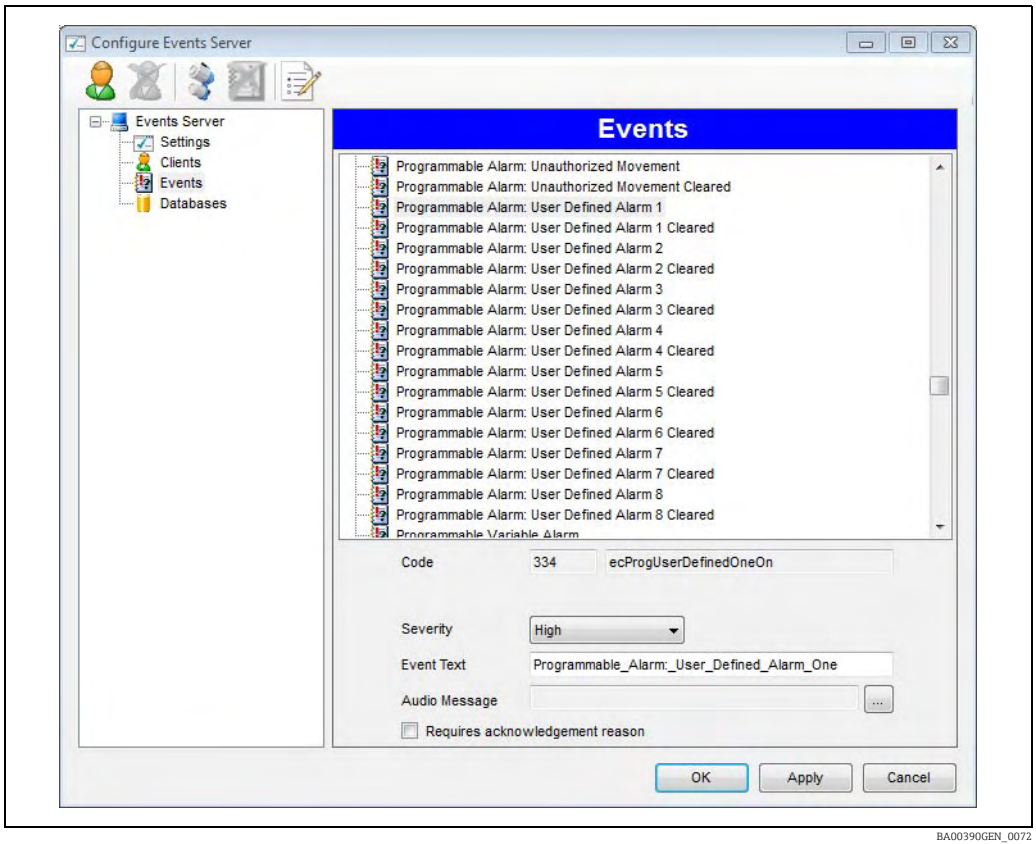
BA00390GEN_0190

There is a drop down box to select the alarm type and a text box to enter the alarm description.



BA00390GEN_0191

The text that is displayed when the alarm is activated or cleared and the severity is set in Event Server Configuration.



BA00390GEN_0072

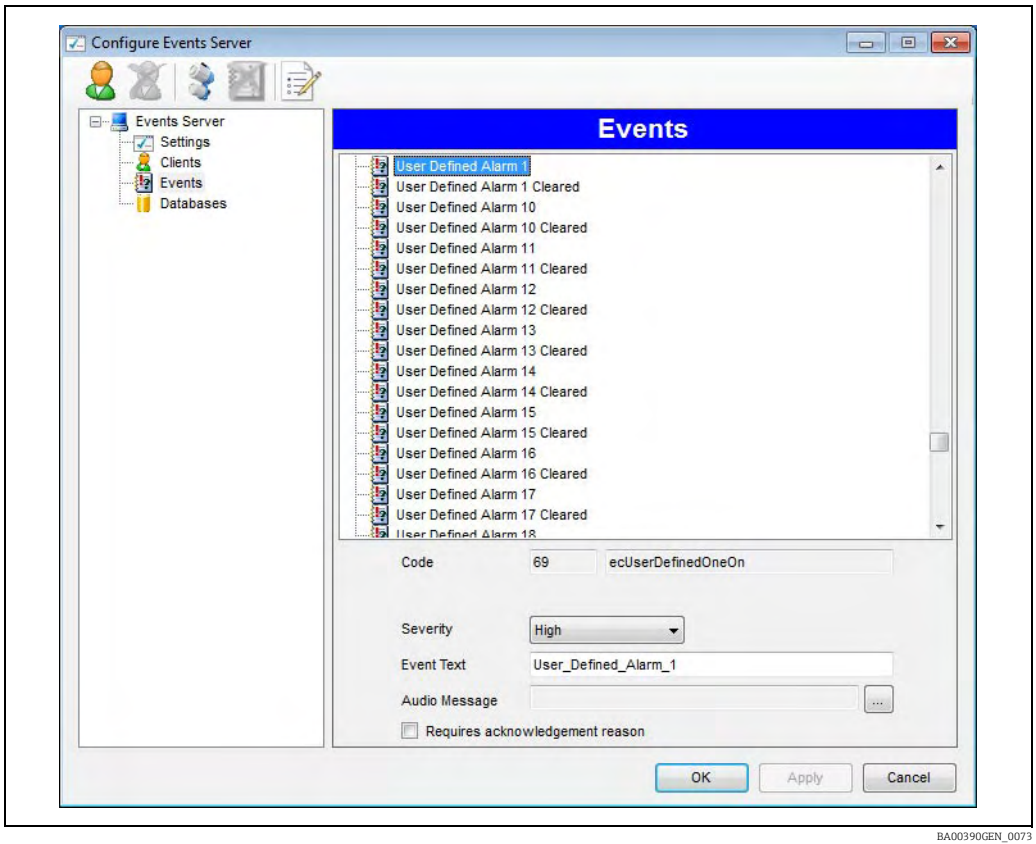
8.6 User Defined Alarms (Gauge)

User Defined Alarms (Gauge) are a set of alarms generated by certain gauge types, Bit pattern data is received by the application from a Modbus or OPC host which must be configured in DCC (see DCC config document). The user may configure the text to be displayed when the alarm is activated and cleared. There are 32 such alarms per gauge:

- User Defined Alarm 1
- User Defined Alarm 2
- User Defined Alarm 3
- Etc. etc. up to;
- User Defined Alarm 32

The alarms are available in the database for all gauge types which support Modbus or OPC.

To configure the text and severity, display the **Events** page of the **Event Server Configuration** utility.



BA00390GEN_0073

From this page the settings for each alarm in the system can be defined.

1. To show the settings select the alarm from the list.

The user defined alarms are:
- User Defined Alarm 1
- User Defined Alarm 1 Cleared
- User Defined Alarm 2
- User Defined Alarm 2 Cleared
- User Defined Alarm 3
- User Defined Alarm 3 Cleared
- Etc. etc. up to;
- User Defined Alarm 32
- User Defined Alarm 32 Cleared

The On and Cleared parameters define what text is displayed when the alarm is activated and cleared. These should be modified by the user to the required text.
The severity may be set by the user as required.
The Event Server should be re-started to load any new alarm definitions. Use the DCC Config applet in the control panel to do this.

9 Product Configuration

When first installed, the system has no product information.
This function is used to enter the names of the products stored on-site.
Product Configuration can be launched at any time in order to edit and modify existing products as well as add new products or delete existing products.
Each product needs to be allocated to a product type. By default, a **GENERAL** product type exists. Other product types can be created using this function.

The use of this feature can be controlled by the security system.

9.1 Product Types

Product Types allow the user to group products that have similar characteristics.

For example, general product types might be configured as:
- DISTILLATES
- SPIRITS
- CRUDE
- HEAVY OILS
- FUEL OIL

The following products may for example be members of the DISTILLATES product type:
- DERV
- KERO
- GAS
- OIL
- JET A1

Similarly, the following products may be members of the SPIRITS product type:
- ULMS
- LRP
- UL 95
- UL 98

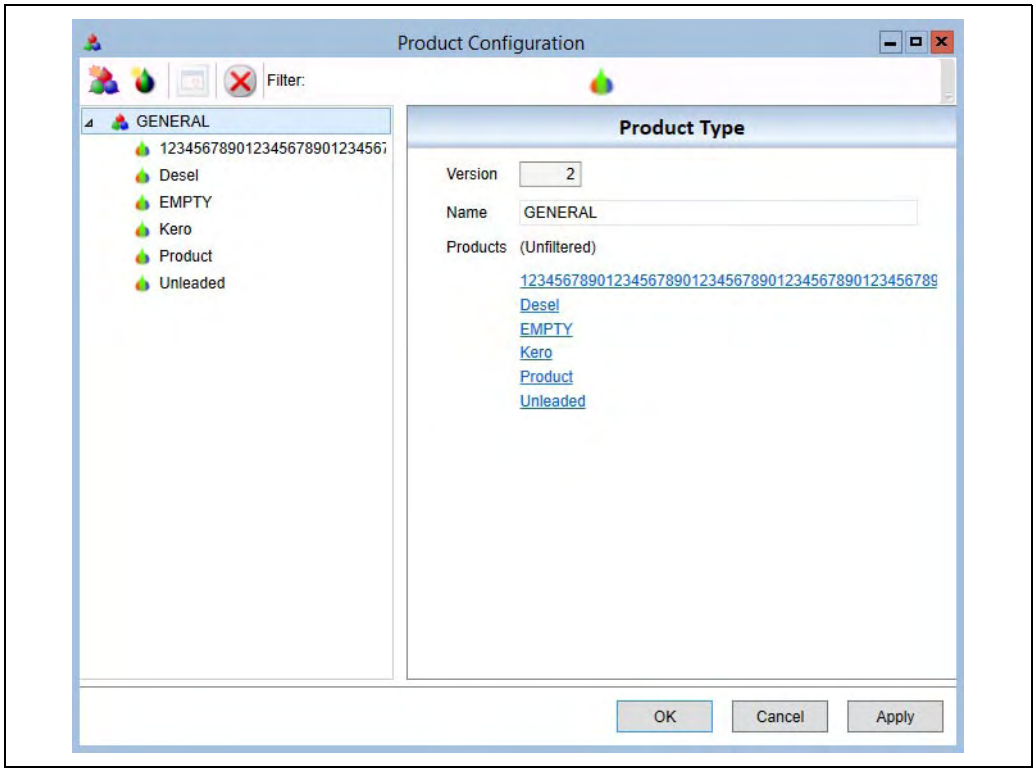
And so on.

The system provides features that allow the user to view tanks by product type.

9.2 Launching Product Configuration

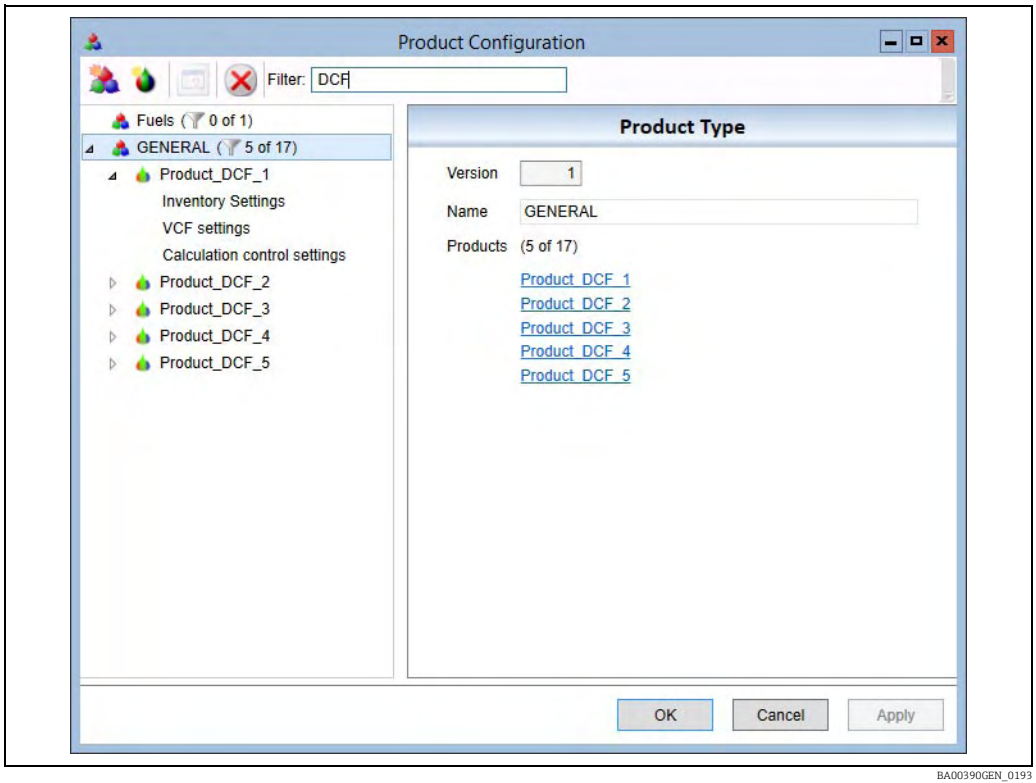
To launch the Product Configuration module, proceed as follows:

1. Select the **Product Configuration** option from the **Configuration** menu.
   The following display is typical:



BA00390GEN_0262

The details of the product or product type selected from the list are displayed in the right-hand pane.
A filter has been provided. This can be useful for locating a particular product when a large number of products have been configured. To filter the products, type the filter criteria into the text box in the tool bar. Any products whose name contains the filter text will be displayed. There is an indication of the number of products included in the filter shown in the product/product type list and also on the product type details pane.

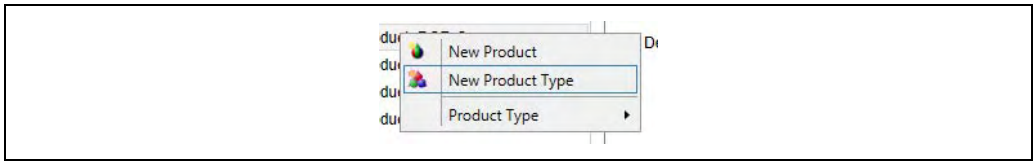


BA00390GEN_0193

9.2.1 Creating a Product Type

To create a product type, proceed as follows:

1. Click on the **New Product Type** toolbar button.
2. Enter a name for the product type.
3. Click **Apply** or **OK** to save the new configuration.
   Alternatively click on any entry in the product/product type list with the right mouse button and select **New Product Type** from the menu



BA00390GEN_0195

The new product type will be created and inserted into the list.

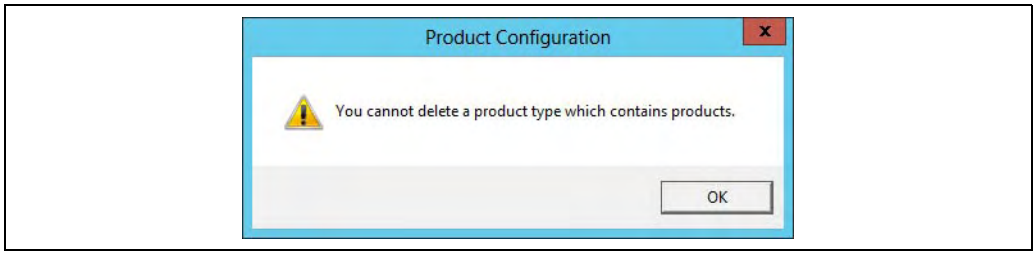
9.2.2 Modifying a Product Type

The only item that can be modified for a product type is the name. To modify the name, proceed as follows:

1. Select the product type from the list of product types.
   The existing details will be displayed in the right hand pane.
2. Edit the name as required and click **Apply** or **OK** to save the new name.
   The version number will automatically increment.

9.2.3 Delete Product Type

Product types that contain products cannot be deleted. Attempting to delete a product type which contains products will result in the following error message.

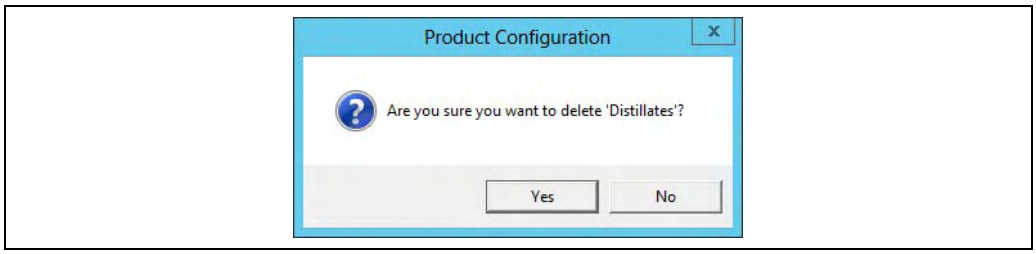


BA00390GEN_0196

In order to delete a product type, all products within the product type must first be deleted or moved to a different location.

To delete a product type, proceed as follows:

1. Select it from the list of product types and click the **Delete** toolbar button.
2. Confirm that the product type is to be deleted in the pop up.



BA00390GEN_0198

The **GENERAL** product type cannot be deleted.

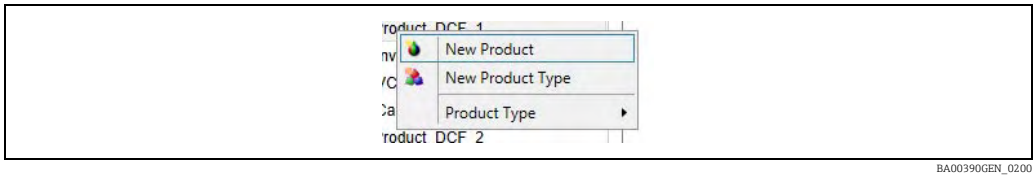
9.2.4 Creating a New Product

To create a new product, proceed as follows:

1. Select the product type that will contain the product and click on the **New Product** toolbar button.
2. Enter a name for the product, select a colour to represent the product and, optionally, add a product code (up to 8 characters) and a description.
3. Click **Apply** or **OK** to save the configuration.
   The new product will be created and inserted into the list under the currently selected product type.

The use of colour is determined by options configured in the System Settings module. Please refer to this section for a description of these settings (→ 94).

Alternatively click on any product type, or entry within the product type, with the right mouse button and select **New Product** from the menu to create a new product in the selected product type.



BA00390GEN_0200

9.2.5 Modifying a Product

To modify a product, proceed as follows:

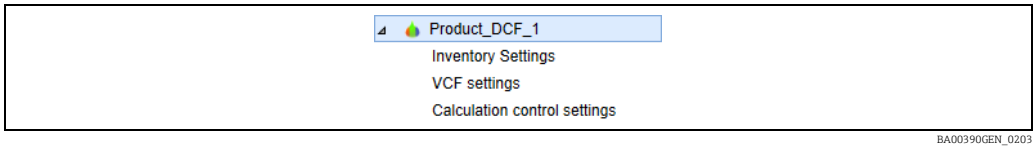
1. Select the product from the list. The existing details for the product will be displayed in the right hand pane. The name, colour and description for the product can then be modified.

A product can also have a set of characteristics configured which will override the corresponding settings in **Tank Charcteristics** which will then appear grayed out and will be fixed for use with the selected product. This is not an exhaustive set of characteristics and should not be considered an alternative to configuring tank characteristics for individual tanks. It is, however, useful for fixing a set of characteristics for a particular product.

2. To add characteristics select the product and then click the **Add Characteristics** toolbar button. If a product already has characteristics, then the toolbar button is displayed differently and can be used to remove the characteristics.

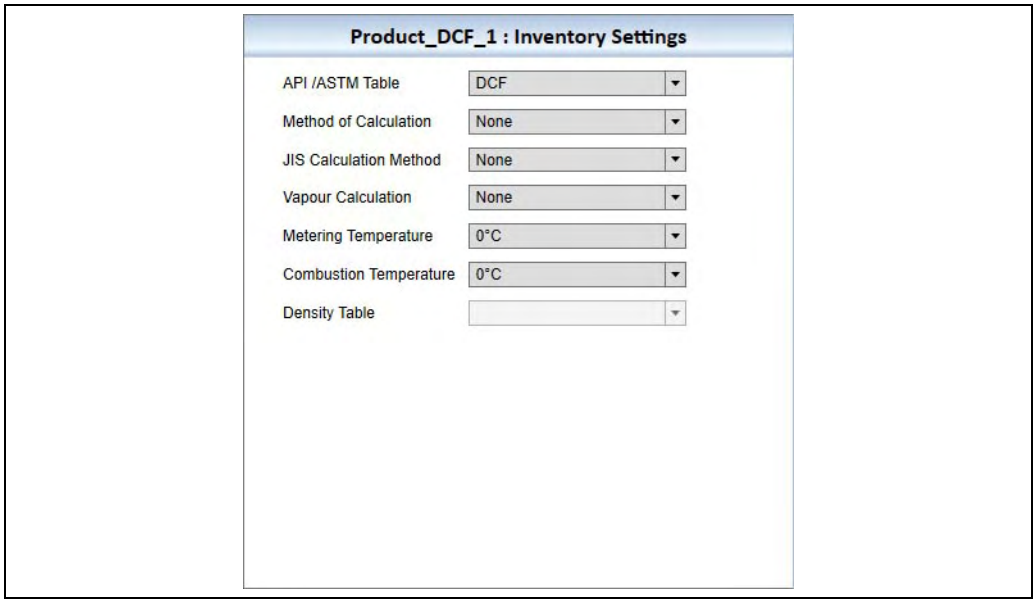
If characteristics are removed they will then need to be set on each tank containing the product.

A product which has characteristics set can be expanded to show additional entries:

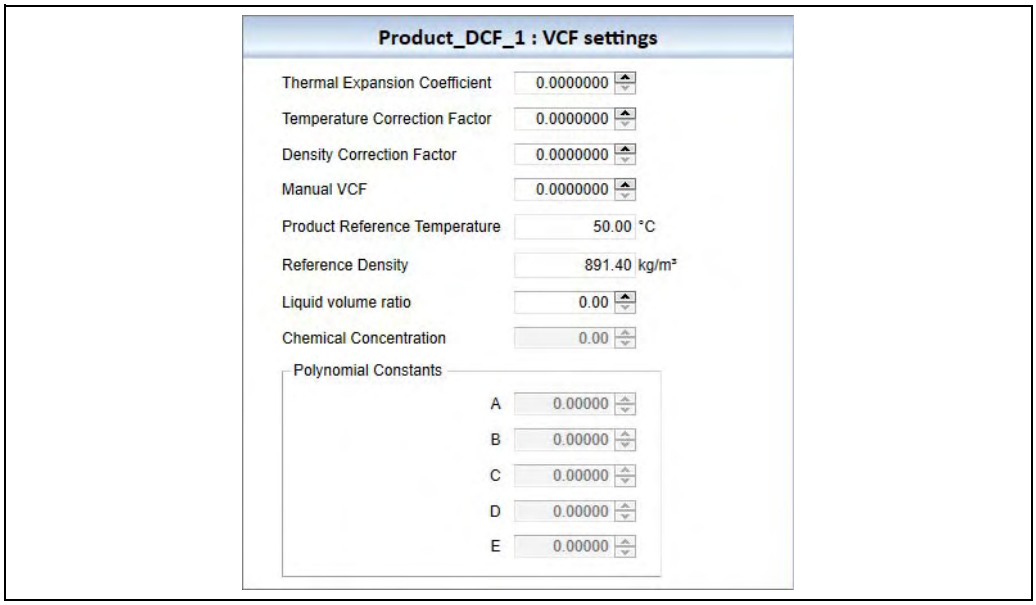


BA00390GEN_0203

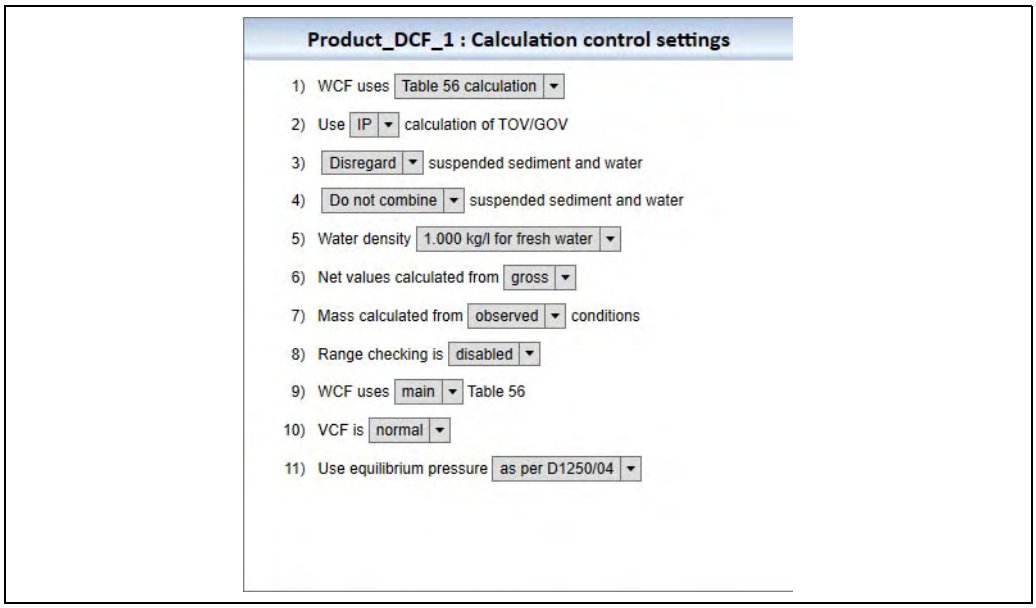
3. Select the entry to show the settings available for each heading:



BA00390GEN_0204



BA00390GEN_0205



BA00390GEN_0206

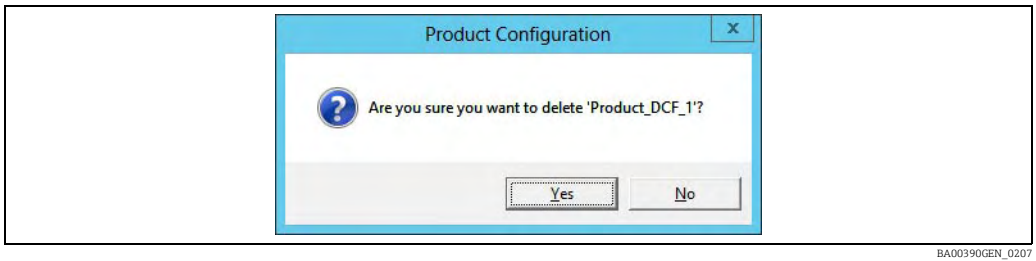
Refer to the section on Tank Characteristics (→ 25) for more details on these settings.

4. Click the **Apply** or **OK** button to save the settings.

9.2.6 Deleting a Product

To delete a product, proceed as follows:

1. Select the product from the list and click the **Delete** toolbar button.
2. Confirm the product is to be deleted in the pop up.



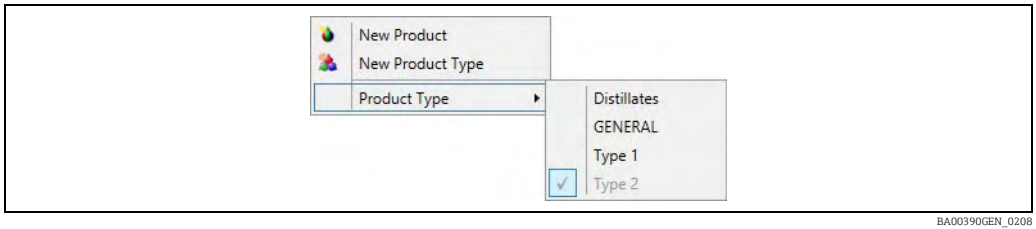
BA00390GEN_0207

The **EMPTY** product is required as the default when creating new tanks so cannot be deleted, also products which are currently allocated to a tank cannot be deleted.

9.2.7 Relocating a Product

To relocate a product, proceed as follows:

1. To move a product from one product type to another it can either be dragged with the mouse from its current product type to the new product type, or it can be clicked with the right mouse button and the new product type selected from the menu.



BA00390GEN_0208

9.2.8 Displaying Product Codes

Products may be selected using either Product Names or Product Codes.
To change between names and codes, proceed as follows:

1. Click on the toggle (\ ) button in the **Product Configuration** menu bar. This will affect product selection in Tank Characteristics, on the Home page and in the SCADA screens.

9.2.9 Saving Changes

To save changes made to products and/or product types, proceed as follows:

1. Click either the **Apply** or **OK** button.

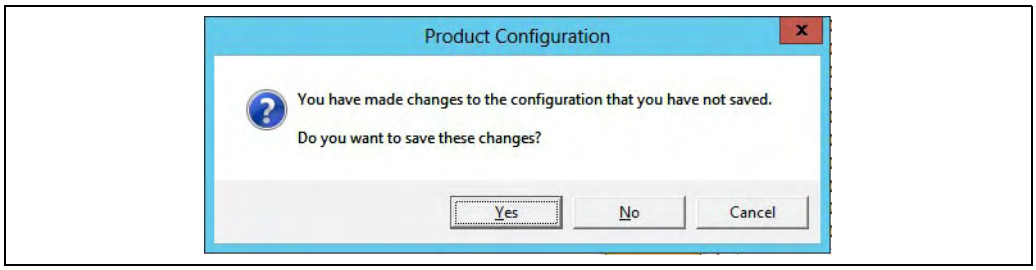
Clicking **Apply** will save the changes and keep the product configuration screen open allowing for further editing.
Clicking **OK** will save the changes and then close the product configuration screen.

If a product with characteristics has been modified, then any characteristics of the product will be applied to all the tanks that have that product allocated when the product changes are saved.

9.2.10 Discarding Changes

To discard any changes made, proceed as follows:

1. Click the **Cancel** button.
The following message will be displayed if there are any unsaved changes.



BA00390GEN_0209

Choosing **Yes** will save the changes and close the product configuration screen.
Clicking **No** will discard the changes and close the product configuration screen.
Clicking **Cancel** will leave the product configuration screen open so that the changes can be verified before continuing.

9.3 Allocating Products to Tanks

Once all the product information has been entered the products can then be allocated to their operational tanks.
The Tank Characteristics module is used to allocate a product to a tank.
See the section detailing the Tank Characteristics module for a full and complete description (→ 25).
Alternatively, the product allocated to a tank can be changed from the Home Page, Single Tank Overview and SCADA screens. See the relevant sections in the Operations Manual for more details.

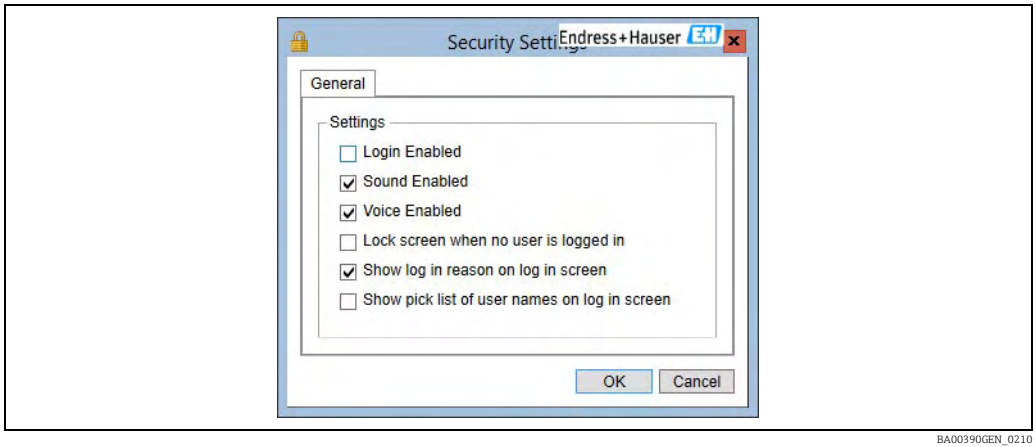
10 Security

The application is provided with its own security and user administration functions. It is not dependent on Windows system security for access to its features.
During initial installation an Administrative account is created as part of the Set-up procedure. Thereafter additional user accounts can be created by a user with administrative privileges.
The security maintenance features are accessed via the **Security** menu.
The security features should be used carefully to ensure users have the correct access rights for their day to day tasks yet prevent unauthorised access to the other features.

10.1 General Security Settings

In order to adjust the general security settings, proceed as follows:

1. Log on to system as an administrator.
2. Select the **Security Settings** option from the **Security** menu.
   The following screen appears:



User Access rights (from User group) are only applied if **Login Enabled**.

3. Adjust the settings according to the explanations below.

Login Enabled

Determines whether the use of logins should be disabled throughout the whole application.
If this option is checked, the system will prompt for a Username and Password before providing access.
If this option is not enabled, no login prompt will appear.
Clearly this option needs to be treated with care.

Sound Enabled

Determines whether a sound is played when the user attempts to access an area to which they do not have access rights.

Voice Enabled

Determines whether messages are annunciated when the login dialog is displayed.

Lock screen when no user is logged in

Determines whether the screen is locked when no user is logged in. If this option is ticked the screen is locked when the user logs out. Before anything can be accessed on the computer, a user must log in.

Show log in reason on log in screen

Determines whether a log in reason is displayed on the log in screen when it is displayed due to a user trying to access an area to which they do not have access rights. For example 'View Settings access required'.

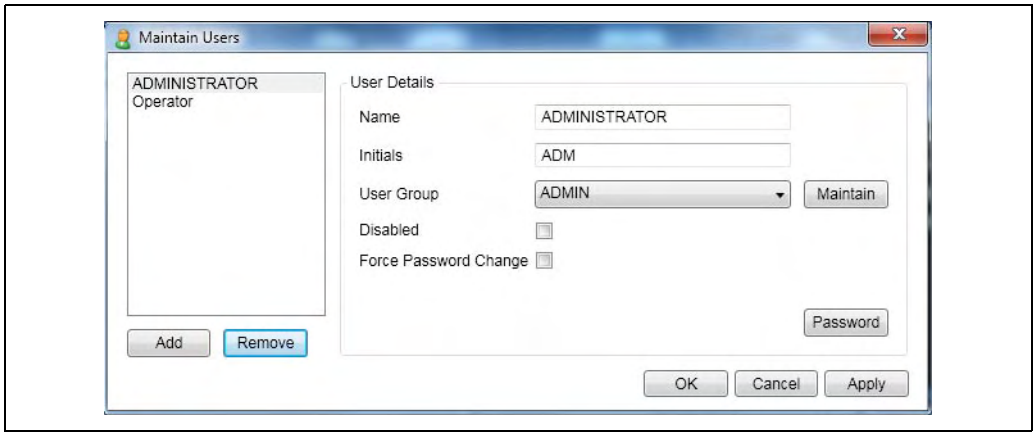
Show pick list of user names on log in screen

Determines whether a pick list of user names is displayed on the log in screen instead of the user name text field. Use of this setting is not recommended since it reduces security.

10.2 User Maintenance

In order to launch the User Maintenance module, proceed as follows:

1. Log on to system as an administrator.
2. Select the **Maintain Users** option from the **Security** menu.
   The following dialog opens:



BA00390GEN_0077

10.2.1 View/Edit Details of an Existing User

To view/edit details of an existing user, select the user in the list. Details of the user will be displayed in the **User Details** area.
If you have access rights to edit users, the following details can be edited.

Name

The name of the user.

Initials

The initials of the user.

User Group

The user group that the user belongs to. It is the user group that determines the areas that the user has access to. To edit user groups click the **Maintain** button.

Disabled

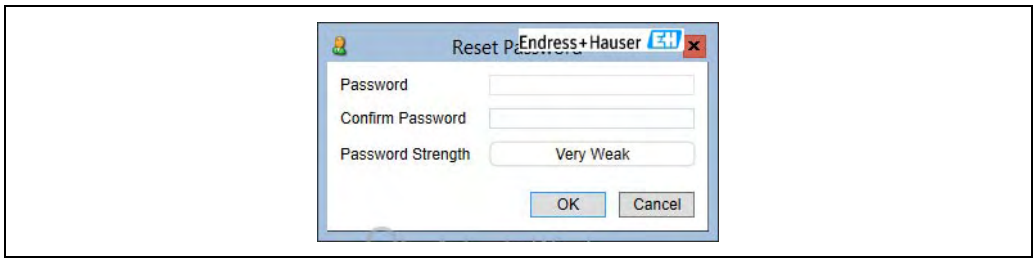
Determines whether the log in for the user is disabled. This can be set explicitly on this screen, or automatically by the system depending on the user group when the user incorrectly enters their password. To re-enable this user, untick the box.

Force Password Change

Forces the user to change their password the next time that they log in. This can be used in conjunction with the **Password** button to reset their password, but force them to change it the next time they log in, so that the administrator doesn't know their password.

Password

Click this button to reset the password for the user:



BA00390GEN_0211

10.2.2 Adding a New User

To add a new user, click the **Add** button. A new user will be added to the list and selected ready for editing.

10.2.3 Deleting a User

To delete a user, select them in the list and click the **Remove** button. If the user is currently logged in you will be unable to delete them.

10.2.4 Saving Changes

To save the changes to the users click the **Apply** button. To save the changes and close the screen click the **OK** button.

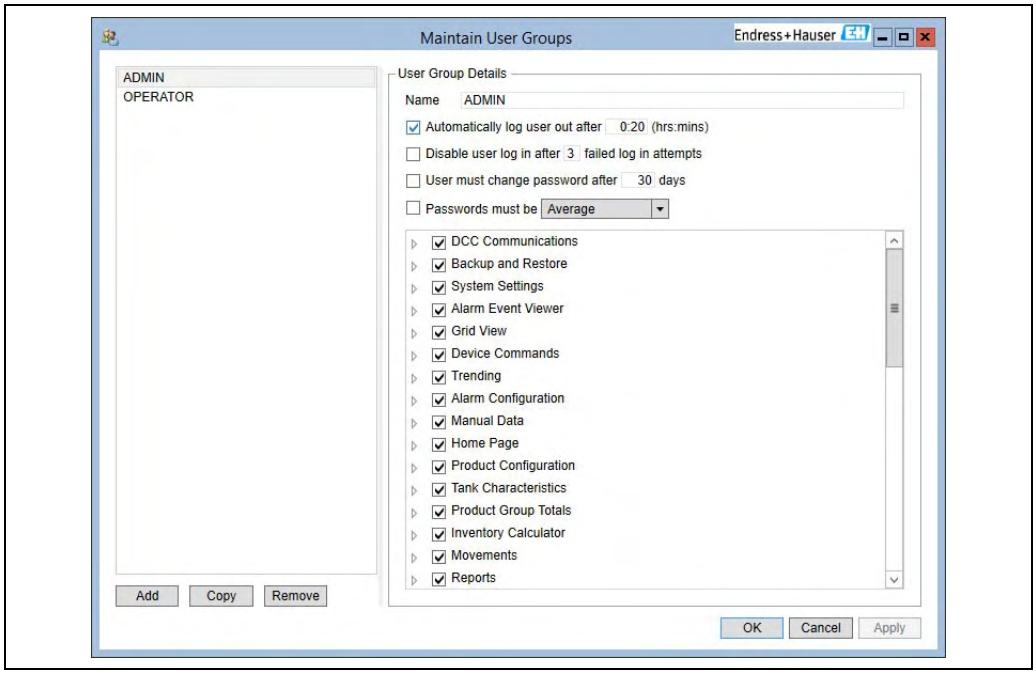
10.2.5 Discarding Changes

To discard the changes to the users click the **Cancel** button. This will discard the changes and close the screen.

10.3 User Group Maintenance

To launch the User Group Maintenance module, proceed as follows:

1. Log on to system as an administrator.
2. Select the **Maintain Users Groups** option from the **Security** menu.
   The following dialog opens:



BA00390GEN_0212

10.3.1 View/Edit Details of an Existing User Group

To view/edit details of an existing user group, select the user group in the list. Details of the user group will be displayed in the **User Group Details** area.
If you have access rights to edit user groups, the details can be edited.

Name

The name of the user group.

Automatically Log Out

Determines whether users belonging to the user group will automatically be logged out after a given period of inactivity.

Disable User Log In

Determines whether users belonging to the user group will have their accounts disabled if they incorrectly enter their password the specified number of times.

Force Password Change

Determines whether users belonging to the user group will be forced to change their password after the given number of days.

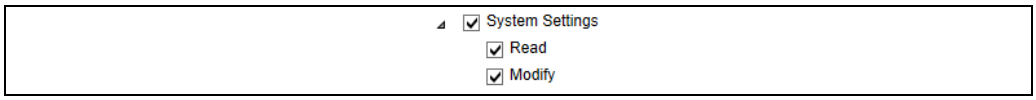
Password Strength

Determines whether users belonging to the user group will be forced to use passwords of the given strength.

If this option is used, passwords are case sensitive, otherwise passwords are case insensitive.

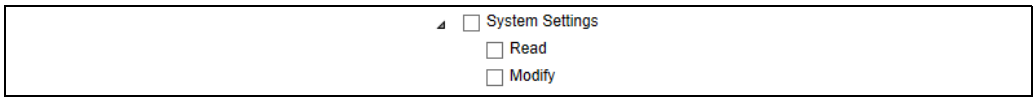
Access rights

To view details of a specific access right click on the button to the left of it. This will show further details:

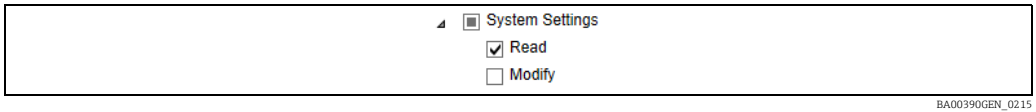


BA00390GEN_0213

Access rights granted for a user group are indicated by a tick. To remove or grant an access right click on the box next to it. This will toggle whether it is granted to the user group. Clicking on a 'parent' access right (for example **System Settings** above) will remove or grant access to all the options underneath it. So, for example, to prevent a user accessing the **System Settings** area, you could untick the box next to **System Settings** and this would remove the ticks from the **Read** and **Modify** boxes underneath it. If the access rights under a 'parent' access right are in a mixed state (some ticked and some unticked), the box for the 'parent' access right will be filled in:



BA00390GEN_0214



BA00390GEN_0215

User Access rights (from User group) are only applied if **Login Enabled**.

10.3.2 Adding a New User Group

To add a new user group, click the **Add** button. A new user group will be added to the list and selected ready for editing.

10.3.3 Copying a New User Group

A new user group can be copied from an existing one, to make setting up access rights easier. Select an existing user group and then click the **Copy** button. A new user group will be added to the list, with the same details as the existing user group, and selected ready for editing.

10.3.4 Deleting a User Group

To delete a user group, select it in the list and click the **Remove** button. If any users are a member of the user group you will be unable to delete it.

10.3.5 Saving Changes

To save the changes to the user groups click the **Apply** button. To save the changes and close the screen click the **OK** button.

10.3.6 Discarding Changes

To discard the changes to the user groups click the **Cancel** button. This will discard the changes and close the screen.

11 System Settings

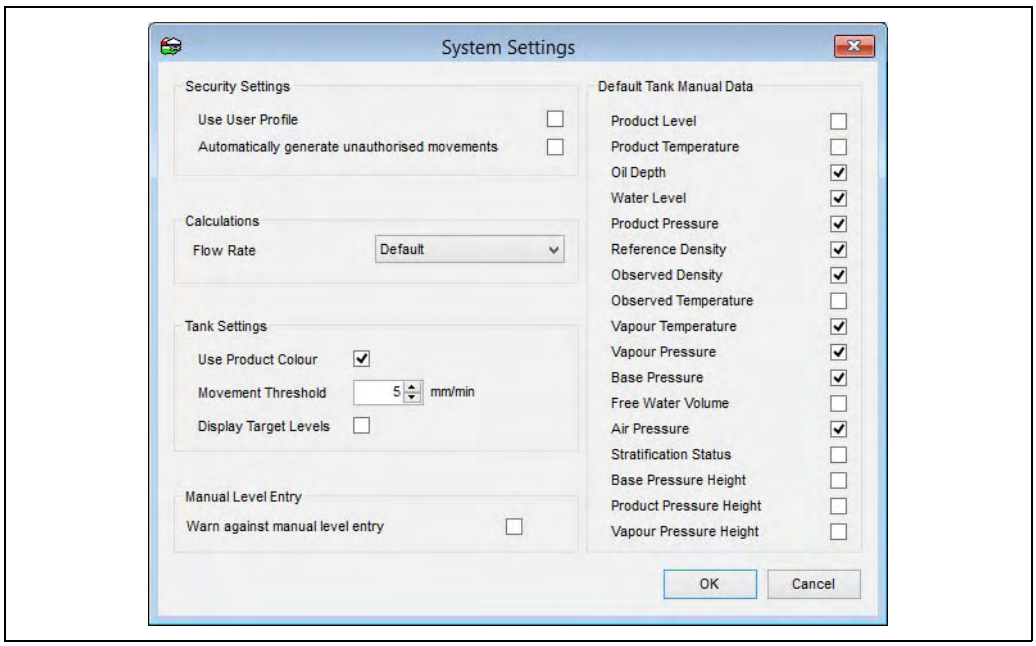
System Settings affect the operation of the entire system. The System Settings option is available under the **Admin** menu.

The use of this feature can be controlled by the security system.

11.1 Using System Settings

To launch the System settings module, proceed as follows:

1. Select the **Admin → System Settings** option from the main menu bar.



BA00390GEN_0216

To change system settings, proceed as follows:

1. Enter the required data or change the current settings. For the meaning of the individual items refer to the explanations below.
2. Press the **OK** button.
   The window will close and the changes will be saved to the database.

11.2 Security Settings

11.2.1 Use User Profile

Determines whether a user profile should be used. The user profile is limited to determining which tanks can be viewed by a user.

- When checked the user will be asked to logon at start-up on the assumption that the user only has access to a limited number of tanks programmed into the system. If the user has not been previously configured with a group of tanks no tanks will be in view at start up.
- When not checked the system will be started with the default profile which is show all tanks programmed into the system.

See the **Tanks By User** feature on how to configure a user profile.

11.2.2 Automatically Generate Unauthorised Movements

Determines whether the movements subsystem should enable and disable the unauthorised movement alarm.
If this option is checked the movements subsystem will disable the unauthorised movement alarm when a movement is opened for a tank. Similarly the movement's subsystem will re-enable the unauthorized movement alarm when a movement is closed and there are no more open movements for a tank.

11.3 Calculations

11.3.1 Flow Rate

The flow rate calculation can be made to mimic an MDP system.

11.4 Tank Settings

11.4.1 Use Product Colour

Determines the strategy for use of colour in the tank windows.
When selected the colour representing the product level in the tank will be that which was selected for the product in the tank. See the **Configuration → Product Configuration** options which allows the user to configure the colour a product will be displayed in.
When not selected the colour of the tanks is represented by the tank status. For example, if the tank is filling the colour of the product is displayed in blue, if the tank is emptying the colour of the product is displayed in brown, and if the tank is static the colour is displayed in green.

11.4.2 Movement Threshold

Determines the minimum level flow rate that is deemed significant enough to mark a tank as moving.
A flow rate of 5 mm/min is correct for most installations, but if your particular site has a lot of large crude tanks, for instance, you might want to use a smaller value. The threshold level is used to drive the up and down arrows on the tank mimic screens on the main page.

11.4.3 Display Target Levels

Determines if a target level is displayed in the homepage when using simple movements.

11.5 Manual Level Entry

11.5.1 Warn Against Manual Level Entry

Determines whether the user should be warned if they attempt to enter a manual level entry that would fall outside the normal operating range of the tank.
For example above the High High level or below the Low Low level.

11.6 Default Tank Manual Data

Determines which data items will be set to manual status by default.
Selecting a data item in this section will force the corresponding item to be set to manual status by default when a new device is added to the system.

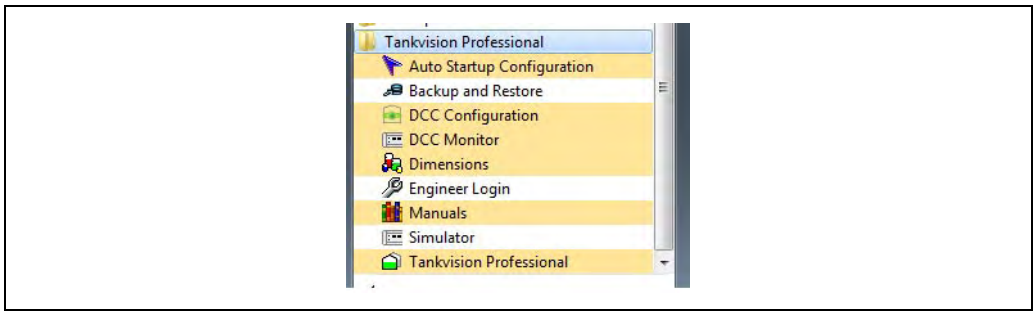
12 Auto Startup Configuration

12.1 Description

The Auto Startup configuration allows the user to start any application within the system when the PC is rebooted or restarted. This is useful after a power trip for example. Any other program on the PC can also be added via the browse option. There is an overall delay (to allow for the database and services to start) and each application can be further delayed separately. Parameters or arguments may be passed to any application on startup.

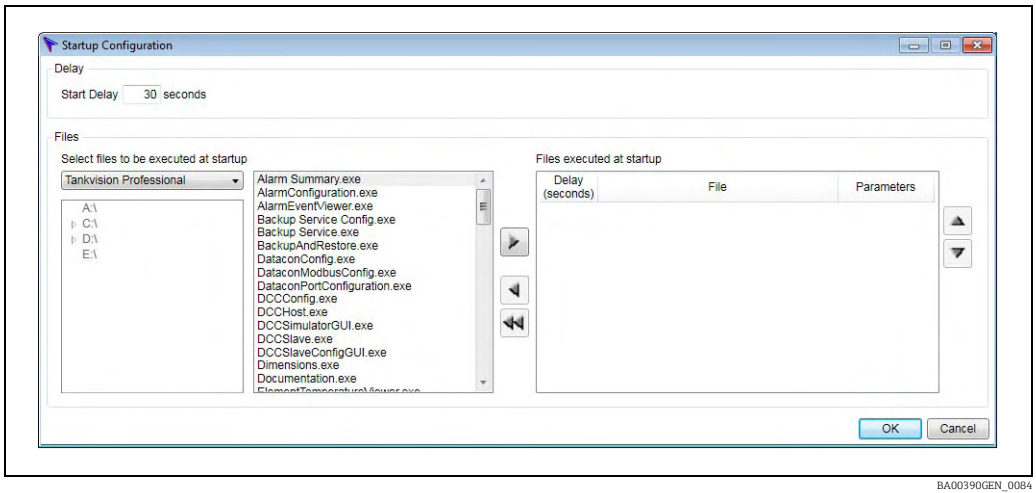
12.2 Launching

The **Auto Startup Configuration** is launched from the windows start menu.



BA00390GEN_0083

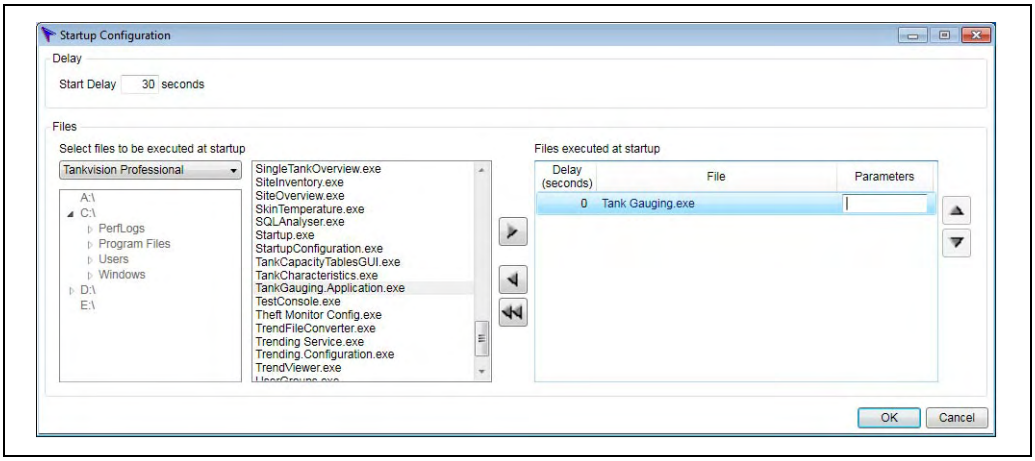
The configuration window below is opened:



BA00390GEN_0084

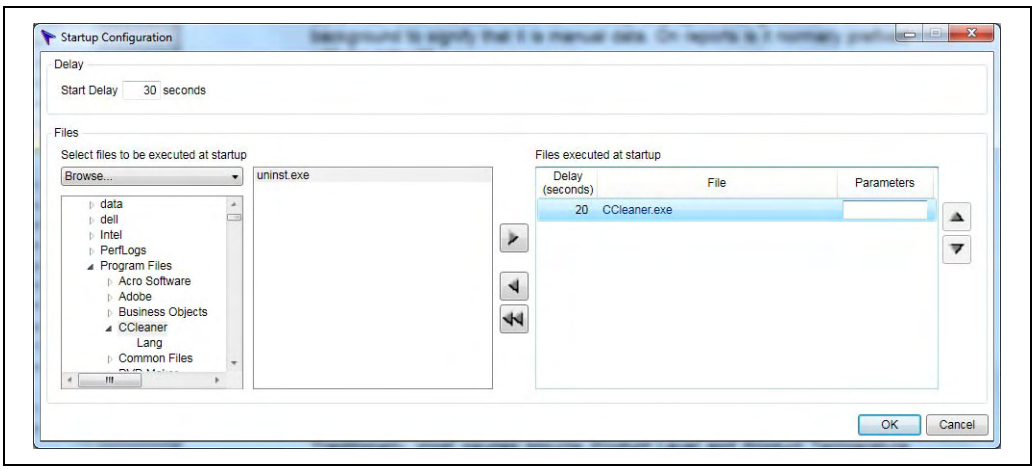
12.3 Configuring

Any application from the tank gauging system can be selected.



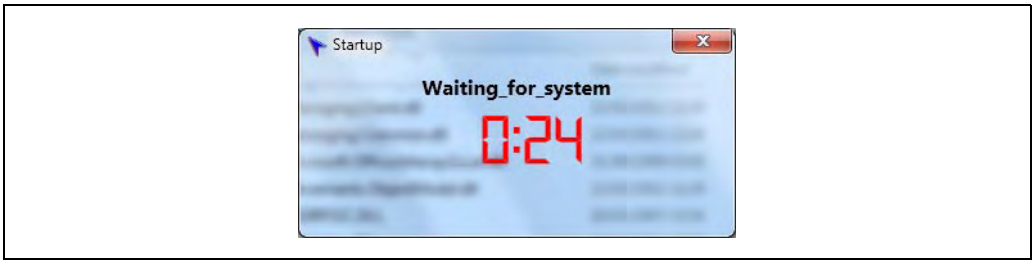
BA00390GEN_0085

In this case the main screen with multi tank view has been selected. The default delay is 30 seconds and no further delay has been added. The dialog for adding arguments or parameters is shown opened.



BA00390GEN_0086

The default delay is 30 seconds and a further delay off 20 seconds has been added. The dialog for adding arguments or parameters is shown opened.
There is a count-down window displayed during startup.



BA00390GEN_0087

13 Manual Data

Normally tank data is collected from the field instruments automatically.
Where primary data values are not available or no longer available due to a gauge fault, data values can be switched from automatic mode to manual mode.
When in manual mode the data values have to be provided by the operator.
Data that is in manual mode is normally displayed with green text on black background to signify that it is manual data. On reports is it normally prefixed with the letter **M**.
Where tanks are not fitted with gauges but they are still required on the system, the tank may be operated with all of its primary data values in manual mode. In this way at least the tank inventory is still calculated.

Gauges that have both level and temperature in manual mode will not be polled by the communications layer.

Primary data values are those measurements made by the tank gauging instrument such as:
- Product Level
- Water Level
- Product Temperature
- Product Density
- Pressure

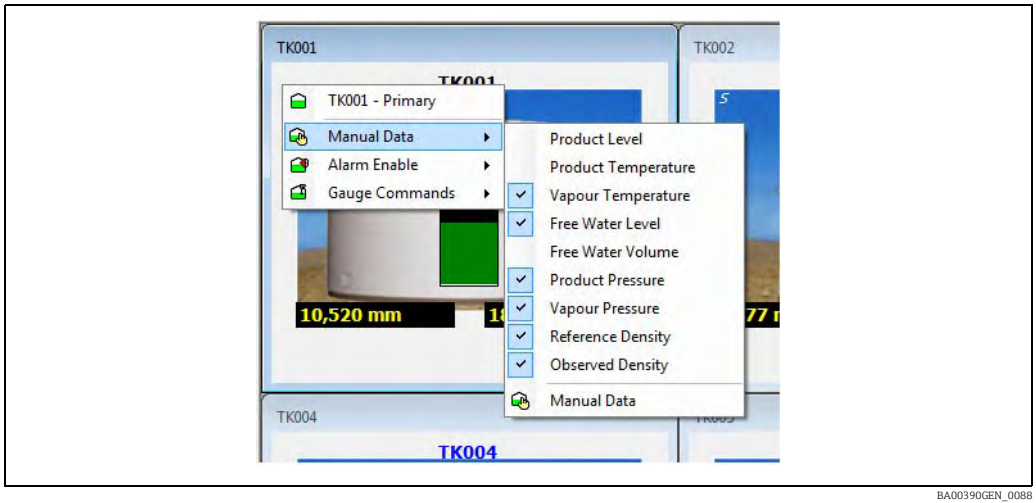
Traditionally, most gauges provide Product Level and Product Temperature measurement capability. It is quite common to find that the rest are entered as manual data.
More modern gauging instruments have the capability to measure water level, density and pressure automatically. In this case the values would be collected automatically.

The use of this feature can be controlled by the security system.
By default a manual value will not trigger a programmable alarm, **DCC Host → Options → Configure** ticking the option for alarms on manual data will reverse this functionality.

13.1 Launching the Manual Data Entry Module

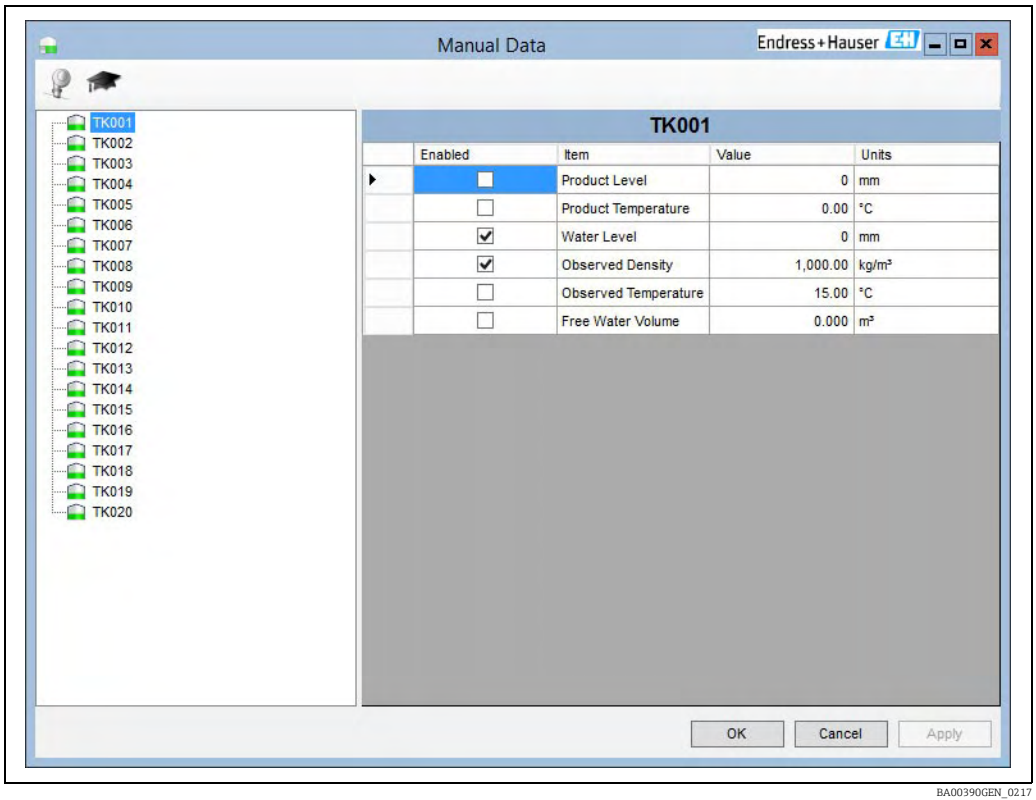
To launch the Manual Data Entry Module, proceed as follows:

1. Select from the main application window menu **Configuration → Manual Data**.



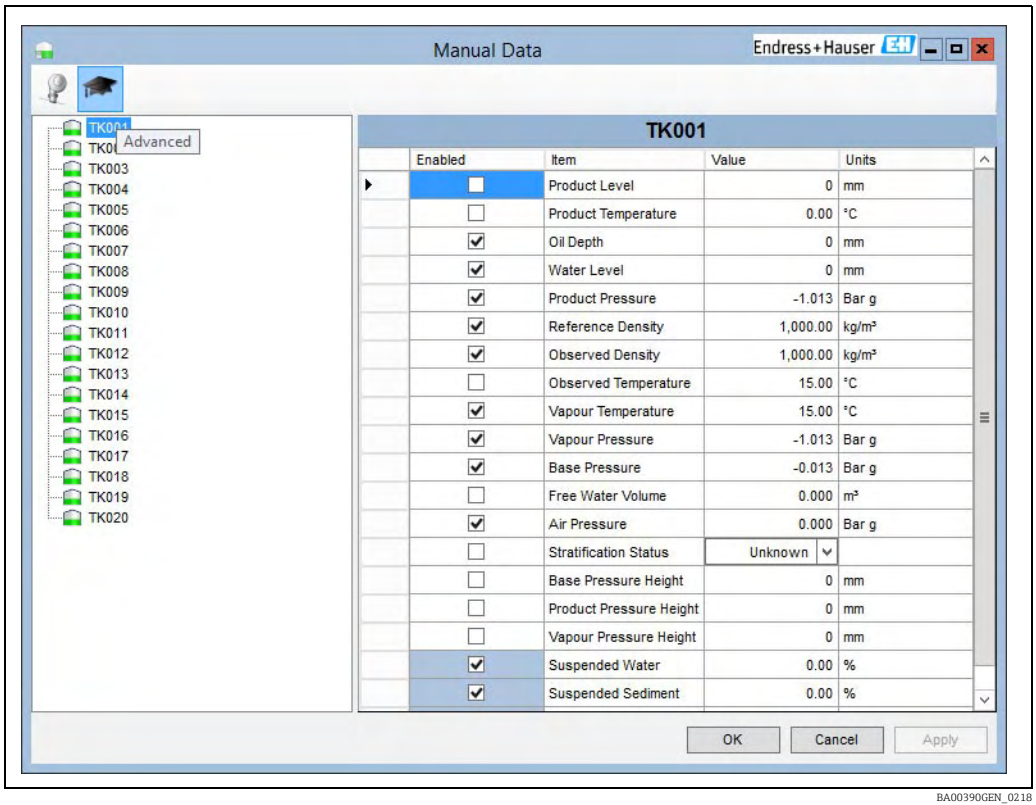
BA00390GEN_0088

The following display is typical.
A list of all tanks will be displayed on the left, together with the manual data entry fields for the selected tank.



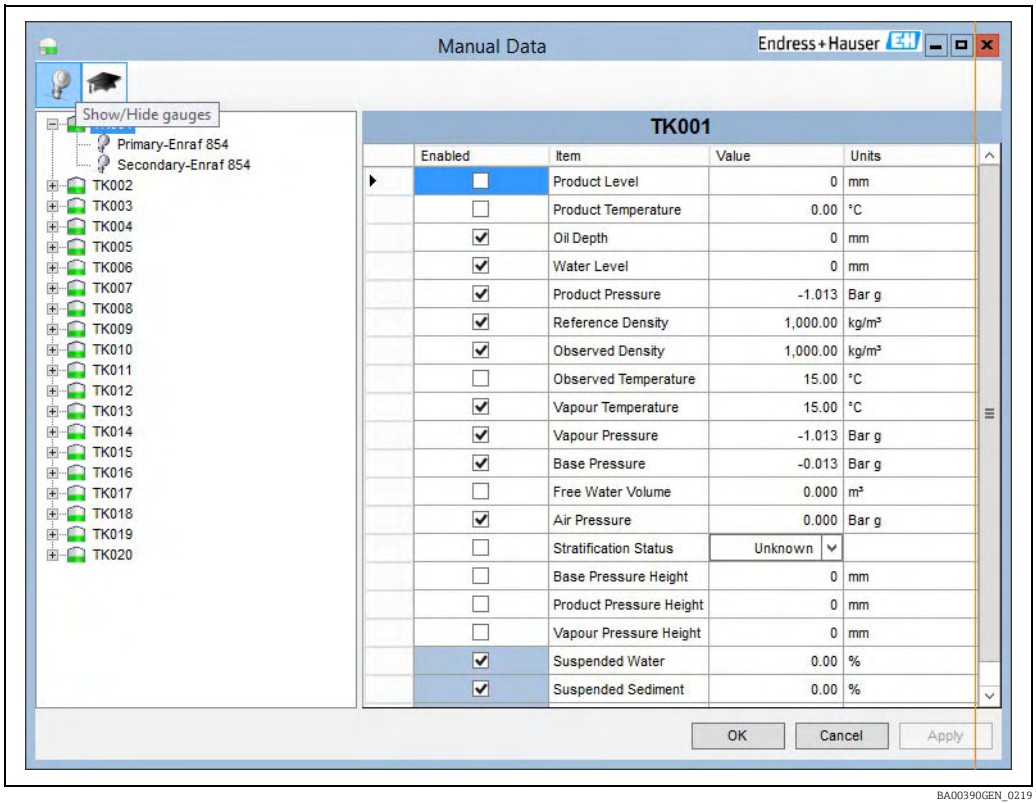
BA00390GEN_0217

By default a reduced set of the most common fields will be displayed.
To view the additional fields for a tank click on the advanced button.



BA00390GEN_0218

By default any changes to the manual data for a tank will apply to ALL gauges on that tank. The individual gauges assigned to a tank can be viewed and edited by clicking on the **ShowHide Gauges** button.



BA00390GEN_0219

In this mode the manual data can be configured for individual gauges.

13.2 Entering Manual Data

To enter manual data, proceed as follows:

1. Select the required tank/gauge from the list.
2. Edit the value.
3. If the variable is not already in manual mode tick the **Enabled** tick box. When saved this will switch the value to manual mode.

The observed density and observed temperature are enabled and disabled together, (i.e. you cannot put the density into manual mode without also providing a suitable observed temperature).

4. After all required data has been entered, press the **Apply** button to save the changes to the database.

Any problems in writing the data to the database will be reported to the user via the Status bar of the display.

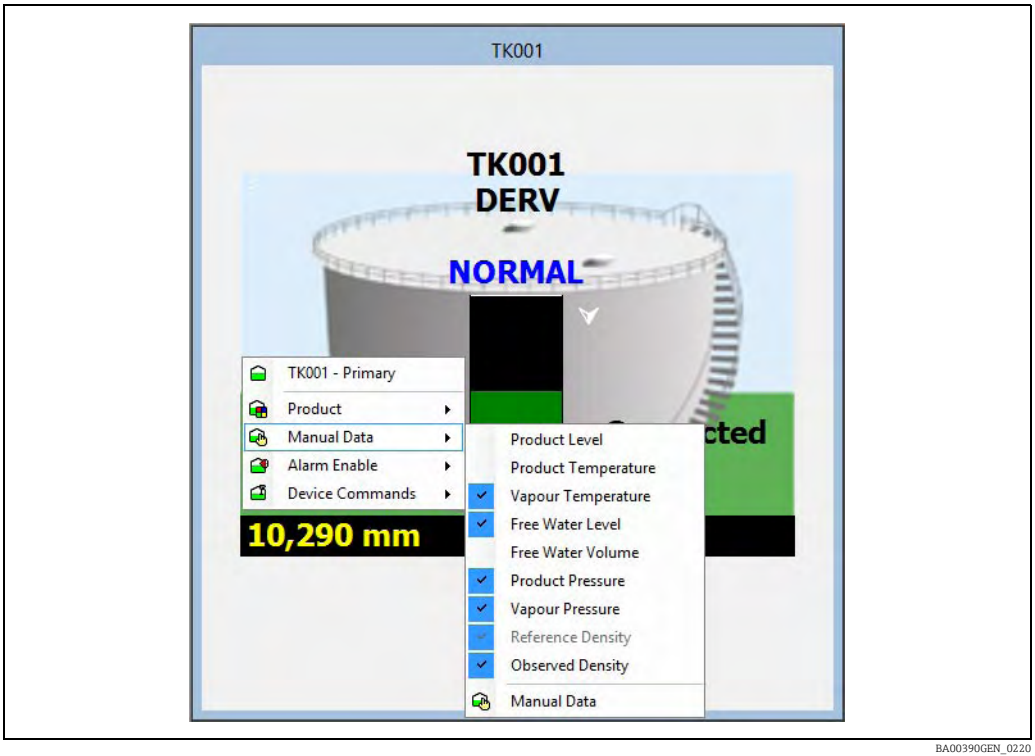
5. Press the **Cancel** button to discard any changes and exit the application.

13.3 Putting a Variable into Manual Mode

Manual data can be modified regardless of whether the value being modified is in manual mode or not.

When a parameter is switched to manual mode, the current data stored in the manual value will be utilised. The inventory data will also be calculated using values that are in manual mode.

There are essentially two techniques to putting a parameter into manual mode:
- Checking the tick box adjacent to the parameter in the manual data entry module, or
- Selecting the **Manual Data** option from the pop-up menu on the tank graphic view (see below).



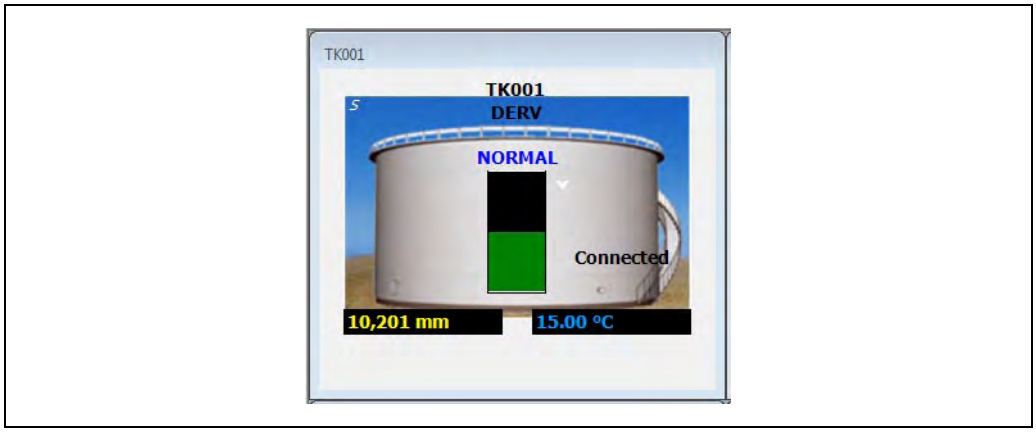
BA00390GEN_0220

Either has the same effect.

If the pop-up menu is used, the current manual data will replace the automatic value. If the current manual values are incorrect you would need to use the **Configuration → Manual Data** module or select **Manual Data → Manual Data** from the pop up menu to update them.

13.4 Shortcut to Manual Data

When a parameter is set to manual mode, its data is displayed with blue text and black background colour.
From within the tank graphic view, a shortcut to the manual data entry module exists. See the illustration below for a pictorial view.



BA00390GEN_0093

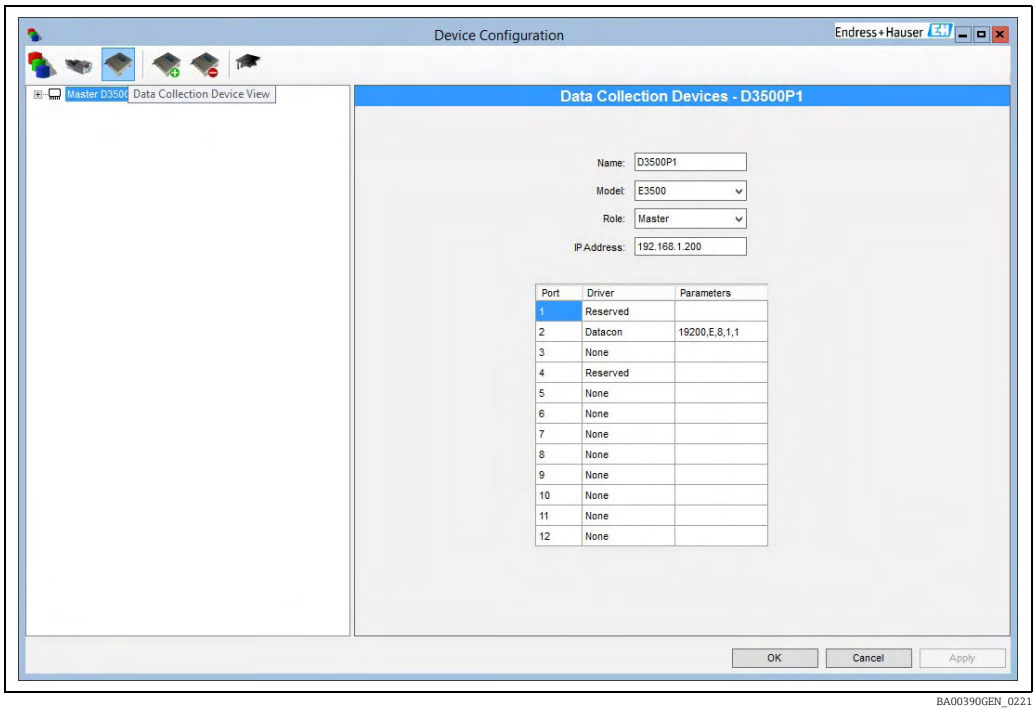
1. Double click the parameter in manual mode.
   This will launch the manual data entry module for the selected tank.

14 Data Collection Device & Device Configuration

Gauges may be connected directly to the PC via the gauge vendors interface box e.g. Enraf CIU or via the MINI.
When a Date Collection Device is in use it must be configured using the integrated Data Collection Device configuration tools.

14.1 Data Collection Device Configuration Step 1

1. To launch, select **Device Configuration** in the **Configuration** menu.
2. Once open click the **Data Collection Device View** icon.
   Any Data Collection Devices already configured will be shown.

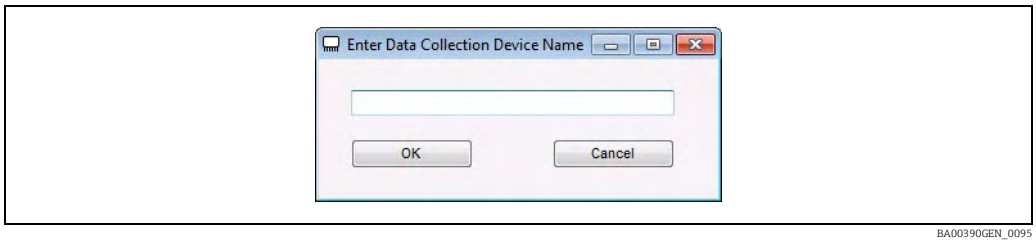


BA00390GEN_0221

3. Click on any of the editable fields within the display panel on the right of the screen to edit.
   No Data Collection Devices will appear in the tree view on the left of the screen if there are no Data Collection Devices configured.
4. To delete a Data Collection Devices from the list, click on its icon in the tree view and click on the **Delete** button.
   Alternatively, right click on the icon in the tree view and click **Delete Data Collection Device**.

Data Collection Devices must have all devices removed before they can be deleted.

5. Click the **Add Data Collection Device** button to add a new Data Collection Device.
6. Enter the name of the Data Collection Device in the dialog box.



BA00390GEN_0095

Each Data Collection Device on a network must have a unique **Name**. Additionally, the name must not duplicate that of any PC which is on the same network. The name may comprise up to eight upper case alphanumeric characters, "A" - "Z", "0" - "9", and must be identical to the name which has been configured in the Data Collection Device itself.

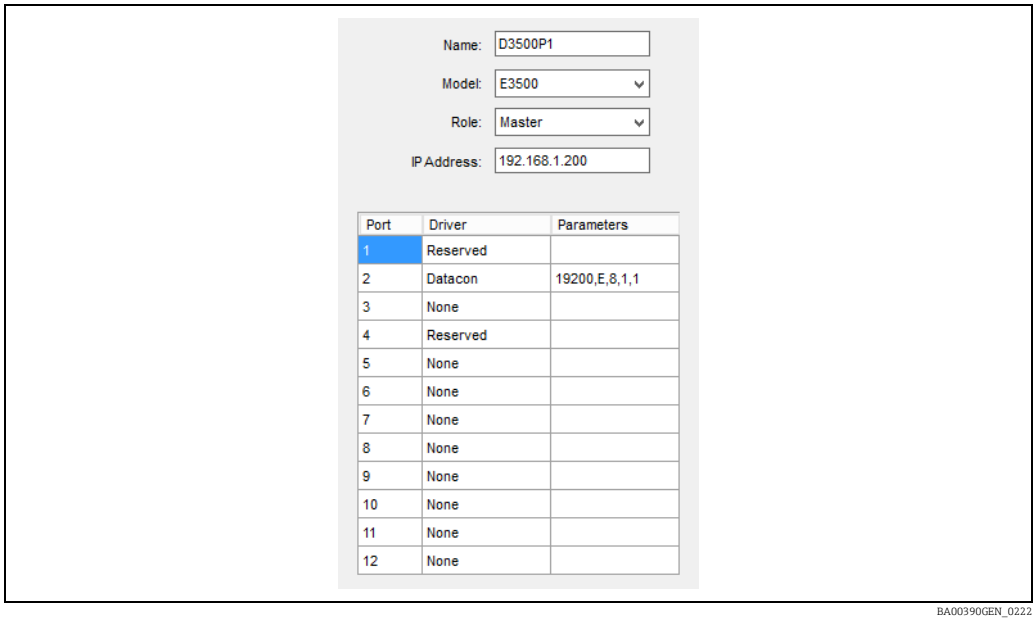
7. Select the correct **Data Collection Device Model** from the drop down list.

The **IP Address** of the Data Collection Device should be specified as four decimal numbers separated by periods ".". A default IP address will be entered depending on the model initially selected. The address entered here is for information only and is not used by the system as such.
The **Role** of the Data Collection Device determines its mode of operation within the system and is primarily related to redundant configurations which feature duplicated Data Collection Devices.
A standalone Data Collection Device should always be configured as a **Master** unit. Redundant arrangements which feature automatic changeover and fallback between Data Collection Devices in the event of failure would normally be set to **Master** for both units, though earlier systems with manual fallback would require the duty Data Collection Device to be set as **Master** and the standby Data Collection Device as **Slave**.

8. Once all settings have been made, click on **Apply** to save the configuration.

14.2 Data Collection Device Configuration Step 2

The second part of the Data Collection Device Configuration tool allows the individual ports to be configured.



BA00390GEN_0222

1. First select the desired Data Collection Device from the tree view.
The port configuration for the selected Data Collection Device will then be displayed. The number of ports listed will depend upon the Model of the Data Collection Device. In the example illustrated above of a Model 3500 Datacon, you will see that ports 1 and 4 are marked as **Reserved**, these being the Ethernet network port and Engineer's Terminal port respectively, and thus are not available for configuration.

2. Click on any of the editable fields to edit the configuration.
For each port which is to be used for communications, select the appropriate **Driver** from the drop-down list of available communications drivers. Some drivers utilise RS232 communications, which is the default hardware fitted for each port. Other drivers may require dedicated interface hardware to be installed into the Data Collection Device in addition to selecting the correct driver.

Some drivers will enter a default set of parameters.

The Parameters entry specifies in order, the Baud Rate (communications speed), Parity, number of data bits, number of stop bits and any additional optional parameter necessary for correct operation of the driver. The items in the Parameters list should be separated by commas, but no spaces. Remember that the order or sequence of the parameters in the list is important.
Only certain distinct selections are permitted for each of the parameters:

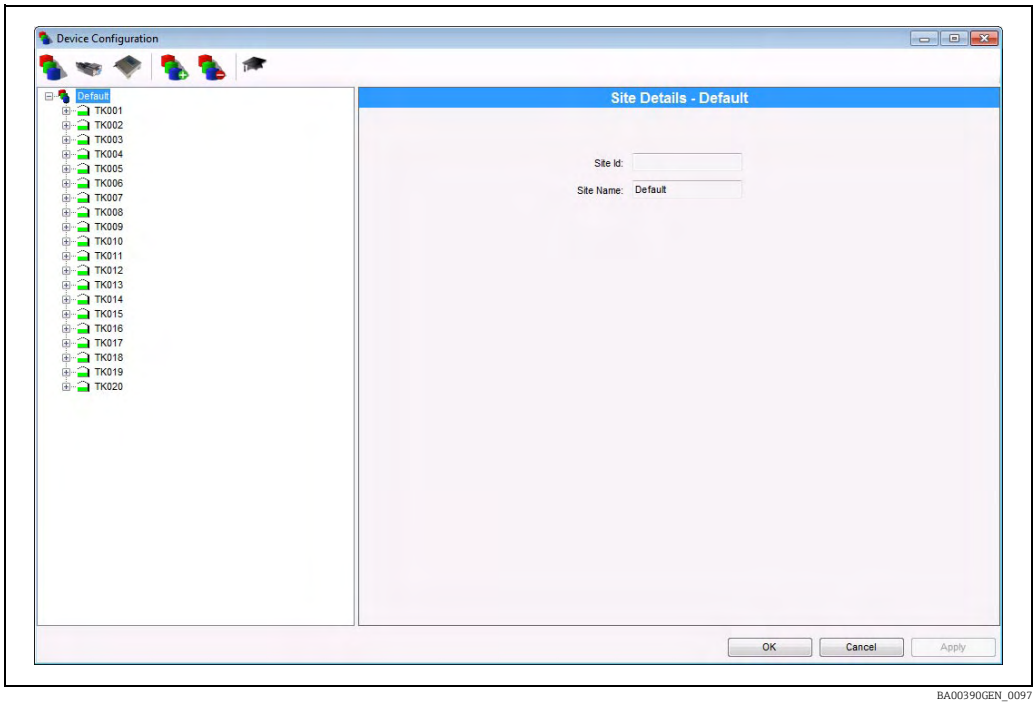
- Baud Rate: 300, 600, 1200, 1800, 2400, 4800, 9600, 19200 or 38400 (bits per second)
- Parity: E (even), O (odd), N (none)
- Data Bits: 7 or 8
- Stop Bits: 1 or 2

e.g. 1200,O,7,1 is 1200 Baud, Odd Parity, 7 data bits, 1 Stop Bit.
The optional parameter will depend upon the type of driver. In the case of gauge / field device drivers the optional parameter allows the user to override the default number of communications retries used for that port. The default, which will be used if the optional parameter is omitted, is usually three.
In the case of host communication interfaces, the optional parameter usually specifies the Slave Address of the Data Collection Device.

3. Once all settings have been made, click on **Apply** to save the configuration.

14.3 Device Configuration

1. To launch the Device Configuration tool, select its entry from the **Configuration** menu.
The **Default** site node will always appear in the tree view, any configured sites will also be displayed as a top level site node in the tree view. Any configured tanks will be displayed a level below the site node, followed by any devices configured to a tank.
E.g. **Site Node** → **Tank Node** → **Device Node**



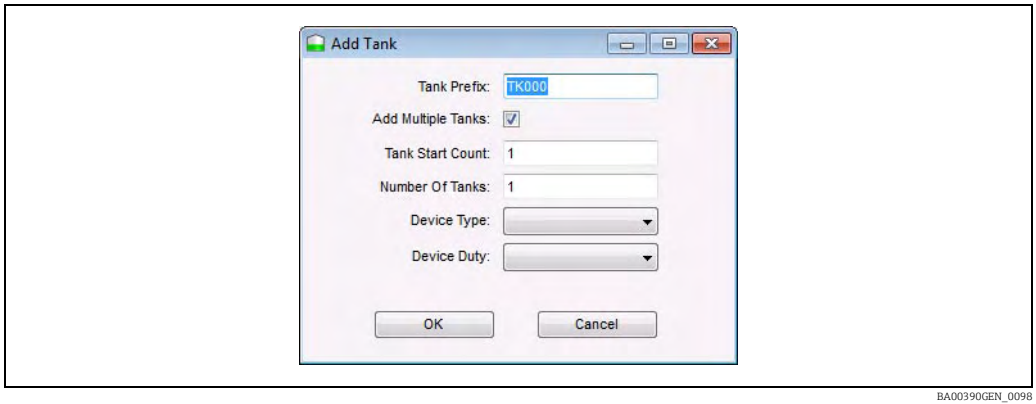
BA00390GEN_0097

The form displays the configuration settings of a selected node. The **Default** site node configuration cannot be edited or deleted.

2. To add a new site to the tree view, click on the **Add Site** button.
   A dialog box will be displayed prompting for a site name.
3. Once the new site has been added, select the site node and the editing features will be available on the editing panel.
4. To delete an existing site, click on the **Delete Site** button.
   Sites can only be deleted if all connected tanks have also been removed from the site.
5. To clear a site of all connected tanks, right click on the site and click **Clear Site**.
6. To edit the configuration of an existing site, click the site node you wish to edit and the editing features will be available on the editing panel.
7. Make the modifications and save the changes.

14.3.1 Adding a new tank

1. To add a new tank to the tree view, right click on the site node you wish to add the tank to, then click **Add Tank**.
   The following dialog box will display:



BA00390GEN_0098

The tank prefix field is a template which the application uses to add multiple tanks at once, alternatively if the **Add Multiple Tanks** check box is not checked, a single tank will be added with the name entered in the tank prefix. When adding multiple tanks, the tank prefix follows a specific syntax; any text characters in the field will be added to the prefix of the tank name. Any 0's indicate the trailing zeros after the prefix. E.g., if the tank prefix was 'TK000' and 10 tanks were added, they would be given the following names:

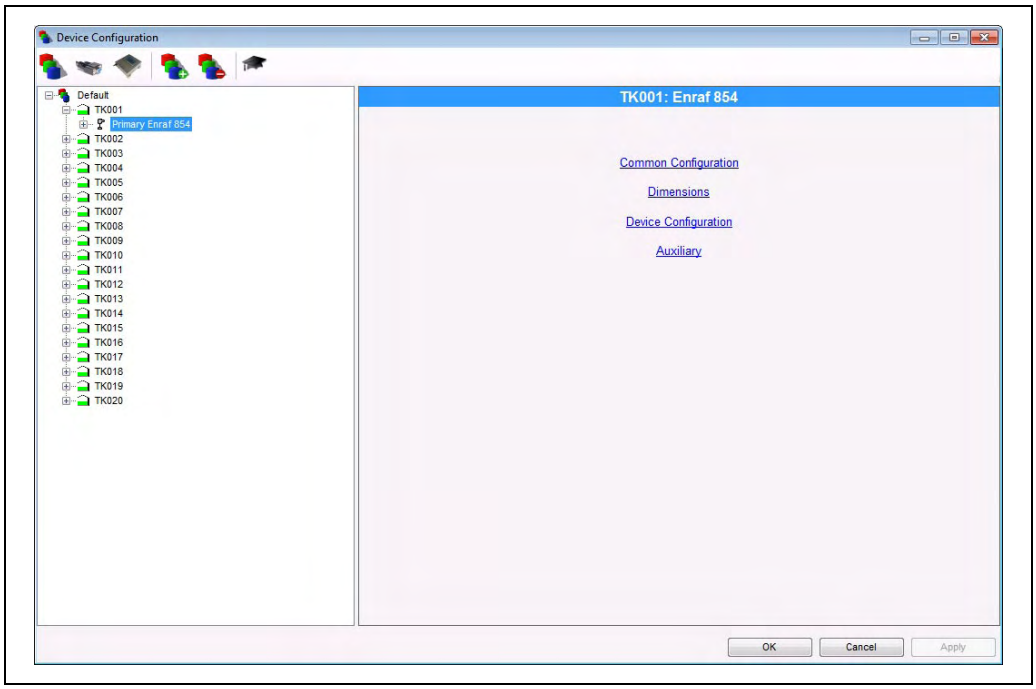
- TK001
- TK002
- TK003
- TK004
- TK005
- TK006
- TK007
- TK008
- TK009
- TK010

Tank Start Count and **Number Of Tanks** fields will only be available if **Add Multiple Tanks** is checked. The tank start count field states the number at which the new added tanks will start at. E.g. if the tank start count was 10 and 5 new tanks were added, the new tanks would start at 10 and count up 5 to 14.
Number of tanks states the number of tanks that will be added. A maximum of 100 tanks can be added at once, and 5000 tanks can be added in total.

2. Select the device type and duty for the tank.
3. Click **OK** to add the tank.

   Alternatively, a new tank may be added to the list by copying an existing one. In this case, right click on the tank you wish to copy and click **Copy**. Multiple tanks can also be copied by selecting tanks from the tree view by holding down the 'Control' key and clicking individual tanks, or holding down the 'Shift' key and selecting multiple tanks using the arrow keys. Once tanks have been copied, right click on the site you wish to paste the tanks and click Paste, this will produce new tank nodes in the tree view, settings will replicate those of the tank from which the copy was made. Any gauges attached to the copied tank will also be copied and pasted.
4. To delete an existing tank, right click on the tank you wish to delete.
5. Click **Delete**.
   Alternatively, selecting the tank and pressing the 'Delete' key will also delete the tank. Multiple tanks can also be deleted by selecting tanks from the tree view by holding down the 'Control' key and clicking individual tanks, or holding down the 'Shift' key and selecting multiple tanks using the arrow keys. Doing so will remove the corresponding tanks from the system as well as any devices attached.
6. To edit the configuration of an existing tank, select the tank node from the tree view and the fields will appear on the editing panel to the right.
7. Make the modifications and save the changes.

Each manufacturers device has different basic requirements for configuration. Knowledge of the different makes and models of devices is useful at this stage although not essential. The following instructions do not provide an exhaustive guide as to the valid options and selections for each type of device; rather instruction is given as to the way in which the information is entered into the system. Application validation features, notes and manufacturer's literature should be consulted for further information.



BA00390GEN_0099

The form displays the different configuration settings of one device at a time: **Common Configuration**, **Dimensions**, **Device Configuration** and **Auxiliary**.

14.3.2 Adding a new device

1. To add a new device to the tree view, right click on the tank node you wish to add the device to, then click **Add Device**.
   The following dialog box will display:

BA00390GEN_0100

2. Select the device type and duty.
3. Click **OK** to add the devices.

   Alternatively, a new device may be added to the list by copying an existing one. In this case, right click on the device you wish to copy and click **Copy**. Multiple devices can also be copied by selecting device nodes from the tree view by holding down the 'Control' key and clicking individual devices, or holding down the 'Shift' key and selecting multiple devices using the arrow keys. Once devices have been copied, right click on the tank you wish to paste the devices and click Paste, this will produce new device nodes in the tree view, settings will replicate those of the device from which the copy was made.
4. To delete an existing device, right click on the device you wish to delete.

5. Click **Delete**.
   Alternatively, selecting the device and pressing the 'Delete' key will also delete the device. Multiple devices can also be deleted by selecting devices from the tree view by holding down the 'Control' key and clicking individual devices, or holding down the 'Shift' key and selecting multiple devices using the arrow keys. Doing so will remove the corresponding devices from the system.
6. To edit the configuration of an existing device, select the device node from the tree view and the fields will appear on the editing panel to the right.
7. Make the modifications and save the changes.

When configuring a new device, it is recommended to complete the applicable data entry fields in the order they appear starting from Common Configuration working down to Auxiliary fields. Certain selections, e.g. Device Type, will affect the data entry requirements.

If the system uses direct communications with the gauges/field devices, the **Master Data Collection Device Name** and **Slave Data Collection Device Name** should be left blank.
Otherwise, the name of the Data Collection Device to which the device is connected should be selected from the **Master Data Collection Device Name** list.
If the system includes redundant Data Collection Devices, also select the **Slave Data Collection Device Name** from its list.

Device Type

The **Device Typ** drop-down list provides a selection of gauges and field devices of various models from various manufacturers. Select the one that matches or most closely resembles the actual gauge or device which will be connected.

Tank ID

The **Tank ID** entry links the gauge to a tank. Typically, each gauge will be associated with a unique tank, though there are cases where there will be a number of gauges fitted to the same tank and thus share a common **Tank ID**.

Data Collection Device Port Address

Data Collection Device Port Address is the number of the Data Collection Device port to which the gauge will be connected. Ignore this if the system uses direct communication between PC and device with no Data Collection Device.

Comm Port

Comm Port is the number of the port on the PC to which the Data Collection Device or the device itself is connected. For redundant systems, also specify the Backup Comm Port.

To put a Tank into simulation mode set the Comm Port to 99. The data for the tank will then be derived from the integrated tank simulator normally used for demonstrations, presentations and training.

CIU Address and Gauge/Device Address

The selections for **CIU Address** and **Gauge/Device Address** (or their corresponding names in the case of other types of gauges/devices) will depend upon not only the **Device Type** but also the way in which the device is connected. Typically, the **CIU Address** is the address of the device which the system or Data Collection Device communicates with, and the **Gauge/Device Address** is the address, register or location from which the level may be read. The data format of the entries (e.g. decimal/hexadecimal) will also be determined by the **Device Type**. The following examples should illustrate the typical scenarios:

Enraf systems may include a CIU or may communicate directly with the gauges themselves. The level is read from the gauge using one of a number of specific requests. The **CIU Address** will be that of the actual CIU (if present) as a decimal number in the range "0" to "9", and the **Gauge Address** will be the Transmission Address of the gauge as a decimal number in the range "0" to "99".

SAAB systems may also include an interface unit; this time called a FIU, or may communicate directly with the gauges. Here, the level is read from one of a number of different Modbus registers within the FIU (if present) or the gauge. The **FIU Address** will be the Modbus Slave Address of the FIU (where present) or the gauge (direct communications without FIU) as a hexadecimal number in the range "01" to "F7". The **Gauge Address** is the Modbus Register Address from which the level will be read as a hexadecimal number in the range "0" to "FFFF". Other types of gauge that use the Modbus protocol will also follow this same pattern.

Whessoe systems fall into two basic types, the older (WM500) which uses a communications Outstation. The **Outstation Address** is specified as a decimal number in the range "0" to "15", and the **Gauge Address** specifies the outstation channel from which the level is read as a decimal number in the range "0" to "15". Later Whessoe systems (WM550) do not use an outstation; communication is directly to the gauge. In this case only the Gauge Address is required and is specified as a decimal number in the range "0" to "31".

Motherwell systems only use the **Gauge Address** setting, whether as an index number when requesting level from a communications rack (MCS4000) or as a field address when communicating directly with later type gauges (MCS2800). The Gauge Address is a hexadecimal number in the range "0" to "FF".

Devices of other manufacturers/types will generally fall into one of the above categories. If in doubt, consult the gauge manufacturer's literature and the Data Collection Device configuration application notes.

Data Collection Device Index

In the case of systems that use the Data Collection Device for field communications, the **Data Collection Device Index** is the address or "position" within the internal configuration database of the Data Collection Device where this device will reside. The positions are addressed from 0 to 255. Each device must have a unique Data Collection Device Index within the Data Collection Device. If Data Collection Devices are not used then any unique number may be entered into this field, as it is not used by the tank gauging system. This field should not be left blank.

Type Of Instrument

The **Type Of Instrument** and **Type Of Record** selections are only required for certain device types which offer different protocols or requests for level. For example, Enraf; where the Type Of Instrument specifies the protocol ("A" = GPP, "B" = GPU, etc.) and the Type Of Record specifies the request used to read level from the device (typically "B").

Multi-Gauges

If the device is one of a number of devices all fitted to the same tank, select **Multi-Gauges**. An additional frame will be displayed where the **Device Duty** should be selected. There should be only one Primary and once Secondary Device on each tank, the others should be backup devices, generic devices or used for other specific duties as listed.

Backup CIU

Systems which feature redundant CIUs should have **Backup CIU Available** selected. An additional frame will be displayed. Set the **Backup CIU Address** and **Backup CIU Mode**

appropriate, depending upon whether changeover is automatically performed or manually requested.

Average Temp. Fitted

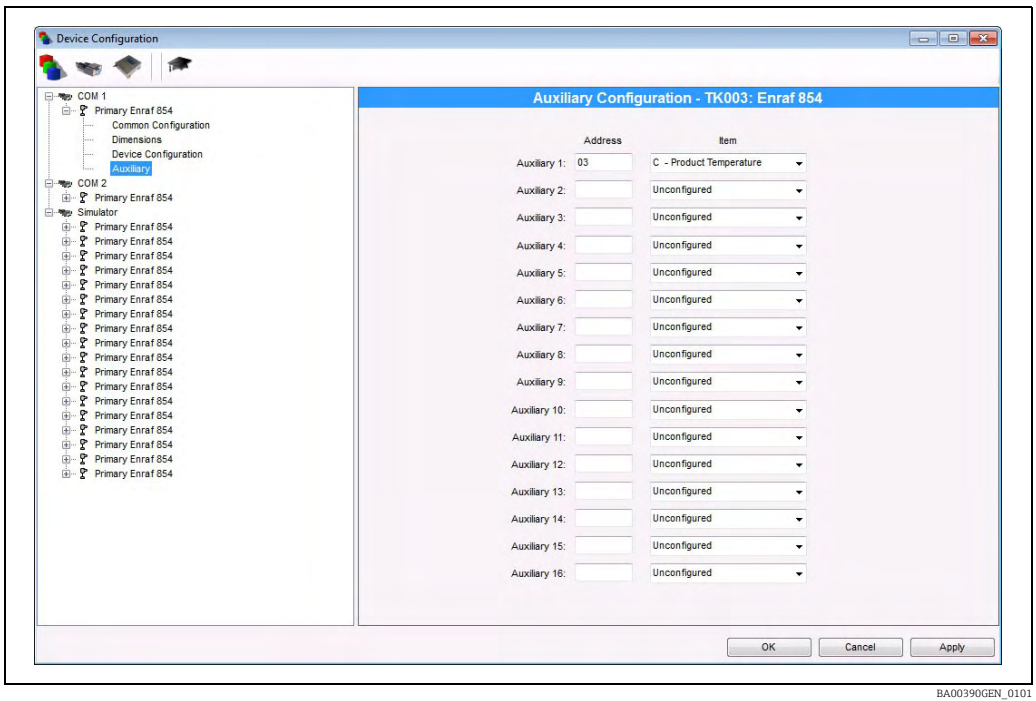
Certain devices which are provided with multi-element averaging/multi-spot temperature measurement may allow the individual element temperatures to be read via the communications. If this feature is available and desired, select **Average Temp. Fitted**.

Flow Rate

To alter the response of the level flow rate calculation, and consequently the volume and mass/weight flow rates, two parameters are available for user configuration. The **Flow Rate Damping** factor is a measure of how much of the current instantaneous flow rate reading is incorporated into the filtered value, as a percentage. Increasing the figure increases the responsiveness of the resulting flow rates but reduces the effective damping. The **Flow Rate Integration** factor is a time in seconds, up to 240 seconds maximum (four minutes), used to increase the effect of damping where the level readings/flow rate calculations are performed at shorter intervals depending upon the number of gauges present on the particular communications port. In most cases the defaults are acceptable.

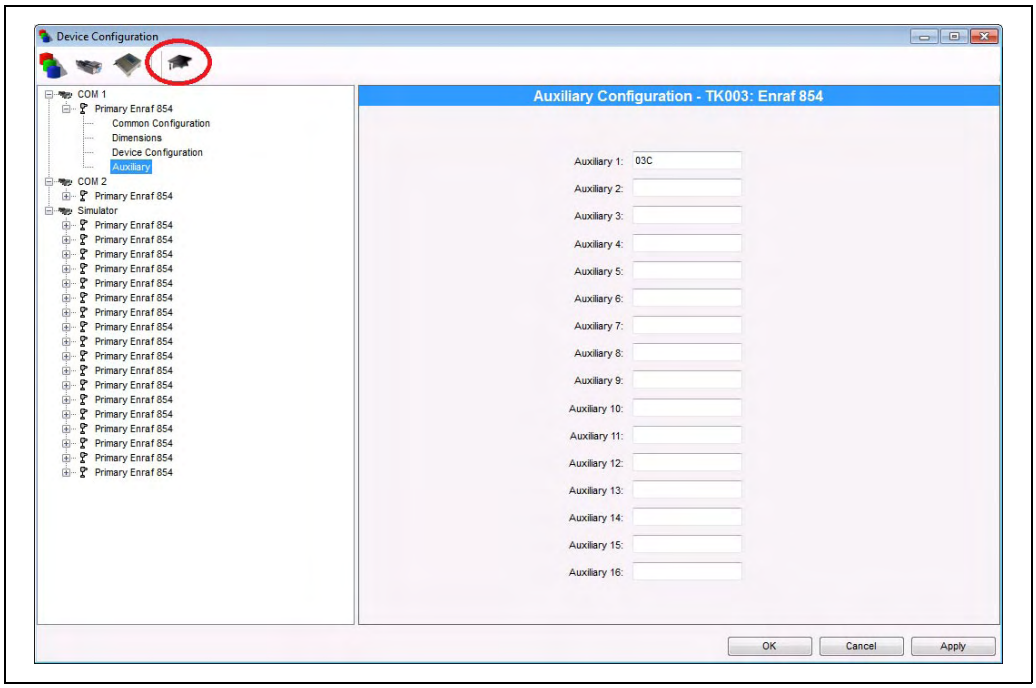
Background Scan/Auxiliary

The **Background Scan/Auxiliary** settings are used to read data parameters other than Product Level from the device at lesser frequency than the level. Product Level is the primary data item and is the default item polled from the device by the system. Polls for other items may be inserted periodically by the system dependent upon the settings of the Background Scan / Auxiliary items. Where used, Auxiliary 1 is assumed to be for Product (Average) Temperature, and is typically polled at half to quarter of the rate of Product Level. The other items Auxiliary 2 to Auxiliary 16 are inserted into the normal polling sequence at a default of three minute intervals. The background scan interval can be modified in the DCC Configuration module. The Auxiliary scans are typically be used to read Free Water Level, Density, Vapour Pressure, Vapour Temperature, etc. The format of the Auxiliary entry will depend upon the device type e.g. Enraf Auxiliaries use the following screen:



BA00390GEN_0101

All auxiliary settings can be viewed in the 'classic' style (without specific validation) by clicking the 'Classic Auxiliary View' icon:



BA00390GEN_0102

By selecting the "Classic" view, there is no validation performed and therefore more chance of a device being configured incorrectly.

For Enraf gauges, the Auxiliary entry is formed of the two digit decimal Transmission Address of the device from which the item is to be read (usually the same as the Gauge Address) in the range "00" to "99" including any leading zeros, followed by the one or two character alphanumeric code of the data item as per the Enraf GPU protocol. A single letter appended to the address will be interpreted as a Type Of Request, whereas a two character code will be interpreted as a Data Item identifier for a Z Record request. As in the example displayed above, Auxiliary 1 is set to request a C Record (Product Temperature), Auxiliary 2 will request Data Item YB (Free Water Level) and Auxiliary 3 will request Data Item SC (Average Servo Density). All of these auxiliary items will be requested from address 04, that being the same as the Gauge Address.

For SAAB gauges, the Auxiliary items should be set to the Modbus Register Address of the desired data value as a four digit hexadecimal number in the range "0000" to "FFFF", including any leading zeros.

Where devices provide Product Temperature in a combined response along with Product Level, as is the case with Whessoe and Motherwell gauges for example, there is no need to set the Auxiliary 1 item to specifically request temperature.

The system and the Data Collection Device will assume that any values read from the gauges/field devices are in Metric units unless the system is able to determine the measurement units of the gauge/field device automatically via the communications. If this is the case, the **Change Dimensions** entries should be left in their default setting of "AUTO". With certain gauges, the system must be configured specifically to match the measurement units of the data from the gauge by selecting the appropriate units of measure from the drop-down lists.

Once all settings for the gauge have been configured, always remember to apply the settings by clicking on the **Apply** button. Note that this saves the configuration settings to the database, but does not in itself alter the configuration of any Data Collection Device present in the system.

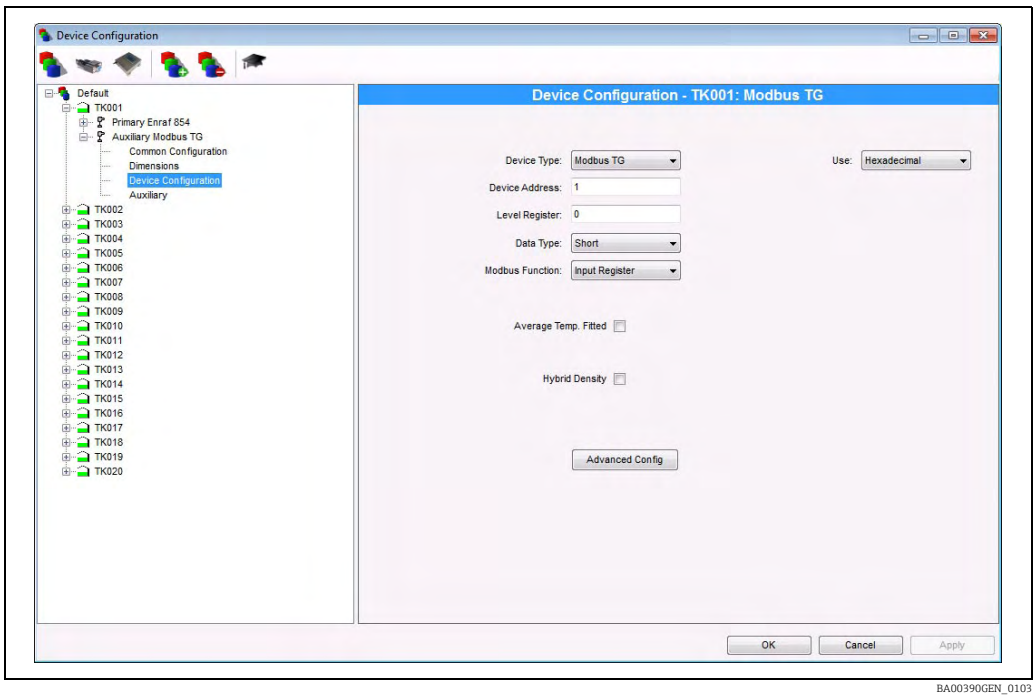
14.3.3 ModbusTG Gauges

ModbusTG gauges are assigned to ModbusTG interface ports and are used to poll for tank data from slave devices using the standard Modbus protocol. These slaves may be PLCs, Remote I/O units or gauges equipped with a Modbus interface.
ModbusTG gauges are often used as Auxiliary gauges, to bring in background data items for primary gauges. See section on "Multi Gauges" for more details, → 123.
ModbusTG gauges may require more configuration than other gauges due to their generic nature. There are two steps to configuring a gauge:

1. Configure gauges on the port with a basic Modbus map, using the standard Device Configuration screens.
2. If required, configure an advanced Modbus register map in an XML config file.

ModbusTG Basic Map

Gauges must be configured to use the ModbusTG driver. This can be done in the normal way using the standard Device Configuration screens.



BA00390GEN_0103

A very basic modbus map may be defined for the gauge using the following fields:

- **Device Type**
  The gauge must be set to **Modbus TG**.
- **Device Address**
  The modbus RTU address of the slave device.
- **Level Register**
  The Modbus address of the register that returns Product Level. This starts from zero and should not include the Modbus function code offset. For example, a Modbus register full address of 40001 should be entered as 0 (and Modbus Type should be set to 3).
  This parameter is not used for Auxiliary duty gauges.
- **Data Type**
  Must be set to **Short**.
- **Modbus Function**
  The Modbus function code to be used for the Level register (and Temperature if used) i.e. Coil, Input Status, Holding Register, Input Register.
- **Auxiliary 1 (Temperature Register)**

An optional field that defines the Modbus address of the register that returns the Temperature.

This will set the ModbusTG to poll for the level data (for non-Auxiliary duty gauges only) using a standard set of decoding parameters:
- Input range: 0 - 32000 in millimeters.
- Encoded as a two byte Short with Little Endian format.
- A value outside the range 0 - 32000 will be decoded as a bad value.

If the Auxiliary 1 field has been entered then the ModbusTG will poll for temperature data using a standard set of decoding parameters:
- Input range +- 3200 Degrees C sent times 10, i.e. +32 DegC encoded as 320.
- Encoded as a two byte Short with Little Endian format.
- A value of 8000 Hex will be decoded as an illegal value.

If the above encoded format for level (and temperature if enabled) is supported by the slave device and no other data (e.g. density etc.) is required, then no other configuration is needed for the ModbusTG driver.

Level will never be polled for Auxiliary duty gauges.

ModbusTG Advanced Map

If the very basic Modbus map defined when the gauges are added to the system is not enough then it may be overridden with a much more advanced map, defined in a separate XML format file. This allows more flexible encoding of data to be defined and also permits a much greater range of data parameters to be polled for.
A configuration tool, "Modbus Config.exe", is available to allow the user to configure the XML file. This is located in the standard installation directory.
The user may also directly edit the configuration file and details of how to do this are included in this document. However it is recommended that direct editing should only be used in extreme circumstances, as it may lead to an invalid file structure.

The advanced map consists of a set of Interfaces, each of which may have:
- A set of default parameter details which apply to ALL gauges on the interface
- A set of gauge parameter details which apply only to the selected gauge

All parameters are optional and need not be defined in the map, as they will default to a set of standard values (defined later in this document, → 116).

Modbus Configuration Tool

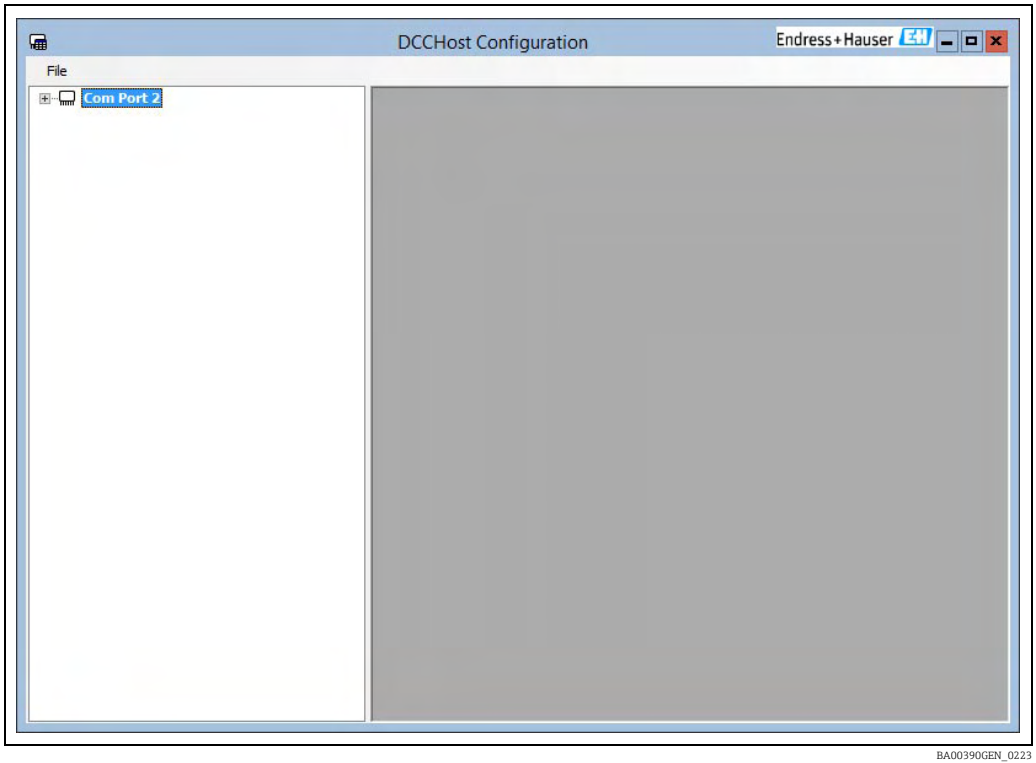
To configure the advanced Modbus map, proceed as follows:

1. Select the menu option **Configuration → DCC Host Configuration**.

The DCC Host Configuration page allows advanced configuration of certain host drivers, including the **ModbusTG** driver.
A list of all COM ports that have drivers that require advanced configuration will be shown in the left hand panel. This will include all **ModbusTG** interfaces that have at least one ModbusTG gauge assigned to them.

If no **ModbusTG** interfaces appear in the list, then ensure that all **ModbusTG** interfaces have been defined (com ports in DCC hosts) and at least one gauge of type **ModbusTG** has been assigned to each interface (com port).

The list of COM ports can be expanded to display all gauges assigned to that port.



BA00390GEN_0223

Each Com Port will have a list of all tanks assigned (including the gauge duty, i.e. Primary, Secondary etc.) and also a section called **Defaults**.
The Modbus fields that are to be polled for each gauge will be displayed beneath the gauge they apply to. These fields include product level, temperature, pressure etc. and will only be polled by the **ModbusTG** interface if they are added to the configuration in this tool.

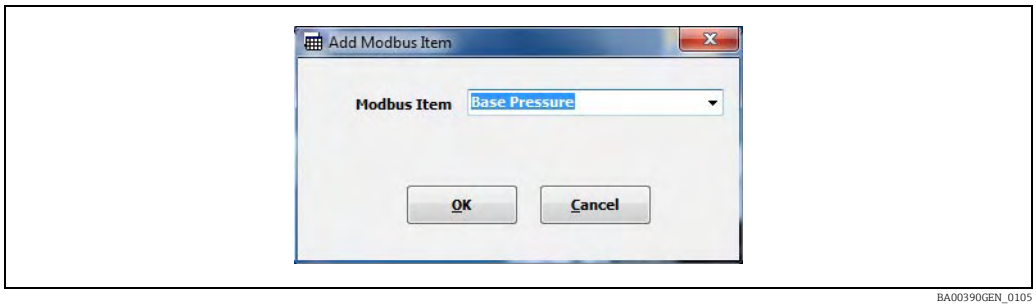
For non Auxiliary duty gauges, Product Level will always be polled for, even if not configured here – see section on **ModbusTG Basic Map** (→ 113).

The **Defaults** section allows the user to configure Modbus field definitions that will be added to ALL gauges on this **ModbusTG** interface. If a field is added to the **Defaults** section it will be polled by a gauge even if the field has not been added to the individual gauge.
Each gauge can be configured with Modbus field definitions that apply only to that gauge. All field data entered for an individual gauge will override data entered in the **Defaults** section. Thus data common to all gauges may be entered in the **Defaults** section, and then individually tailored for each gauge as required.

Adding a Modbus Field

To add a new Modbus field to a gauge or the Defaults, proceed as follows:

1. Right click on the field.
2. Select **Add** from the pop-up menu.
3. Select the field from the **Add Modbus Item** dialog displayed.



BA00390GEN_0105

The new field will be displayed in the left hand panel.

Deleting a Modbus Field

To delete a Modbus field, proceed as follows:

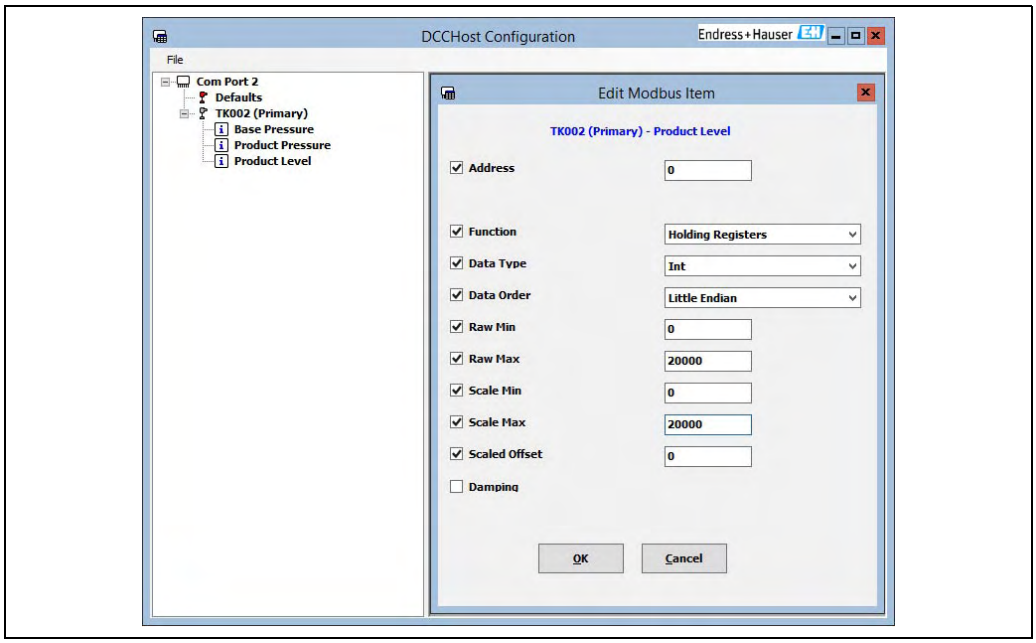
1. Right click on the field.
2. Select **Delete** from the pop-up menu.

Editing a Modbus Field

To edit a Modbus field, proceed as follows:

1. Right click on the field.
2. Select **Edit** from the pop-up menu.

This will display the current set of definitions for the field in a window in the right hand panel. Multiple Modbus fields may be edited at the same time.



BA00390GEN_0224

The parameters are optional and are only used if the left hand box is ticked. Any parameters not ticked will use the default values, defined later in this section.
The range of parameters displayed will depend on the data field selected.

Common to most modbus fields are the following parameters:

- **Address**
  The modbus address of the register or coil, from zero.
- **Function**
  The modbus function type i.e. Holding Register, Coil etc.
- **DataType**
  The format of the data to be requested. May be one of the following:
  – Signed Char (range -127 to +127 using 1 register)
  – Unsigned Char (range 0 to 255 using 1 register)
  – Short (range -32767 to +32767 using 1 register)
  – Unsigned Short (range 0 to 65535 using 1 register)
  – Integer (range -2147483647 to 2147483647 using 2 registers)
  – Unsigned Integer (range 0 to 4294967295 using 2 registers)
  – Float (using 2 registers)
  – Double (using 4 registers)
- **Data Order**
  The byte order of the data, may be one the following:
  – Little Endian (Standard format for MS Windows based systems)
  – Big Endian
  – Little Logical
  – Big Logical (often used by DCS systems for Float datatypes)
- **Raw Min and Raw Max**
  The raw data range. Used in scaling data (see below) and also if the value is outside the raw limits then the value will be set to illegal, i.e. DN04
- **Scaled Min and Scaled Max**
  The scaled data range. The Scaled value must be converted to the default units used within the TankGauging database, (Level=mm, Temperature=DegC, Density=Kg/l, Pressure=BarA). For status fields it is recommended that these should be set to the same as the raw limits. Data will be converted using the formula:

  ScaledValue = ((RawValue - RawMin) / (RawMax - RawMin)) * (ScaledMax - ScaledMin) + ScaledMin

- **Scaled Offset**
  An optional offset to be applied to the scaled value, in the database units for the data type (Level=mm , Temperature=DegC , Density=Kg/l , Pressure=BarA)
- **Damping**
  Not used for status values. A percentage value that is used to damp values that fluctuate rapidly. This field should be entered in the range 0 -100, with 0 and 100 being treated the same as NO damping. Formula used is:

  DampedValue = OldValue + ((NewValue - OldValue) * damping / 100)

Fields for Status parameters

If the modbus field is a Status (i.e. Base Pressure Status, Product level Status etc) then the following parameters will also be available:

- **Status Type**
  Only used for status fields. Defines the test used on the input value to determine if the field is valid i.e. Good. If the test is true for illegal or bad then the field is Invalid and will be set to DN04. May be one of the following:
  – None
  – One illegal value
  – One good value
  – Bits set good
  – Bits set bad
- **Status Test Value**
  Only used for status fields. Defines the value used to test any special case for validity, depending on the value of statustype. If statustype is 3 or 4 then any of the bits in this value will be tested.

Fields for Alarm parameters

If the modbus field is an Alarm (i.e. Level High High , Temp High etc) then the following parameters will also be available:

- **Alarm Type**
  Defines the test used on the input value to determine if the alarm is active. May be one of the following:
  – None
  – Equals Value Sets Alarm
  – Bits set Alarm (i.e. Any of the bits in Alarm Test VAlue will set the alarm)
  – Bits Cleared Set Alarm
  – Greater Than Value Sets Alarm
  – Less Than Value Sets Alarm
- **Alarm Test Value**
  The value used to test the alarm activation status of the incoming data.
- **Hysteresis**
  The value used determine when alarm is cleared. Only used for types "Greater Than Value Sets Alarm" and "Less Than Value Sets Alarm".

Default values

Any Field parameters not defined for an individual gauge will use those defined in the Defaults section. If the Field parameter has not been defined in the Defaults section then the following defaults will be used by the **ModbusTG** interface when polling for data:

- **slaveaddress** = Device No. entered in Device Configuration screen (→ 103)
- **address** = 0
- **function** = 4
- **dataorder** = Short
- **rawmin** = 0
- **rawmax** = 32000
- **scaledmin** = 0
- **scaledmin** = 32000

- **statustype** = 1 (status fields only)
- **statusvalue** = 8000 hex (status fields only)
- **damping** = 0 (i.e. not used) (value fields only)

For Product Level the default values will be those set in the Gauge Configuration screens. If Product Temperature has been defined in the Gauge Configuration screens then those defaults will be used. (→ 25)

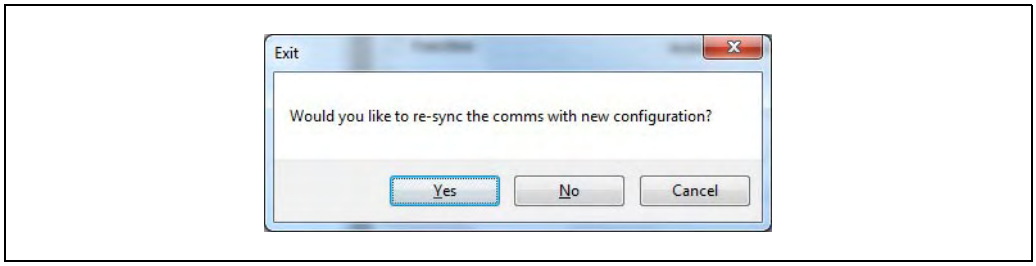
The Modbus PLC address for the field will be the **Device Address** field entered in the Gauge Configuration screen.

1. Click **OK** in the edit box to save the parameters for the Modbus field.

Saving the Modbus Map

To save the new modbus configuration to the Modbus xml file, proceed as follows

1. Close the DCC Host Configuration tool.
   If any changes have been made then the follwoing dialog will be displayed:



BA00390GEN_0107

2. Click **Yes** to save the data and automatically force the DCCHost service to reload the new modbus map for any ModbusTG interfaces.

ModbusTG Field Definitions

The Defaults section and any Gauge node can contain a set of modbus fields which will be polled by the **ModbusTG**.
Each field node can contain one or more attributes which define what the field is and how the **ModbusTG** driver will decode the incoming data when polled.
The **ModbusTG** interface is specifically designed to poll for tank gauge data and thus data fields are polled in a defined way.

There are three basic types of fields in the **ModbusTG** driver, which operate in slightly different ways. The fields are:

- **Data Fields** - Used to get the actual value of a data item, such as level, temperature etc.
- **Status Field** - Optional, used to get the validity of an associated data item. A status field is denoted by name ending in **Status**.
- **Alarm Field** - Used to bring in an alarm. An alarm field is denoted by **Alarm** in name of field.

Fields polled at high priority

Certain fields are polled at high priority, and will always be polled regardless of whether they have been added to the advanced Modbus Map or not. These are:

- Product Level
- Product Level Status

The above fields will NEVER be polled for an auxiliary duty gauge.

The following fields will be polled at high priority if they have been defined in the advanced Modbus Map:

- Product Temperature
- Product Temperature Status
- DensityHigh Alarm

- DensityLow Alarm
- LevelHigh Alarm
- LevelHighHigh Alarm
- LevelLow Alarm
- LevelLowLow Alarm
- TempHigh Alarm
- TempLow Alarm
- GaugeStatus

Fields polled in background scans

Other fields are only polled on background scans, and only if they have been defined in the **Modbus Advanced Map**. The background scan period is defined per interface and defaults to three minutes. These fields include:
- BasePressure
- BasePressureStatus
- FreeWaterLevel
- FreeWaterLevelStatus
- Density
- DensityStatus
- ObservedTemperature
- ObservedTemperatureStatus
- ProductPressure
- ProductPressureStatus
- VapourPressure
- VapourPressureStatus
- VapourTemperature
- VapourTemperatureStatus
- ElementTemperature1 - 16
- ElementTemperature1 - 16Status

Validity of fields

From the above list it can be seen that most fields are in pairs, with a value field and a status field. Thus the Product Level field has a corresponding Product Level Status field etc.

The validity of a value field is determined by the following:
- If the incoming data is outside the raw scaling limits then the value will be set to illegal status i.e. DN04.
- If a status field has been added (i.e. level status added as well as level value) then it determines the status of the value.

A status field may be added to the map in addition to the value field. These are generally used in cases where the status of the data is set in a separate **Modbus Field** (coil or register). However the status field may be set to the same **Modbus Address** as the value.

For status fields the are an extra set of parameters that determine how to decode the status. They work in the following manner:
- If the status is outside the raw scaling limits then the value will be set to illegal status i.e. DN04.
- If the status is within the raw limits then the Status Type parameter will be used to determine how to test for illegal status using the Status Test Value.

Many **Modbus Maps** implemented by slave devices do not have separate status registers (or bits) but instead set the value to some error figure (i.e. full scale etc.). In this case the status field should be set to the same **Modbus Address** and parameters of the value field (i.e. same raw scaling parameters).
Alarm fields must have the Status Type and Status Test Values fields configured. They are used to test the incoming data to check whether the alarm is active or inactive. In this case if the data tests Good then the alarm is active, if it tests Bad then the alarm is inactive.

ModbusTG User Defined Alarms

User Defined Alarms are a set of alarms generated by certain gauge type, which the user may configure the text to be displayed when the alarm is activated and cleared. There are eight such alarms per gauge:

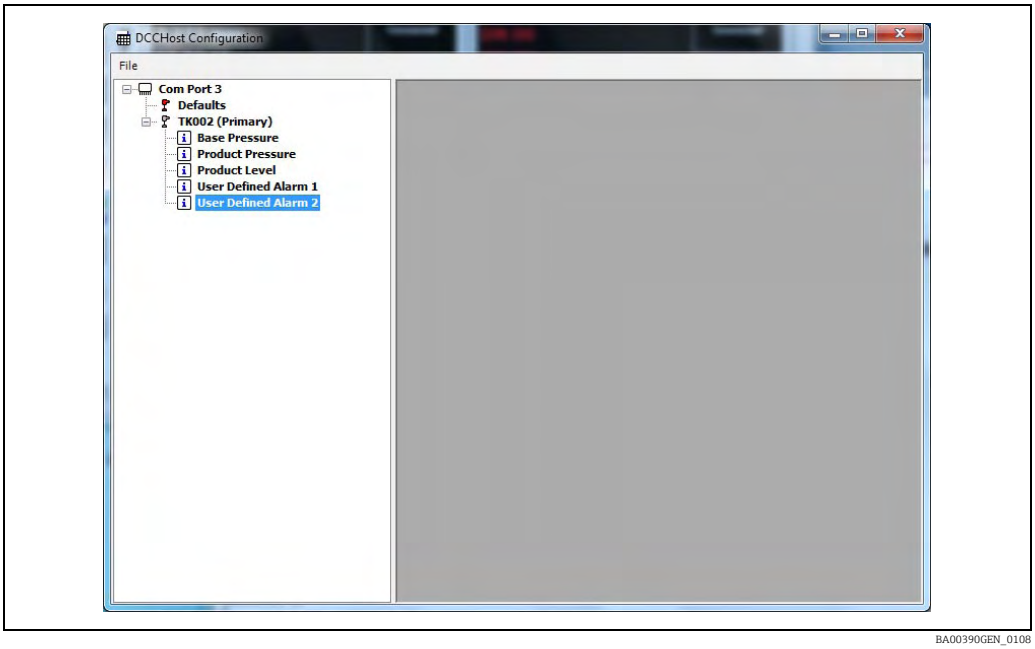
- User Defined Alarm 1
- User Defined Alarm 2
- User Defined Alarm 3
- User Defined Alarm 4
- User Defined Alarm 5
- User Defined Alarm 6
- User Defined Alarm 7
- User Defined Alarm 8

The alarms are available in the database for all gauge types, however whether they can be used depends on the physical gauge type. In fact only the **ModbusTG** gauge type running on the **ModbusTG** direct interface currently supports the use of User Defined Alarms.
The text and severity for each alarm may be configured. See section 5.5 for details on how to do this.

Polling for User Defined Alarms

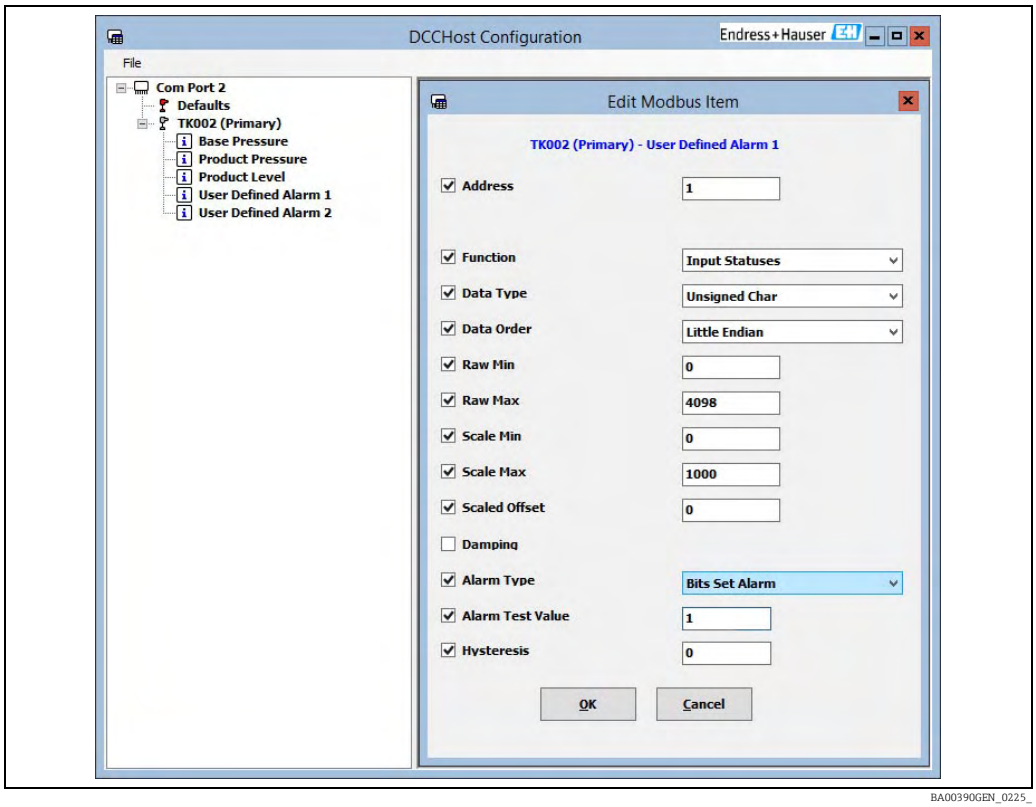
To configure a **ModbusTG** gauge to poll for one of the eight User Defined Alarms, proceed as follows:

1. Select the menu option **Configuration → DCC Host Configuration**.
2. Add the point to the required gauge.



These may be configured to read individual coils.

Example 1



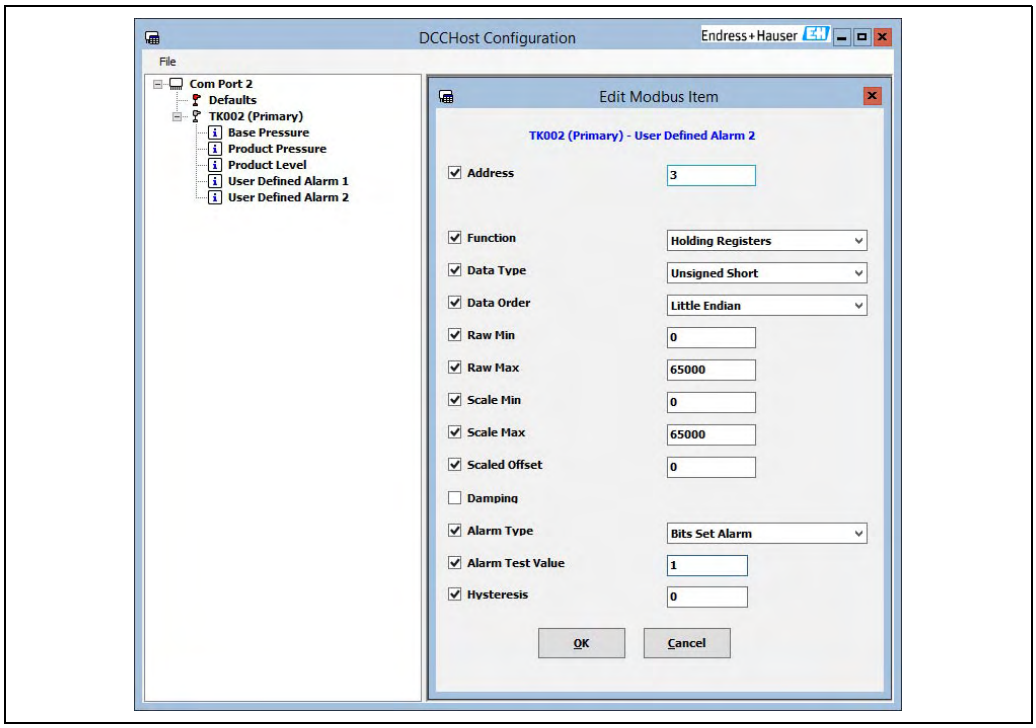
BA00390GEN_0225_

In the above configuration, User Defined Alarm 1 will be generated from an Input Status coil at address 1.

- The **Alarm Type** field is used to set the activation of the alarm.
- The **Alarm Test Value** will be used to test the incoming data to see whether the alarm is active.

Therefore in this case **Alarm Type** is set to Bits Set Alarm and the test value is one. So if a value of 1 is received then the alarm will be activated, any other value will clear the alarm. The incoming value is a coil therefore it will be either 1 or 0.
User defined alarms may also be configured to read individual bits within a bit-mapped register. In that case the Data Type would be set to unsigned short, and the Status Type will defined the bits to be tested.

Example 2



BA00390GEN_0226

In the above configuration, User Defined Alarm 2 will be generated from Bit 1 of an Input Register at address 3.

14.3.4 Multi Gauges

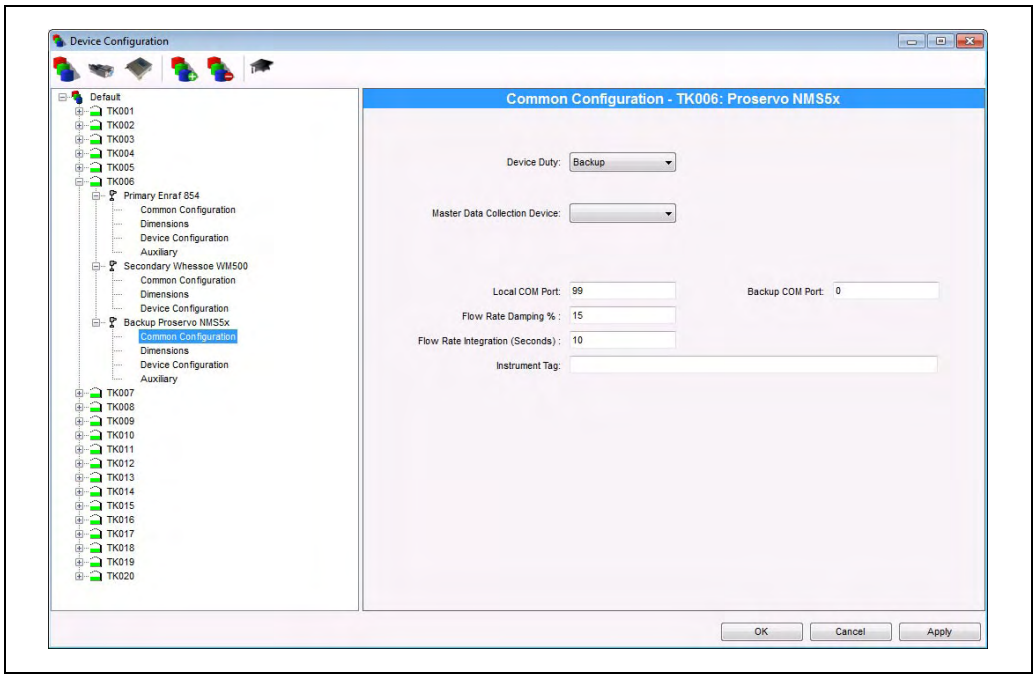
Tanks may be fitted with more than one gauge.
To configure multiple gauges per Tank, each gauge must be assigned a duty for the tank.

The Device Duty types available are:
- Primary
- Secondary
- Backup
- Densitometer
- Auxiliary
- Backup Densitometer
- Generic Device

These define how the gauge will be treated in the various operator displays.

Device Duty Configuration
To configure multiple gauges per tank carry out the following in the Device Configuration screen:

1. Add multiple devices onto a tank using the right click context menu.
2. Select the appropriate gauge duty from the **Common Configuration** panel.



BA00390GEN_0111

For multi-gauge tanks configuration data entered for the tank will be saved for ALL the gauges on that tank. This applies to data entered in the following screens:

- Tank Characteristics
- Alarm Configuration
- Tank Capacity Tables

This means that when a programmable alarm is triggered on a multi-gauge tank, an alarm event will be generated for each gauge on the tank.
The exception to the above is the Manual Data screen. Data entered in that screen is per individual gauge, not the tank.

Primary Gauge
One gauge must be configured as the primary duty gauge and there can only be one per tank. This is the gauge that will be used to display the tank data in most of the operator screens. If a Densitometer duty gauge is also present on a tank then the Product Density and Observed Temperature will be automatically be copied from the Densitometer to the primary.
If an Auxiliary duty gauge is present on a tank then any background parameters that are not available in the primary will be automatically transferred from the auxiliary gauge.

Secondary Gauge

If more than one level gauge is required on a tank then set the second gauge to be Secondary duty. It will not be displayed in the inventory screens but may be accessed via modbus and OPC interfaces.
The secondary gauge will not normally be displayed on any screens.
Its main use is for the Difference alarm. When this alarm is enabled for a tank, it monitors the Primary and Secondary gauge levels and generates an alarm if they differ by more than the allowable tolerance.
Only one secondary gauge should be configured.

Backup Gauge

Any other level gauges on a tank should be configured as Backup duty.
They will not be displayed in the inventory screens (except for LNG systems) but may be accessed via modbus and OPC interfaces.

Densitometer Gauge

This duty is only required for LNG tanks and is used for devices such as the Scientific Instruments 6280/6290, although any gauge capable of carrying out profiles may be configured as a densitometer.
Its main purpose is to carry out profiles and calculate the product density, which is then automatically transferred to the primary gauge for volume/mass calculations.

Auxiliary Gauge

An auxiliary gauge is different from all other gauge duties, and is not treated as a separate gauge on its own, rather it is used to retrieve background scan parameters (pressures, temperatures, water bottom etc) from a separate device and store them in the Primary gauge.
An auxiliary gauge will not poll for level, generate alarms or be displayed in the operator screens. It is typically used on a **ModbusTG** interface to access parameters from devices such as pressure transducers. All data retrieved from an auxiliary gauge will be transferred to the Primary gauge and used in the volume calculations.

Parameters on an auxiliary gauge will only be polled on the background scan and include:
- Product Temperature
- Vapour Temperature
- Density
- All Pressures
- Multi-Element temperatures (not transferred to Primary)
- Skin Temperatures (not transferred to Primary)
- Water bottom
- Gauge Alarms

It is important to consider the background scan rate of any interface polling for auxiliary tanks. This will determine the rate of update for the data to be transferred to the primary gauge. If the interface is only polling for auxiliary gauges then it is recommended that the background scan rate is reduced from the default (default 180 seconds, minimum 10 seconds).

Backup Densitometer Gauge

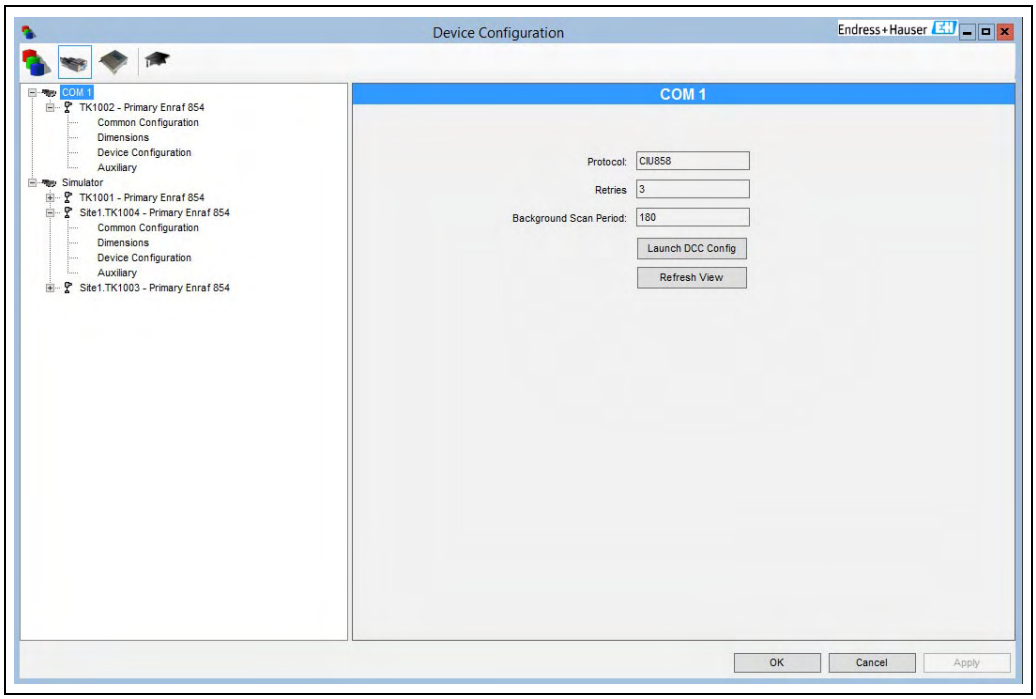
Any other densitometer gauges on a tank should be configured as Backup Densitometer duty.

Generic Device

Any devices other than gauges on a tank should be configured as Generic Device duty.

14.4 COM View

The COM View is an additional feature added to easily see which devices are connected on each "In Use" COM port. To access the COM View, click the **COM View** button on the device configuration screen.



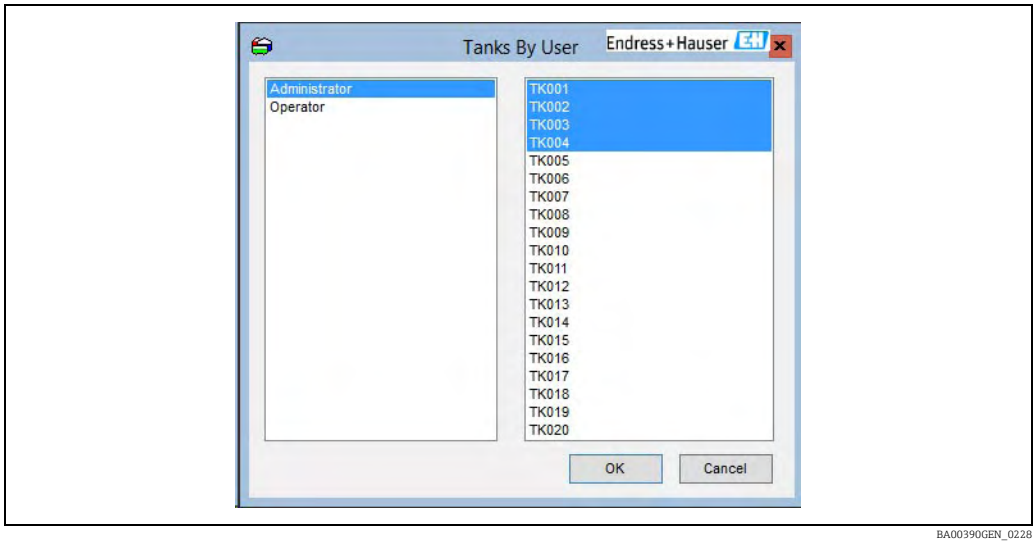
BA00390GEN_0227

The simulator node will always appear and cannot be deleted. Any COM ports configured to 'In Use' within DCC Configuration will also be displayed as COM nodes. Any devices configured to the COM ports will be displayed as child nodes of the parent COM node. Connected devices can be configured within this screen, by selecting the device and editing the fields on the panel to the right.
Clicking on a COM port node displays the configuration settings of the COM port, these cannot be edited within the application, but can be edited within the DCC Configuration application, which can be launched by clicking the **Launch DCC Config** button. If new ports are configured, they will not appear in the tree view until the screen is refreshed by clicking the **Refresh View** button.

15 Tanks by User

This function provides an administrator with the ability to configure which tanks a user login can view.
This is quite useful on larger multi-user systems where tank operations are split between different users, and a user may be responsible for looking after a specific set of tanks.

1. Select the **Tanks By User** option from the **Admin** menu.
   The **Tanks By User** display will be loaded.



BA00390GEN_0228

This display comprises two list boxes. One list containing the currently configured users and the other the full list of tanks with the tanks currently assigned to the selected user highlighted.

15.1 Setting Tanks a User Can View

To set the tanks a user can view, proceed as follows:

1. Select the user from the list.
   Any tanks currently allocated to that user will be highlighted. Highlight the tanks in the tanks list that the selected user is able to view.
2. Click the **OK** button to save the changes. Repeat this for each user.
3. To exit the screen without saving the changes click the **Cancel** button.

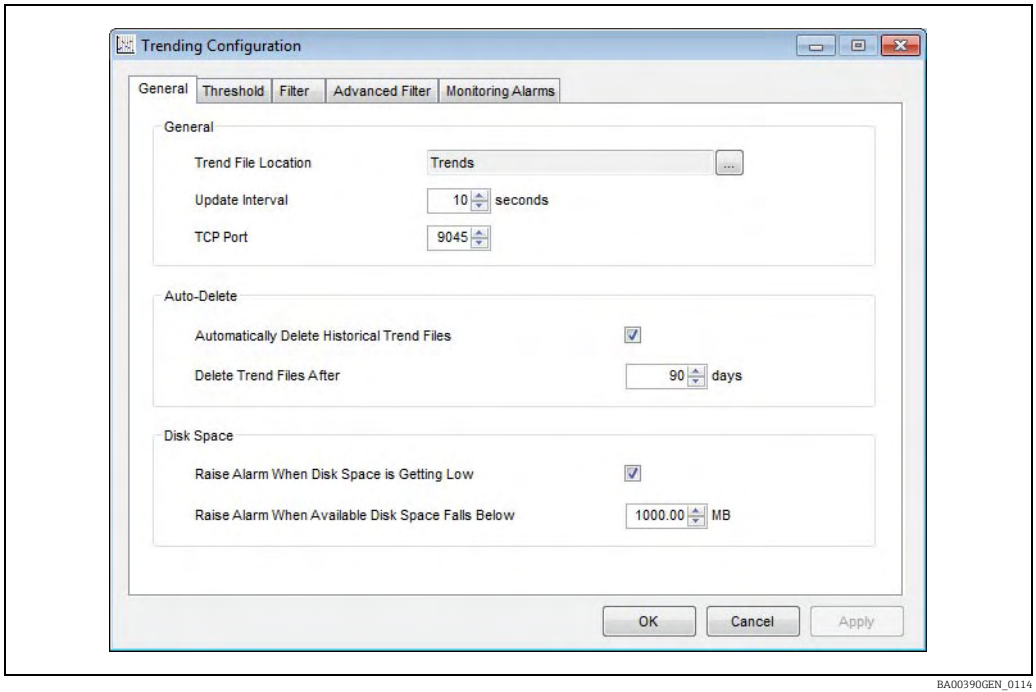
For Tanks by User to work **Login Enabled** must be selected in **Security Settings**.

16 Trending Configuration

Trending configuration is done on a server or standalone station. It is accessed via the Service Manager in the Windows system tray. The display is a multi-tabbed dialog as shown below.

16.1 General Tab

This contains configuration options relating to the trending service and housekeeping of the trend files.



BA00390GEN_0114

Trend File Location

A directory where the trend files will be stored. This location is relative to the Application directory.

Update Interval

The interval at which the tank data is checked to see if it has changed.

TCP Port

The TCP port to be used by clients to communicate with the trending service.

Automatically Delete Historical Trend Files

If this option is checked historical trend files will be deleted after the time specified below.

Delete Trend Files After

The age the files need to be before they are deleted, if this feature is enabled.

Raise Alarm When Disk Space is Getting Low

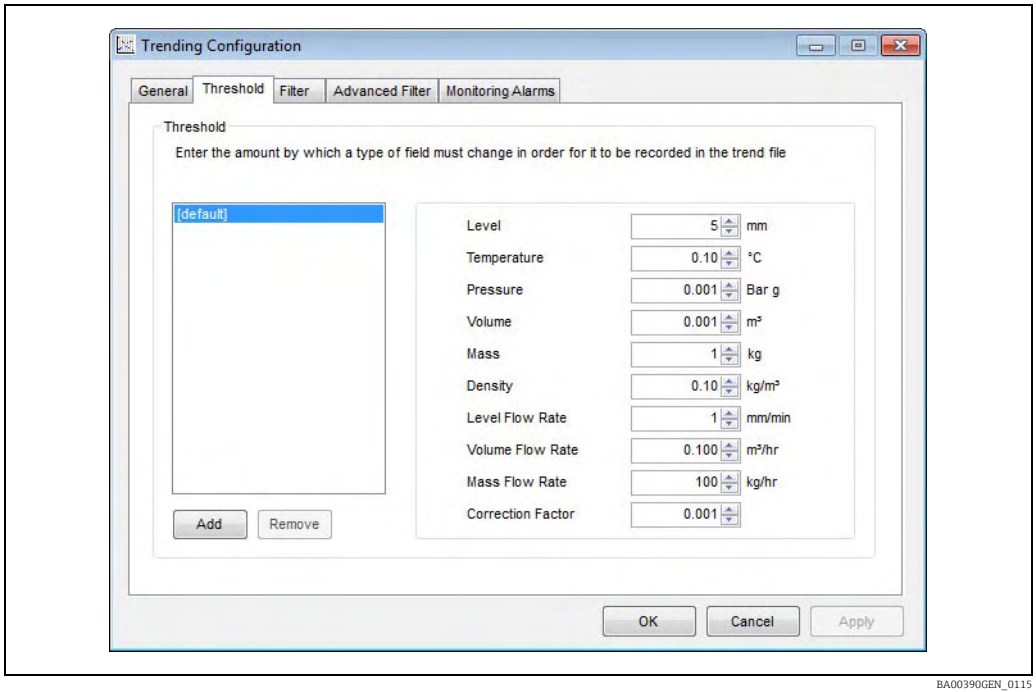
If this option is checked an alarm will be raised through the events subsystem when the available disk space falls below the defined threshold.

Raise Alarm When Available Disk Space Falls Below

The available disk space below which an alarm is to be raised.

16.2 Threshold Tab

The Threshold tab allows the sensitivity of the trending to be modified. The new value of a parameter will only be written to the trend file when the change in value (since it was last written to the trend file) is greater than the threshold defined for that field type.

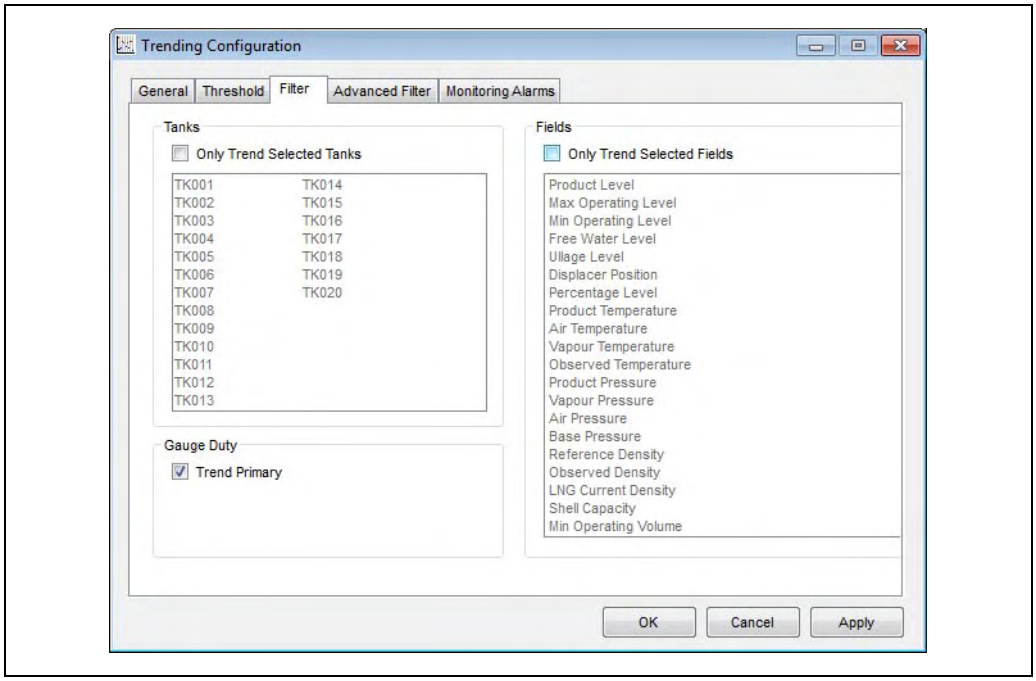


BA00390GEN_0115

The threshold values can be overridden for individual tanks to allow for the different behavior of different products and/or tank shapes. To override the threshold values for a tank click on the **Add** button and select the tank from the list of tanks displayed. The tank will then appear in the list of tanks. Ensure that the tank is highlighted and then amend the threshold values.
Similarly to remove the override for the tank ensure that it is highlighted in the list and then click on the **Remove** button.

16.3 Filter Tab

The Filter tab allows the data to be trended for each tank/gauge to be unique. By default all tanks, gauge duties and fields are trended.



BA00390GEN_0116

Only Trend Selected Tanks

If this option is checked, only the data for the tanks highlighted in the list of tanks will be trended. Otherwise the data for all of the tanks will be trended.

Trend Primary

If this option is checked, the data for the primary gauges will be trended.

Trend Secondary

This option will only be visible if one or more tanks in the system has a secondary gauge configured. If this option is checked, the data for the secondary gauges will be trended.

Trend Backup

This option will only be visible if one or more tanks in the system has a backup gauge configured. If this option is checked, the data for the backup gauges will be trended.

Trend Densitometer

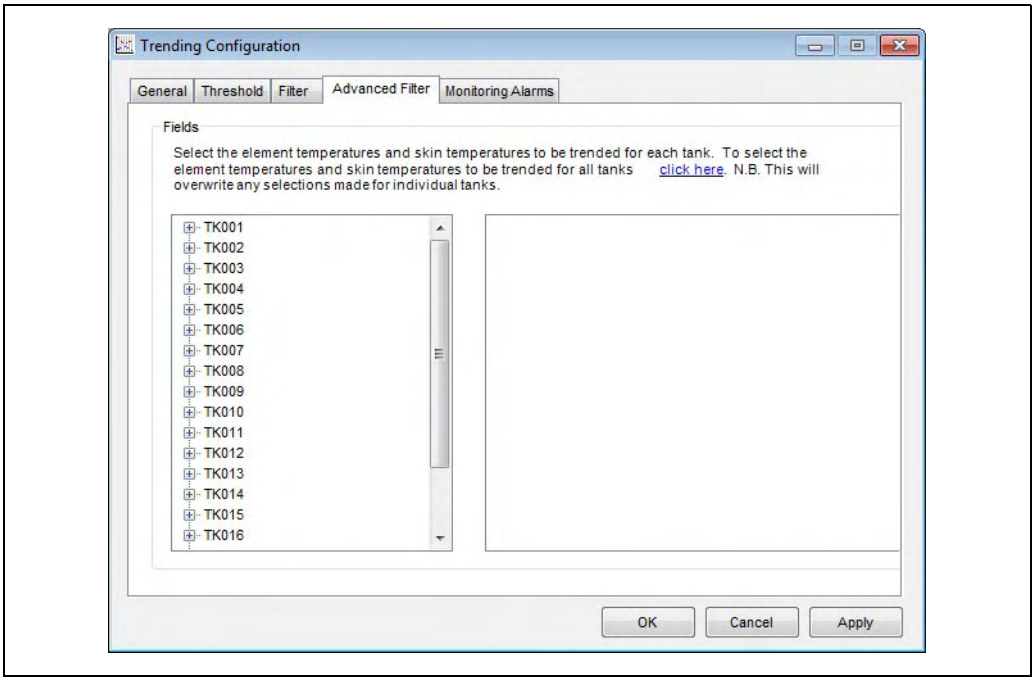
This option will only be visible if one or more tanks in the system has a densitometer configured. If this option is checked, the data for the densitometers will be trended.

Only Trend Selected Fields

If this option is checked, only the data for the fields highlighted in the list of fields will be trended. Otherwise all the fields in the list will be trended.

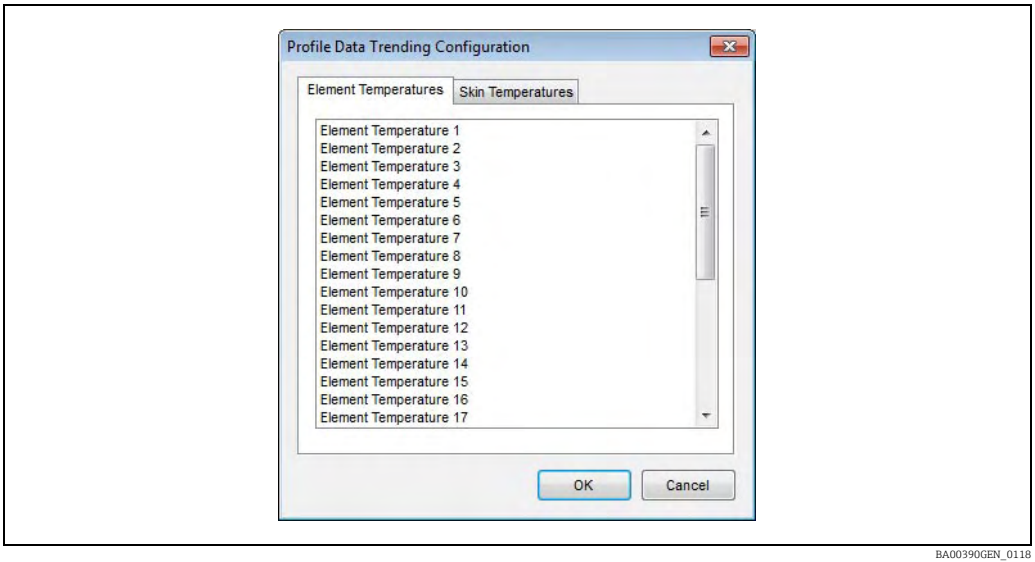
16.4 Advanced Filter

The Advanced Filter tab of the trending configuration screen allows trending options to be set for element temperatures and skin temperatures (if appropriate). By default, element temperatures and skin temperatures are not trended.



BA00390GEN_0117

To set the element temperatures and/or skin temperatures to be trended on all gauges click on the **click here** hyperlink in the description. This will display the following screen:



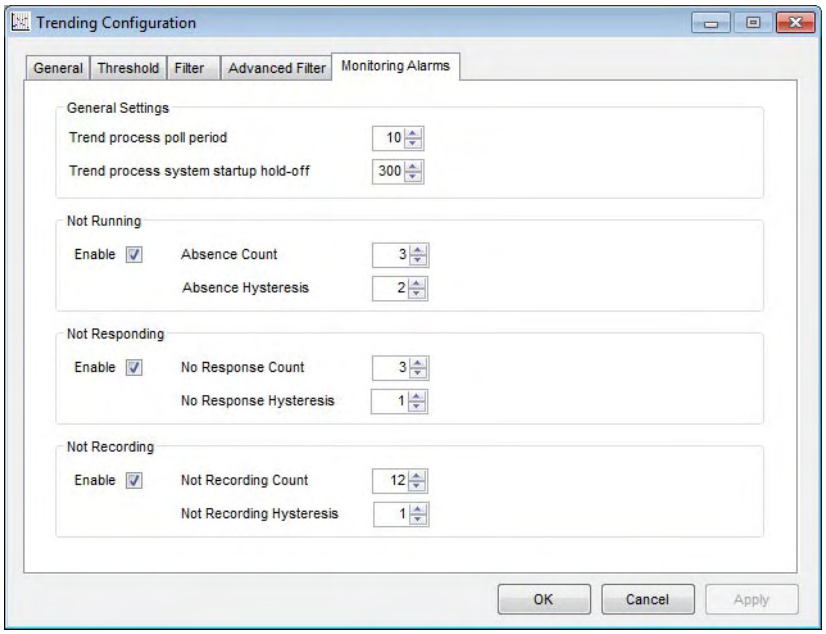
BA00390GEN_0118

Highlight the element temperatures and skin temperatures to be trended and click the **OK** button. Note that this will overwrite the existing selected element temperatures and skin temperatures for all gauges.
To set the element temperatures and skin temperatures to be trended for an individual tank, double-click the tank in the tanks list. If the tank has multiple gauges, double-click the gauge for which the element temperature and skin temperatures are to be trended. If the element temperatures can be trended for a gauge, the entry **Element Temperatures** will appear under the gauge. Similarly if the skin temperatures can be trended for a gauge, the entry

Skin Temperatures will appear under the gauge. Select either **Element Temperatures** or **Skin Temperatures** and the list on the right hand side of the screen will be populated with the element temperatures or skin temperatures respectively. The temperatures to be trended will be highlighted. To modify the temperatures to be trended, highlight the temperatures to be trended.

16.5 Monitoring Alarms

The Monitoring Alarms tab of the trending configuration screen is used to configure and Enable/Disable the various trending alarms.



BA00390GEN_0119

General Settings

- **Trend process poll period** - The frequency, in seconds, that the trend service is polled to check the status of the alarm conditions.
- **Trend process system startup hold-off** - The delay, in seconds, after the system starts to allow the Trend service to stabilize. No alarms are raised during this time.

Not Running

If the Trending Service is not running no trend data will be generated. If enabled a "Trending Service not running" alarm will be raised in the Alarm Event Viewer. The following items are configurable:

- **Enable** - If this option is checked an alarm will be raised through the events subsystem if the Trending service stops running for the specified time (Poll period × Absence Count). If this option is not checked none of the alarms will be enabled and it will not be possible to configure any "count" or "hysteresis" values.
- **Absence Count** – Use this option to set the number of successive polls that must not detect that the trending service is running before an alarm is raised.
- **Absence Hysteresis** - Use this option to set the number of successive polls that must detect a running trending service before an alarm is cleared.

Not Responding

If the Trending Service stops responding to requests there will be a loss of "Real Time" trending data, "Historic" trend data may still be generated. If enabled a "Trending Service not responding" alarm will be raised in the Alarm Event Viewer. The following items are configurable:

- **Enable** - If this option is checked an alarm will be raised through the events subsystem if the Trending service stops running for the specified time (Poll period × No Response Count).
- **No Response Count** - Use this option to set the number of successive polls that must not detect a response from the trending service before an alarm is raised.
- **No Response Hysteresis** - Use this option to set the number of successive polls that must detect a response from the trending service before an alarm is cleared.

Not Recording
If the Trending Service stops recording there will be a loss of "Historic" trend data, "Real Time" trending data may still be available. If enabled a "Trending Service not recording" alarm will be raised in the Alarm Event Viewer. The following items are configurable:

- **Enable** - If this option is checked an alarm will be raised through the events subsystem if the Trending service stops recording for the specified time (Poll period × Not Recording Count).
- **Not Recording Count** - Use this option to set the number of successive polls that must not detect the trending service is recording before an alarm is raised.
- **Not Recording Hysteresis** - Use this option to set the number of successive polls that must detect that the trending service is recording before an alarm is cleared.

17 Data Communications Controller

The Data Communications Controller (DCC) sub-system consists of a number of services which are responsible for transmitting tank data to and from the PC.
The DCC sub-system is required for both standalone and client server configurations.
In a standalone environment all DCC services run on the same PC as the Tankvision Professional client modules.
In a client server environment all DCC services run on the PC dedicated as the database server.

The three main services are:
- DCC Host
- DCC Slave
- OPC Server

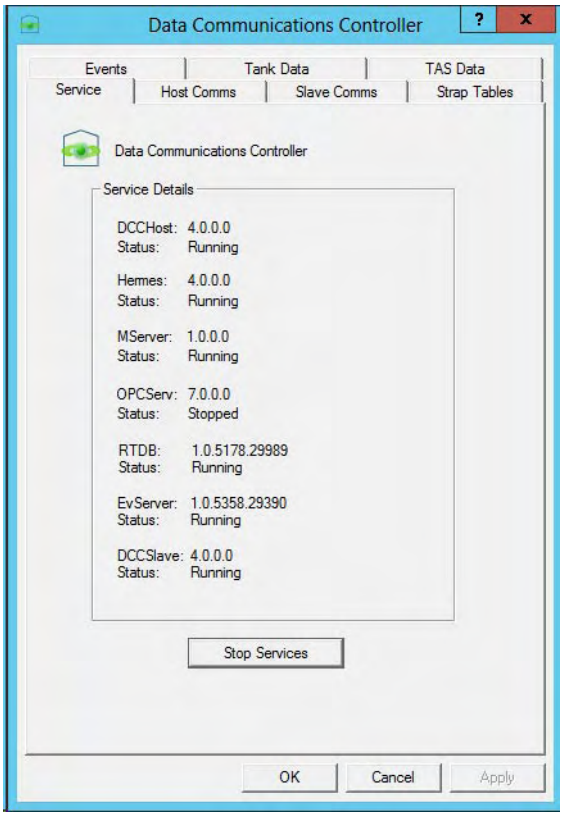
The first two are automatically started when the PC is booted, whilst the OPC Server is started when an OPC client tries to connect to the Tankvision Professional system.
After the DCC has been configured, there is relatively little interaction between it and the users. However some maintenance operations may be required from time to time.

17.1 Stopping and Starting DCC

The DCC runs as a set of services, therefore when the PC is restarted they are automatically started. However there may be times when it is required to stop or restart the services.

To Stop the DCC services, proceed as follows:

1. Select **All Programs → Endress+Hauser → DCC Monitor** from the Windows start menu.
   This will bring up the following screen:



BA00390GEN_0229

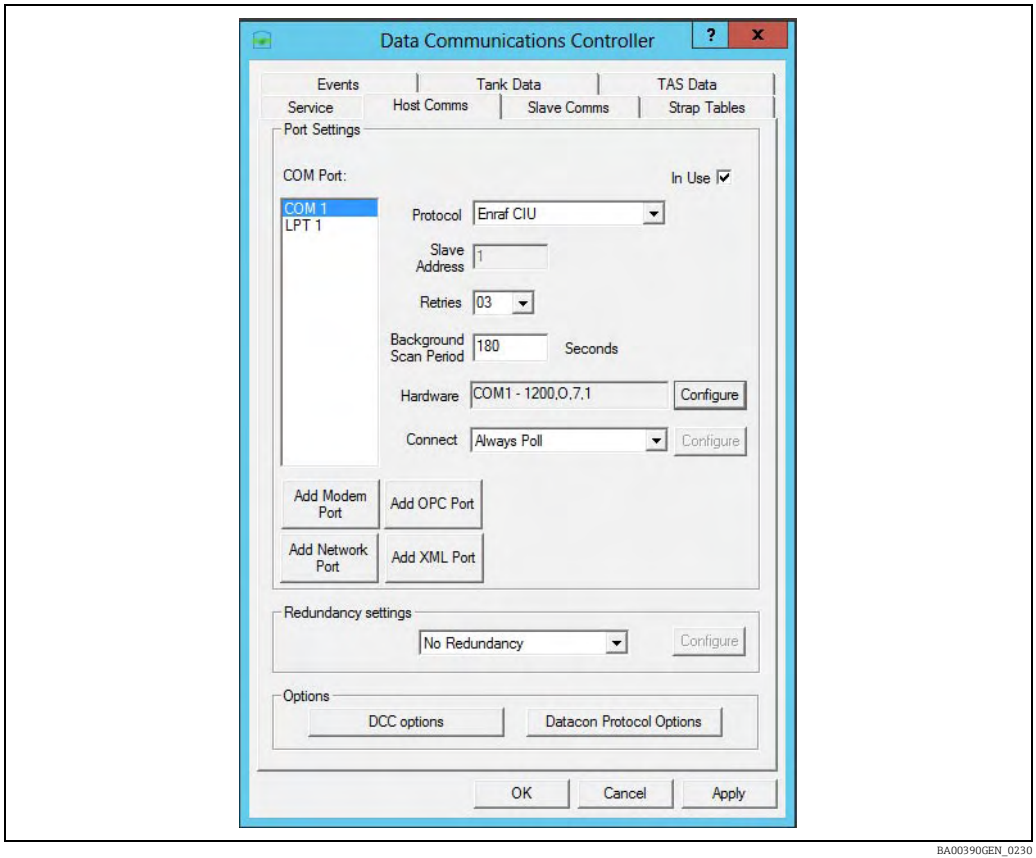
2. To stop the DCC services click on the **Stop Services** button.
   When all Service Details have changed to Stopped the button will change to **Start Services**.
3. To start the DCC Host again simply click the **Start Services** button.
   After a few moments all installed services should change to Running.

17.2 Configuring a Host or Slave port

Host ports are responsible for collecting data from Datacons and gauges, calculating Tank Inventory, and processing command requests from the Tankvision Professional client. Slave ports are responsible for sending data to other computer systems, such as the main DCS for the refinery, using protocols such as Modbus or Enraf.

To configure a port, proceed as follows:

1. Click on the **Host Comms** or **Slave Comms** tab in the DCC Config tool.



BA00390GEN_0230

A list of all physical COM ports (RS232/485/422 etc) will be displayed together with any logical Modem , Network, OPC and XML ports configured (they will have an offset of 40 for modems, 70 for network connections, 110 for OPC connections and 200 for XML ports i.e. COM41, 71, 101, 201 etc).

2. Select the COM port to configure and ensure the **In Use** box is ticked.
   For modem , network, OPC or XML ports click on **Add Modem Port**, **Add Network Port**, **Add OPC Port** or **Add XML Port** to automatically add the port to the list.
3. Select the **Protocol** to be used on the port.

For XML ports this will be fixed as **Generic XML**.

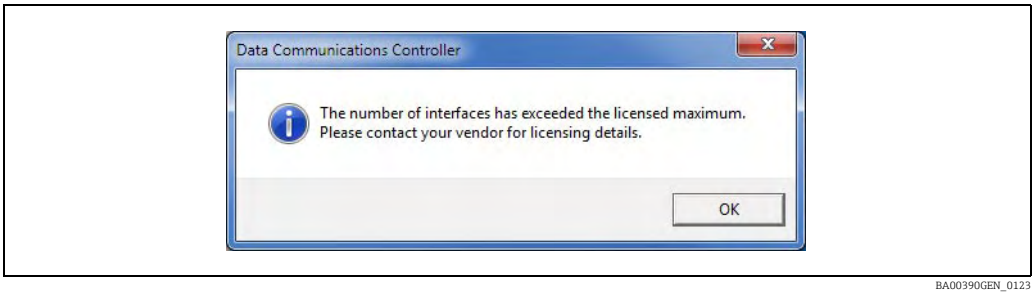
The **Slave Address** only applies to Datacon protocol ports and should be set to the address of that device.
The **Retries** determines the number of consecutive failed polls before a communications failed alarm is generated for host ports.
The **Background Scan Period** determines the update times for certain gauge parameters, such as Density, Observed Temperature, Pressures, Vapour Temperature, Multi-Element Temperatures and Water Level. It is not used for slave ports.

For host ports the **Connect** section determines when to connect to the COM port or Modem and poll the gauges, usually this will be **Always** for direct serial ports and **Scheduled** for modem ports.
The **Options** section allows the operation of DCC Host to be modified as required. Current options supported include:

- **Manual Levels set Programmable Alarms** - by default a manual value will not trigger a programmable alarm, ticking this option will reverse this functionality.
- **Servo/Stow set Programmable Alarms** - by default when a gauge is moving due to a **Stow/Unstow** or servo command then programmable level alarms will be suppressed, ticking this option will reverse this functionality so that the current position of the sensing head will be used to trigger alarms.

4. For host ports, select the **Redundancy** option to that required, usually this will be left as **No Redundancy**.
5. Click on the **Configure** button next to the **Hardware** field to configure the communication parameters for the port.

A warning message may be displayed if a new Host port is added by selecting the **In Use** box and the number of licensed host interfaces has been exceeded:



BA00390GEN_0123

6. Adjust the parameters according to the explanation below.
7. Save the settings by clicking **OK**.

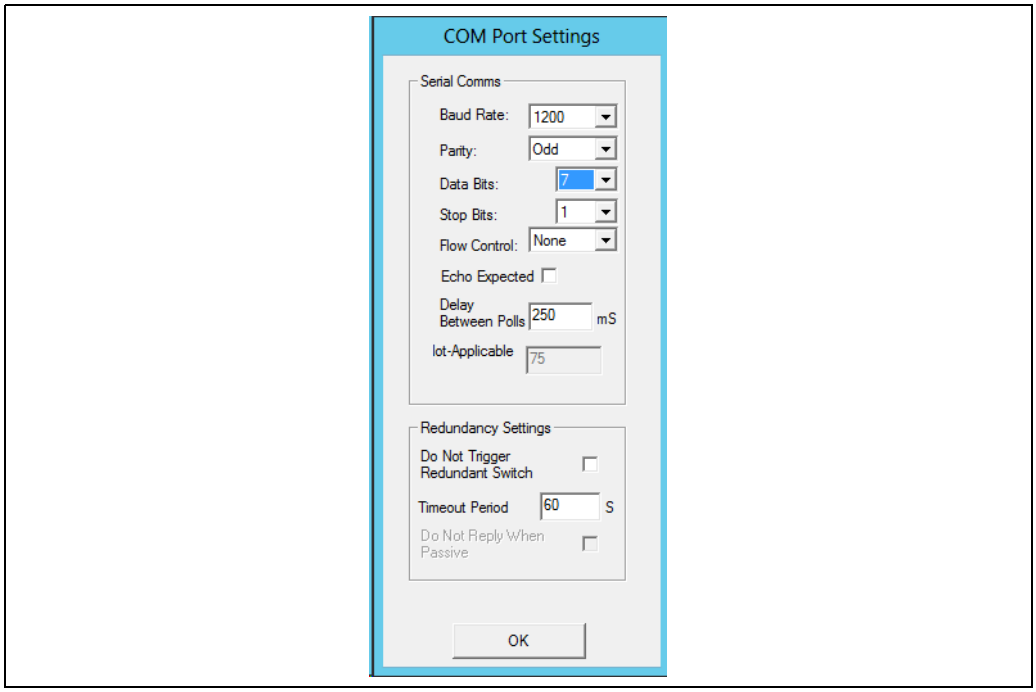
17.3 Communication Parameter Configuration

Each Host or Slave port requires the Hardware configuring for the communication parameters. These parameters differ depending on the hardware, i.e. Physical COM ports, modems, Network connections, OPC or XML ports.

1. Click on the **Configure** button next to the **Hardware** field to configure the communication parameters for the port.

17.3.1 Serial ports

Serial ports require the **Baud rate**, **Parity**, **Data Bits** and **Stop Bits** configuring. **Flow Control** should always be set to **None**, except for SAAB protocol ports where it should be set to **RTS**.

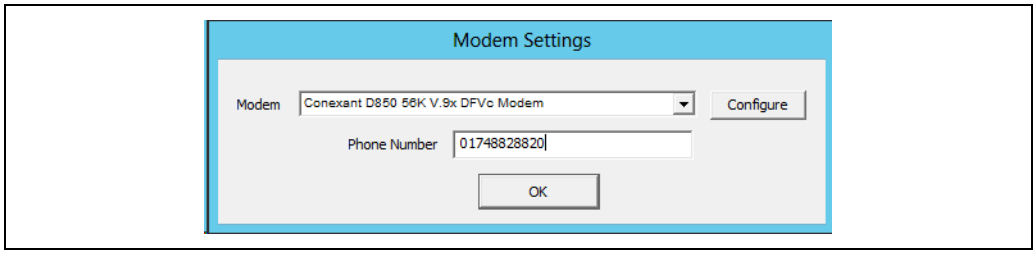


BA00390GEN_0231

If the serial communications hardware produces an echo of sent characters (i.e. some RS485 or 20mA current loop devices) then tick the **Echo Expected** field to tell the driver to handle the echoed characters.

17.3.2 Modem ports

Modem ports require the **Modem** and **Phone Number** configuring.

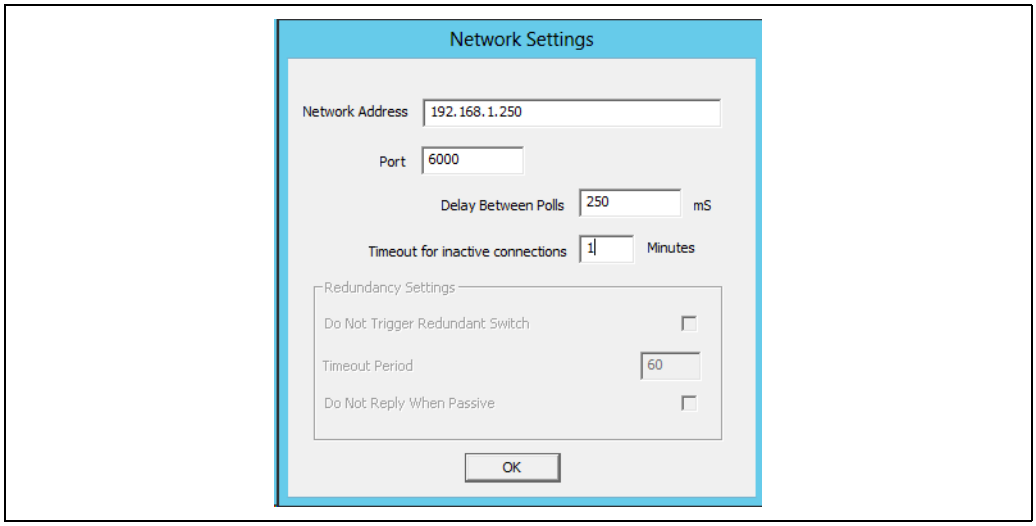


BA00390GEN_0232

The Modem should be selected from those installed in the operating system.

17.3.3 Network ports

Network ports require the **Network Address**, **IP Port** and the **Delay Between Polls** configuring.

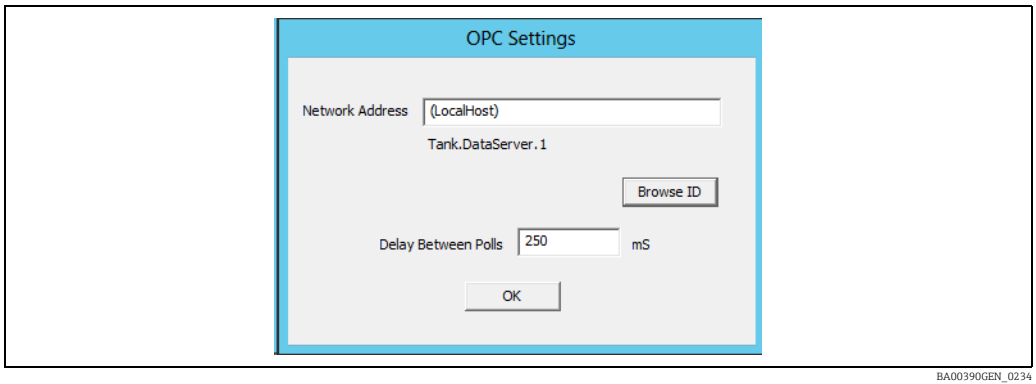


BA00390GEN_0233

The **Network Address** is the address of the remote computer to connect to, and may be entered as a TCP/IP address or the PC name. The IP **Port** should be entered for the interface running on the remote system.
The **Delay Between Polls** is only required for host ports and should generally not be set below 100 ms.
For slave ports the **Timeout for inactive connections** setting is used to disconnect the remote system if no requests have occurred for that length of time. Do not set the value too low as it could affect communications. It should normally be set to 1 minute.
The **Redundancy Settings** are only active in a Redundant system. The **Do Not Trigger Redundant Switch** and **Timeout Period** are only available for Host ports and the D**o Not Reply When Passive** is only available for Slave ports.
Tick **Do Not Trigger Redundant Switch** to disable switchover for network ports.
Set the **Timeout Period** for the number of seconds to wait before triggering a switch over if no reply is received to polls from the Host port.
Tick **Do Not Reply When Passive** to prevent slave ports for the non active server in a redundant pair from replying to poll requests.

17.3.4 OPC ports

Require the **Network Address** of the host, the **OPC Server** and the **Delay Between Polls** configuring.



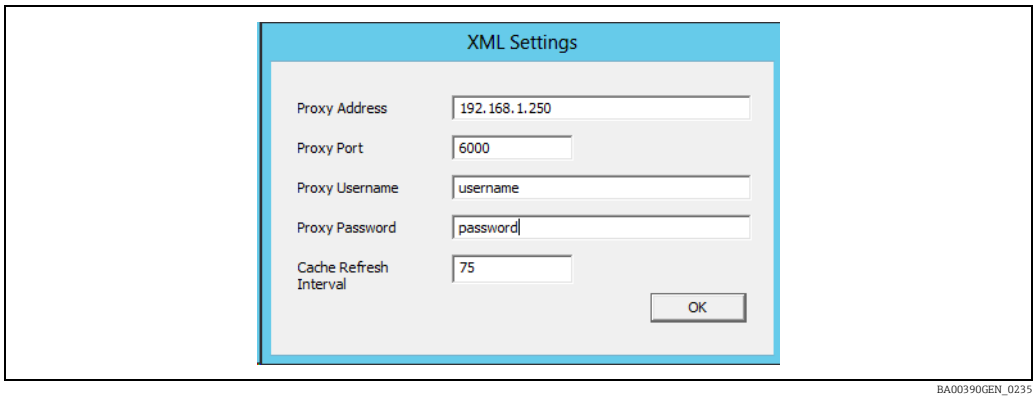
BA00390GEN_0234

The **Network Address** may be either a TCP/IP address or the PC name.

The OPC server is selected by clicking the **Browse ID** button to get a list of all OPC servers on the specified **Network Address** and then selecting the OPC server required.
The **Delay Between Polls** should generally not be set below 100 ms.

17.3.5 XML ports

XML Ports require the **Proxy Address** and **Proxy Port** number of the proxy server configuring along with the **Proxy Username** and **Proxy Password** used to connect to the server. The **Cache Refresh Interval** can also be set but it is recommended to leave this at the default value of 75.



BA00390GEN_0235

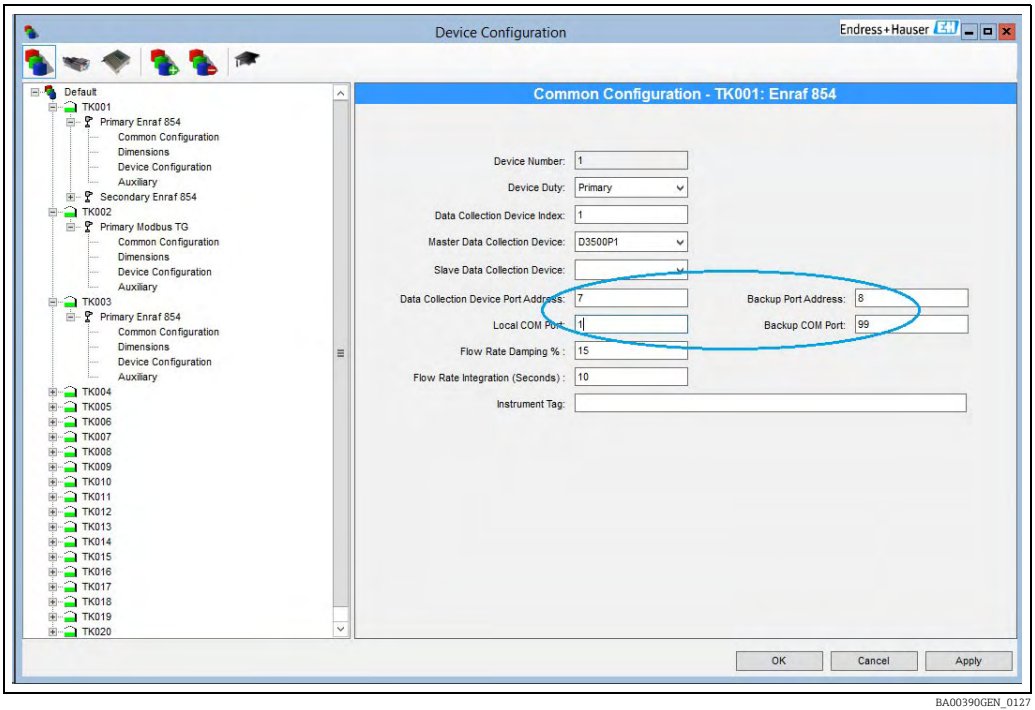
17.4 Redundancy

The DCC Host service supports redundant communications to gauges using a pair of communication ports (Physical COM ports, modems or Network connections).

Any ports that are to be used as part of a redundant communications system should then have their Redundancy Settings field set to either of the following:

- **Switch By Interface** - where gauges will only switch to the Backup COM port if ALL gauges have failed on that interface.
- **Switch By Gauge** - where gauges will switch individually.

After the interfaces have been configured, the gauges may be configured with redundant operation. To do this, select the gauge in the **Device Configuration** screen in Tankvision Professional, then set the **Local COM Port** field to the desired primary interface port and the **Backup COM Port** field to the backup interface port.



BA00390GEN_0127

17.5 Configuring scheduled connections

Host ports may be configured to connect at scheduled intervals, rather than always be connected. Scheduled connections are normally used on Modem ports, where the host port will connect to the remote site, poll for all the data and then automatically disconnect.

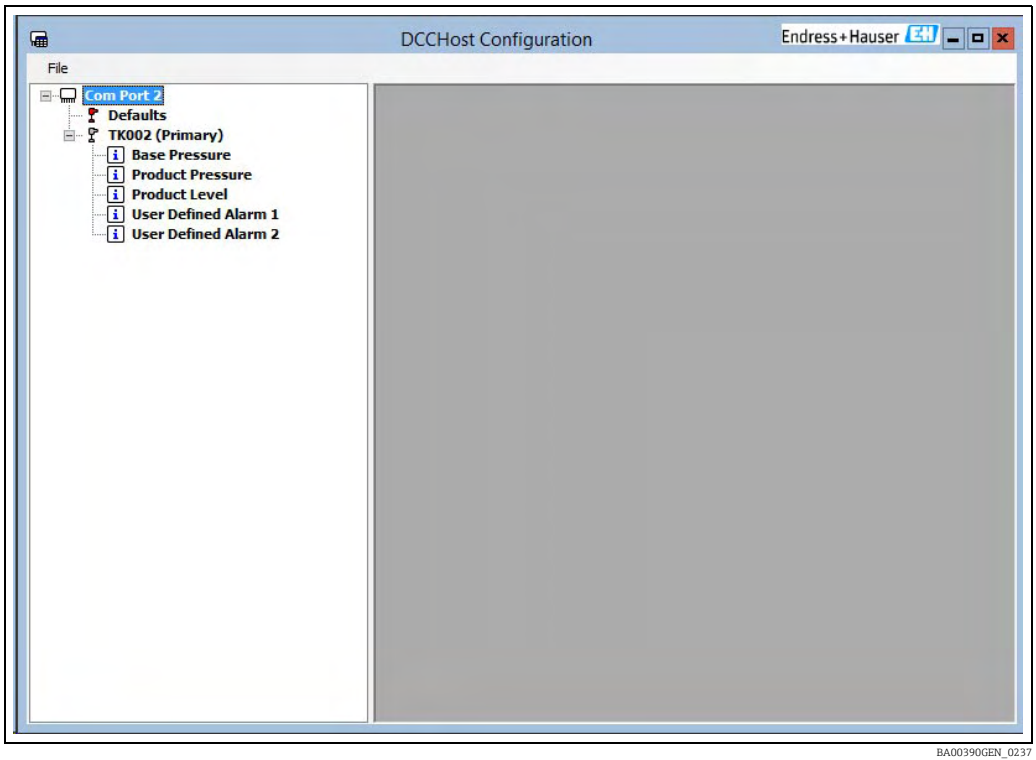
A host port may be set to one of the following connection types:
- **Always** - Interface will always try to be connected and polling the gauges.
- **Manual** - Interface will only connect and poll gauges if manually commanded by User.
- **Scheduled by Hour** - Interface will connect on the hours selected by the user.
- **Scheduled by Interval** - Interface will connect periodically.

For scheduled connections the times to connect must be configured by clicking on the **Configure** button next to the **Connect** field.

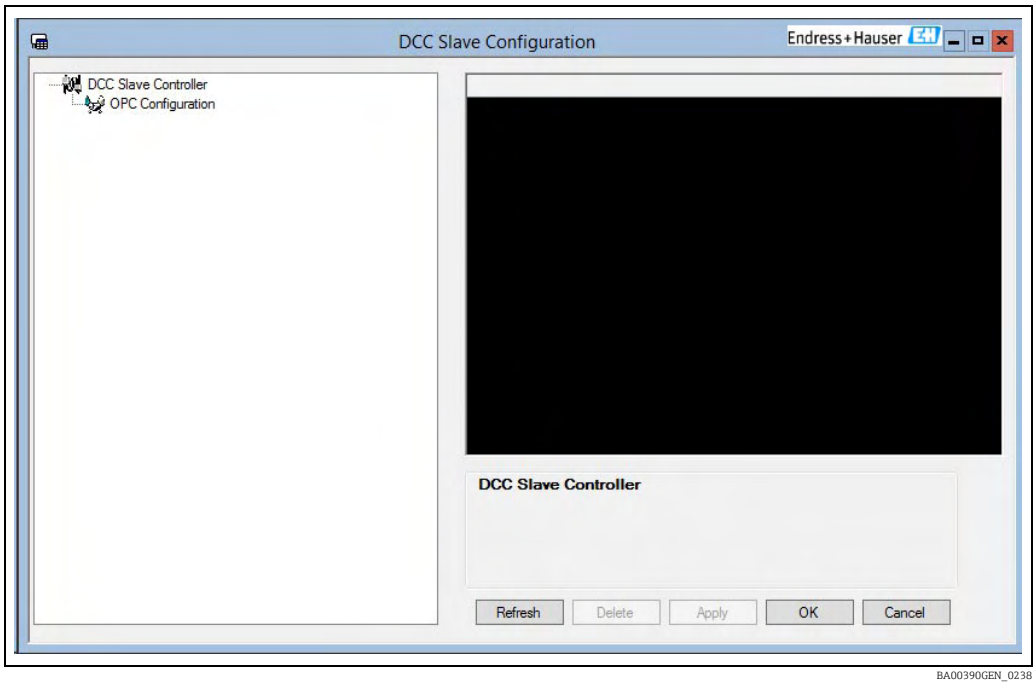
17.6 Configuring protocols

Most of the Slave protocols (Modbus , Enraf etc) and some Host protocols (ModbusTG) require extra configuration that is specific to the protocol.
To configure any protocol specific data, proceed as follows:

1. Select either the **DCCHost Configuration** or the **DCC Slave Configuration** item from the **Configuration** menu.



BA00390GEN_0237



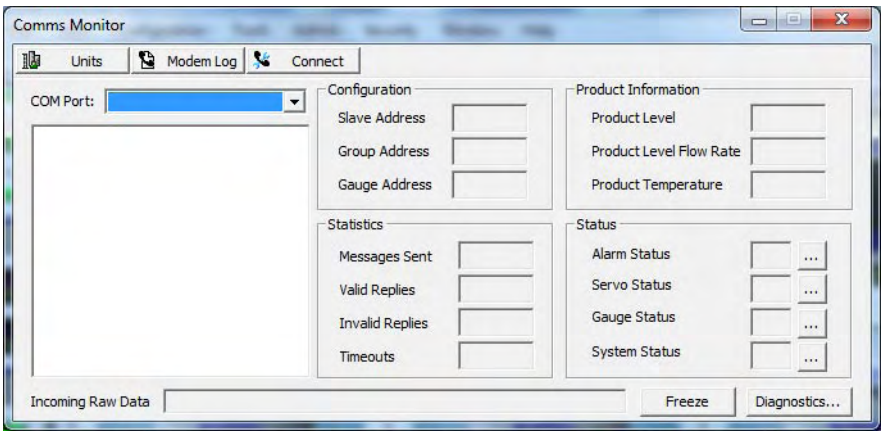
BA00390GEN_0238

Refer to the appropriate DCC configuration manual for details on configuring the protocol data.

17.7 Communications Monitor

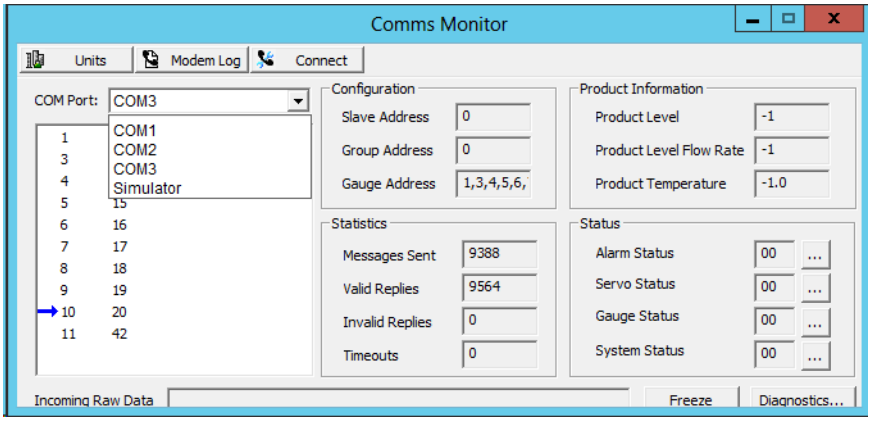
To view the DCC Host Comms Monitor, proceed as follows:

1. Select **All Programs → Endress+Hauser → DCC Monitor** from the Windows start menu.
   This will bring up the following screen:



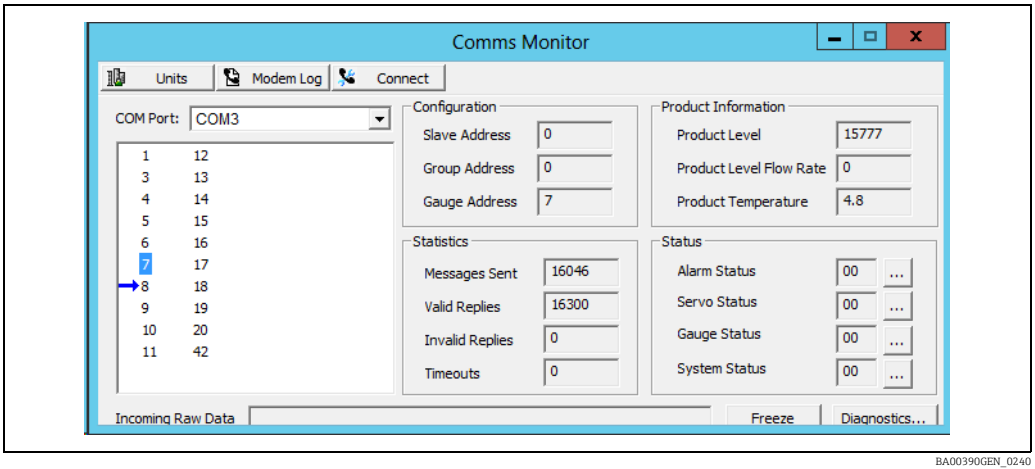
BA00390GEN_0130

The DC Host module allows the user to view the data communications that occurs between the PC and any connected devices such as Datacons or directly connected gauges.
From the drop down list select the COM port you chose for communication, e.g. Com 3. A list of gauges being polled on that COM port will be displayed in the box below.



BA00390GEN_0239

The communications statistics are displayed in the **Statistics** section. These are useful for indicating communications problems.
To view the data for a gauge, click on that item in the list.



BA00390GEN_0240

The parameters returned from the gauge, such as Level, Temperature etc. will be displayed on the left hand side of the screen.

18 Device Command Scheduler

The Device Command Scheduler is a Windows service that can be configured to send device commands at a specific time of day on a recurring basis.
The Device Commands can be sent to a Single Tank, all Tanks, or a group of tanks generally specified by Gauge Type or Tank Group.
Care should be exercised when scheduling device commands, particularly those that affect a gauges primary measuring capability, as the tank may be involved in some sort of critical operation such as receiving product from a ship or similar.

18.1 Launching the Device Command Scheduler

The windows service part of the scheduler, which sends the commands at the scheduled time, automatically starts up when Windows boots. The service can be monitored, as with all Windows services via the control panel, or using the application Service Manager, which is present as an icon in the system tray.

18.2 Configuring Scheduled Commands

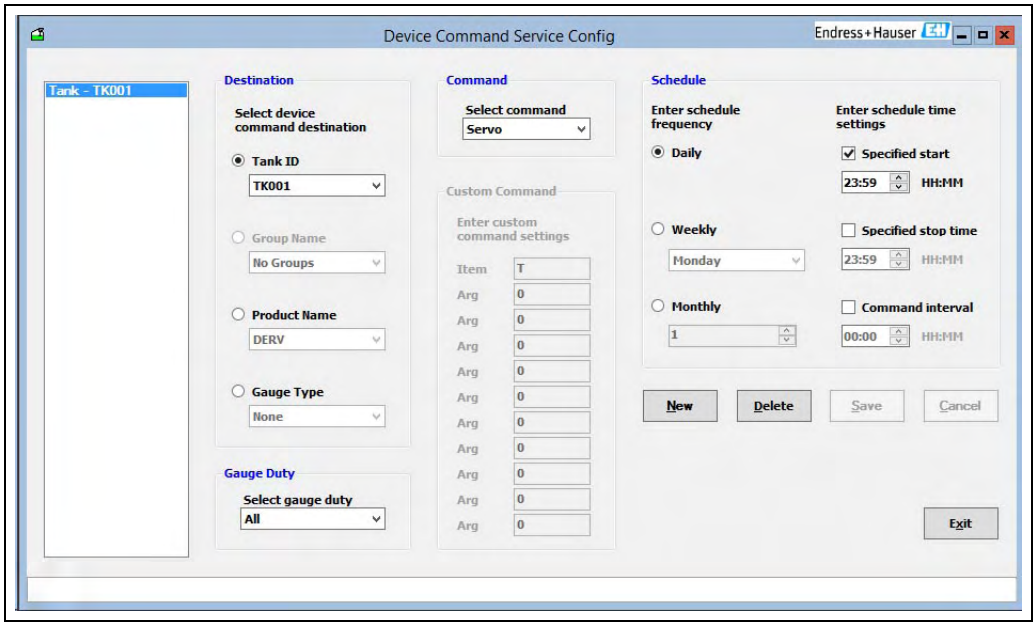
The schedule by which the commands are executed is configured from the Command Scheduler GUI.
To configure scheduled commands, proceed as follows:

1. Right click on the Service Manager icon in the Windows system tray:

BA00390GEN_0133

2. Select **Device Command Service → Device Command Config**.

This will bring up the configuration application, which you can use to view and edit the scheduled commands.



BA00390GEN_0241

3. Select a scheduled entry from the list on the left of the window or create a new entry by clicking the **New** button.

You can also delete an entry from the database by selecting it from the list and clicking the **Delete** button.

4. Adjust the parameters according to the explanations below (→ 147).
5. Click **Save** to commit the changes to the database, or **Cancel** to discard them.

Scheduled entries are listed on the left of the window, selecting one of these entries will display the details of the entry in the controls on the right.

18.2.1 Scheduled Commands Parameters

Destination

Denotes the way the gauges can be selected for scheduling, either by a specific Tank ID, or collectively by Product Group Name, or by Product or by Gauge Type.

Gauge Duty

Where tanks are fitted with more than one gauge, you can specify which gauge on the tank is to perform the command.

Command

Sets the command to be executed by the gauge or gauges.

Custom Command

Enables you to configure a custom command.

Schedule

A scheduled command can be configured to send a series of commands between two specified times and a specified frequency. For example to send a command every hour between the hours of 01:00 and 04:00 you would set the start time as 01:00, the stop time 04:00 and the interval as 01:00.

When you make changes to the schedule's detail, click **Save** to commit the changes to the database, or **Cancel** to discard them.
Clicking **New** will clear the currently selected entry's details, allowing you configure a new one. Clicking **Save** commits the entry to the database.
Delete will remove the currently selected entry from the database.

19 Report Scheduler

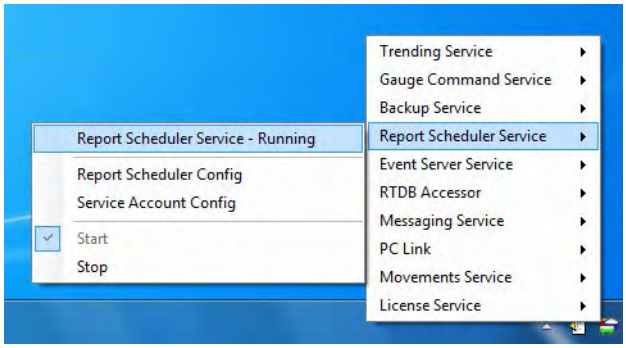
The report scheduler facilitates the printing and exporting of reports and report documents in various formats at defined moments in time.

The report scheduler consists of 2 independent components:
- A background Report Scheduler Windows Service which executes the reports at the appropriate time(s).
- The Report Scheduler Configuration tool, used for configuring the reports.

The report configuration data is held in the file ReportSchedulerConfig.xml located in the same directory as the ReportSchedulerService.exe service executable.
This file is used by both of the above components. The configuration tool is used to edit the contents of the file for the desired user configuration. The service then loads this file to determine its actions.

19.1 Report Scheduler Service

The Report Scheduler service runs automatically as a Windows service, executing all scheduled reports at the appropriate times. It will run in the background and has no user interface.
The service will start automatically whenever the computer is rebooted and should therefore always be running.
The status of the service can be viewed by right clicking on the Tank Gauging Service Manager icon in the system tray and selecting the Report Scheduler Service item from the pop-up menu.



BA00390GEN_0135

The service may also be started or stopped using this menu.

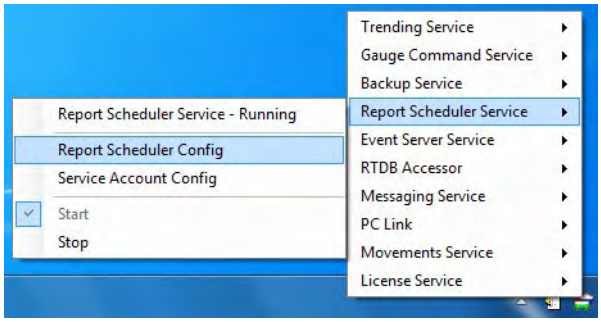
19.2 Spooling of Scheduled Reports

Reports that are printed by the service are spooled to a directory where they are stored for a period of seven days before being deleted. This enables an administrator to obtain any time critical reports that have failed to print for any reason.
The location of the spool directory can be specified by the user by using the configuration tool to change the **Spool Directory** settings of the Area component.
Spooling does not occur if the reports are printed directly from the configuration tool.

19.3 Report Scheduler Configuration

The Report Scheduler Configuration tool allows the user to configure the reports and report documents for a system.
To configure the report scheduler, proceed as follows:

1. Right click on the **Tank Gauging Service Manager** icon in the system tray.
2. Select the Report Scheduler Config item from the Report Scheduler Service menu:



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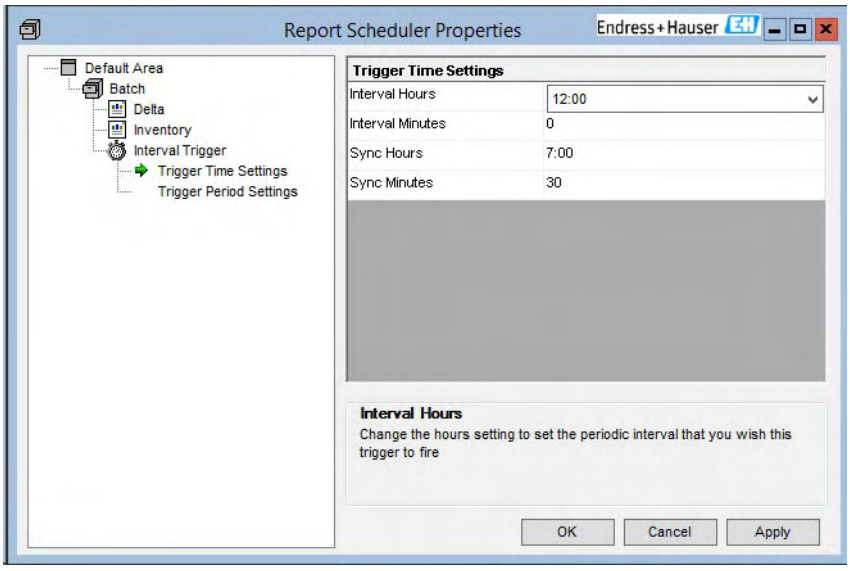
The following window opens:



BA00390GEN_0242

From the tree on the left select the component you are going to edit.
The tree view control on the left hand side of the configuration tool represents the components which exist on the system.

The following types of components can appear in the tree view:
- Areas
- Batches
- Reports
- Report Documents
- Triggers

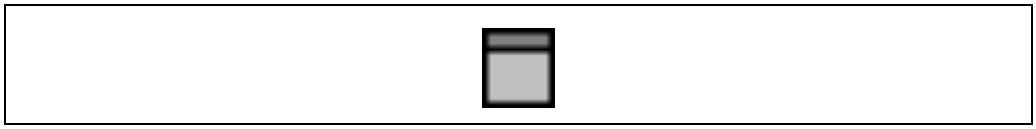
The grid view adjacent to the tree view represents the settings for each of these components. For a description of these types of components refer to the sections below.

3. Enter the required values into the grid view on the right.

4. Click **Apply** to confirm your changes or **Cancel** to discard them.
5. If all the necessary changes have been made, click **OK** to close the window.

Any changes which are made to the report scheduler configuration will only be written to the ReportSchedulerConfig.xml when the user hits **OK** or **Apply**. If the user hits **Cancel** all changes to the configuration will be lost.

19.3.1 Area Component



Icon_Area_Component

The reporting system is represented by the root component of the tree, called an Area.

Renaming an Area component

The Area component can be renamed to reflect the name of the site and/or system. To do so, right click on the Area component and select **Rename**.

The Transaction log

The Area component also defines settings which determine the location of the transaction log. The transaction log stores information about the execution of the reports that the system processes and any consequent abnormal operating conditions. Right click on the Area component and select **Transaction Log** to view the log using Wordpad.

The System Reports directory

Also defined by the Area component is the System Reports directory. This is the directory which contains the predefined reports associated with the tank automation system. Both the Transaction Log directory and the System Report directory are set to sensible defaults upon installation, but can be easily changed if necessary.

19.3.2 Batch Component

Icon_Batch_Component

Report, Report Document and Trigger components are contained within Batches. An Area can contain one or more Batches.
A Batch defines various settings which describe the printing/export behaviour of the Report and Report Document components that it contains.

Adding Batches

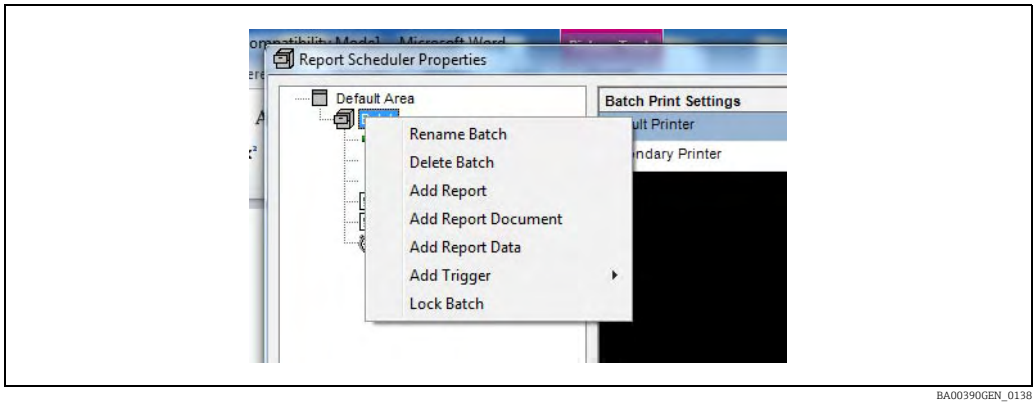
In order to add a Report or Trigger to the system, we must first add a Batch. Right click on the Area node and select **Add Batch** from the menu. This adds a Batch to the Area.

Renaming/deleting Batches

The Batch can be renamed if required by right clicking on the Batch and selecting **Rename Batch** from the menu. A batch can be deleted from the Area in a similar way.

Locking and Unlocking Batches

Batches can be locked to prevent unauthorized users from deleting or modifying them. In order for a user to be able to lock or unlock a batch that user must be granted 'Full' Report Scheduler privileges. Users with 'Modify' privileges will be able to create, delete and maintain unlocked batches, but they won't be able to remove or place a lock on a batch.
In order to lock a batch, right-click on an unlocked batch and choose **Lock Batch** from the context menu, the unlocking process is similar except you choose **Unlock Batch** instead. A locked batch can't be altered - it must be unlocked in order to be amended.



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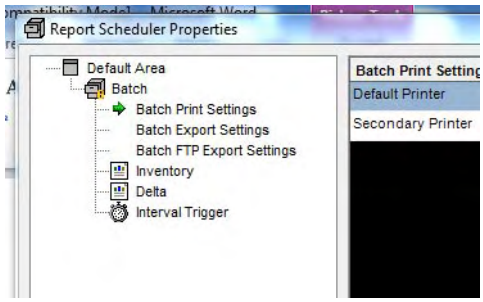
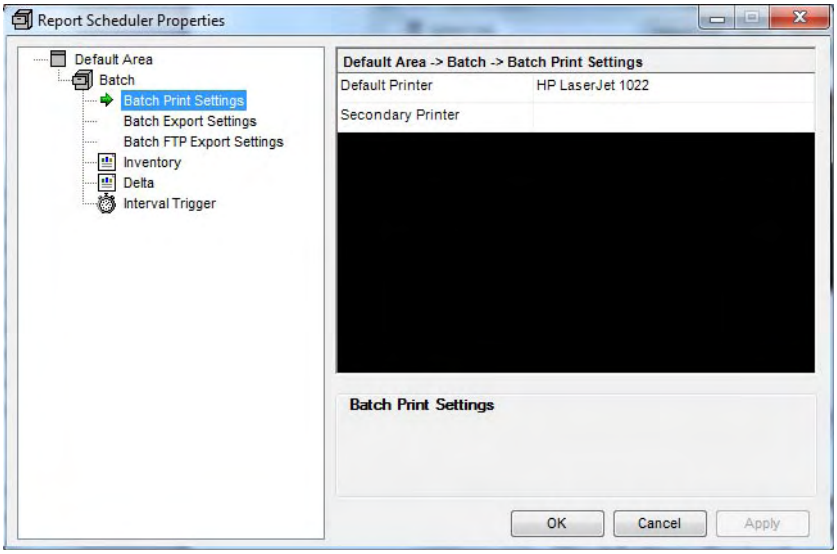
Locked batches can be identified by the lock icon superimposed over the top of the filing cabinet icon.



BA00390GEN_0139

Batch Print Settings

1. Click on **Batch Print Settings** to change the following parameters:



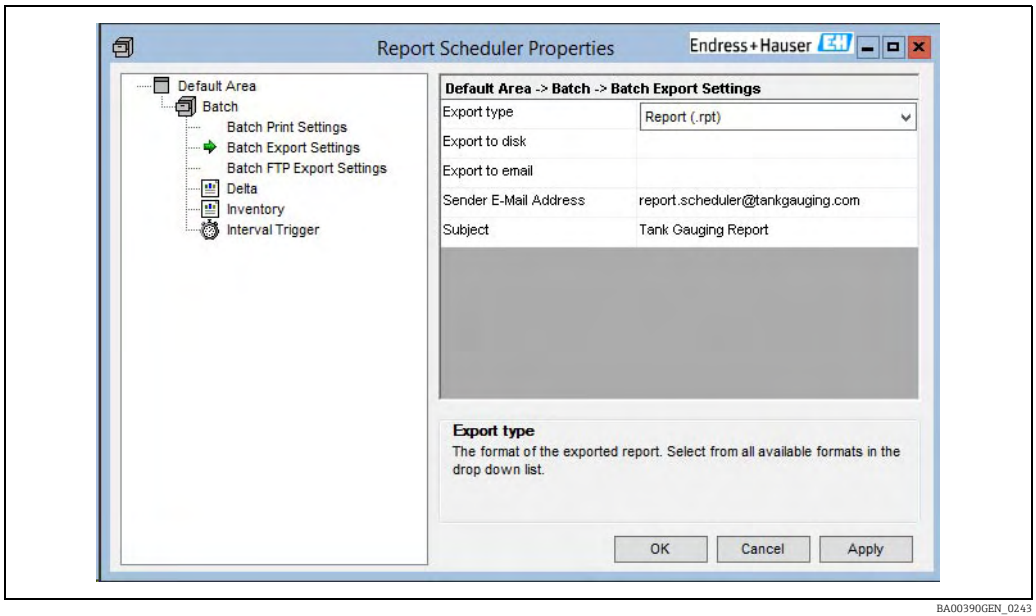
BA00390GEN_0140

- **Default Printer** - The default printer for report printing. Select from all installed printers in the drop down list. The list reflects the users installed printers only.
  [see: **Start → Settings → Printers**]]
- **Secondary Printer** - The secondary printer is used for printing if the default printer is unavailable.

In both cases the printer must be a real printer, not a print to file device as the service does not interact with the console.

Batch Export Settings

1. Click on **Batch Export Settings** to change the following parameters:

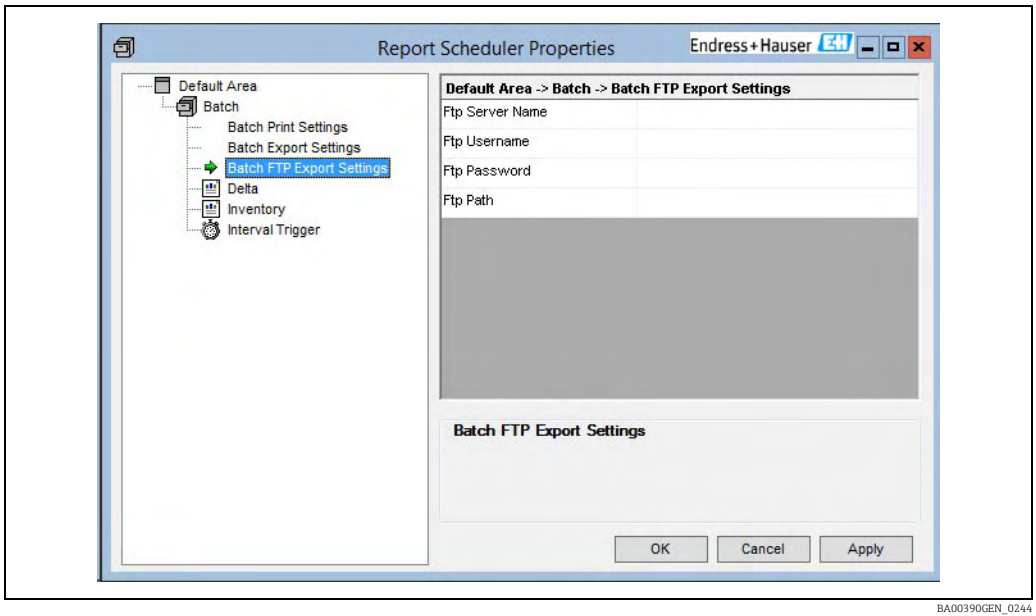


BA00390GEN_0243

- **Export Type** – The format of the exported report. Select from all available formats in the drop down list including .rpt, .xls, .pdf, .rtf and .doc.
- **Export to disk** – Path to folder which will contain the exported report. Blank entry disables disk export.
- **Export to email** – Semicolon separated list of email addresses to which the report will be sent. Blank entry disables email export. (Users require an SMTP mail server to use this feature; the server itself is specified as an Area setting.)
- **Sender E-Mail Address** – The address that will appear in the 'From' field of received E-mails.
- **Subject** – Enter the text that will appear in the 'Subject' field of received E-mails.

Batch FTP Export Settings

1. Click on **Batch FTP Export Settings** to change the following parameters:



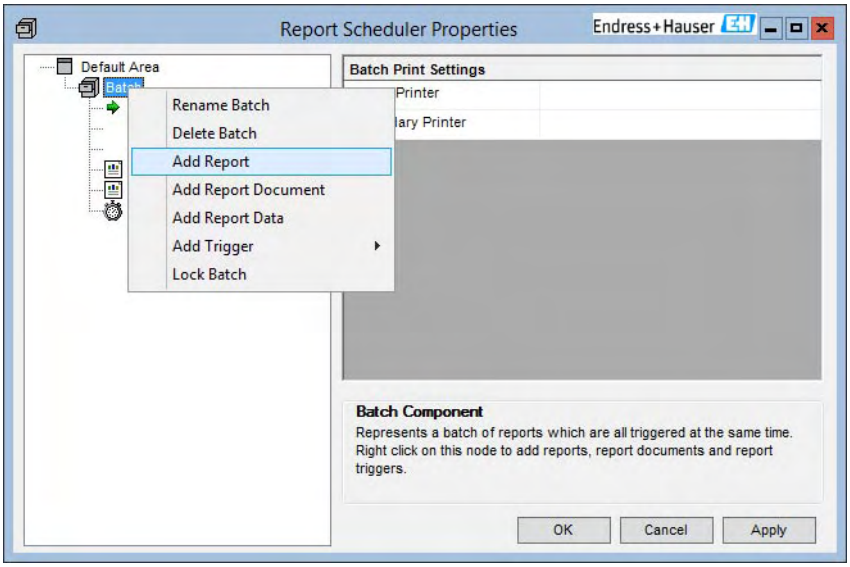
BA00390GEN_0244

- **Ftp Server Name** – The full name used to identify the ftp server. Blank entry disables ftp export.
- **Ftp Username** – Username used to logon to the ftp server.
- **Ftp Password** – Password associated with ftp username.
- **Ftp Path** – The path to the drop directory on the Ftp server.

19.3.3 Report Component

Icon_Report_Comment

A Batch can contain one or more Report components each of which represents a Crystal Reports format report file.
To add a Report to a Batch, right click the Batch, select **Add Report** and select a .rpt file using the 'Open File' dialog box displayed.



BA00390GEN_0245

To remove a Report from a Batch, right click on it and select **Delete Report**.

A Report defines the following settings which describes the Reports individual behaviour independent of it's parent Batch settings:

General Settings

- **Print Enabled**
  Printing enabled for this report.
- **Export Enabled**
  Export enabled for this report.
- **Date Stamp Export**
  If True, add the date to the filename for the exported file.
- **Time Stamp Export**
  If True, add the time to the filename for the exported report.

Database Settings

- **Data Source Name**
  Specify the ODBC data source name.
- **Database Name**
  The name of the database used to generate the report.
- **User ID**
  The user name used to logon to the database. The default is 'sa'.
- **Password**

The password associated with the User ID. The default is blank.

Parameter Settings

This section is auto-generated from the report itself. If the report gives the user the option of specifying parameters they can be entered here. The default values for each field are shown in a combo box if any are specified.

19.3.4 Report Document Component

Icon_Word

Icon_Excel

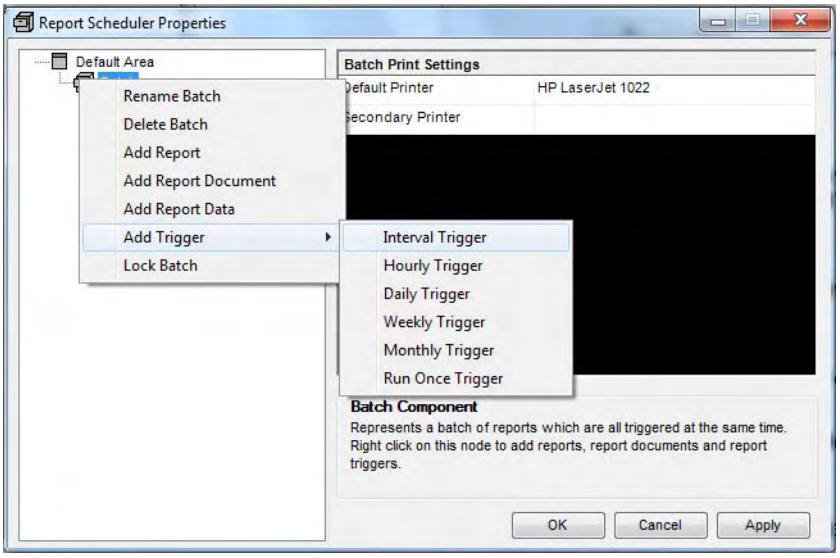
A Batch can contain one or more Report Document components. Each Report Document component represents a Word document or an Excel Workbook which conveys report data. Report and Report Document components can happily co-exist within the same Batch.
To add a Report Document to a Batch, right click on the Batch, select **Add Report Document** and select a .doc or .xls file using the **Open File** dialog box displayed. To remove a Report Document from a Batch, right click on it and select **Delete Report**.

In order to use Report Document components within the Report Scheduler, Microsoft Office 2003 or later must be installed.

19.3.5 Trigger Component

Icon_Trigger

A batch can also contain one or more Triggers. A Trigger is a component which specifies when a Batch will run, and hence when all of its Report modules will run. Right mouse click on the Batch component to see the trigger options as shown below.



BA00390GEN_0144

There are 6 types of Triggers:

1. **Interval Trigger**
   A trigger which is fired every time interval, defined in hours and minutes. A synchronization time may also be defined, from which all interval timings will be based.
2. **Hourly Trigger**
   A trigger which is fired at a specified number of minutes past every hour.
3. **Daily Trigger**
   A trigger which is fired at a specified hour every day.
4. **Weekly Trigger**
   A trigger which is fired on a specified day of the week, at a specified hour.
5. **Monthly Trigger**
   A trigger which is fired on a specified day of the month, at a specified hour.
6. **Run Once Trigger**
   A trigger which is fired once only at a specified time.

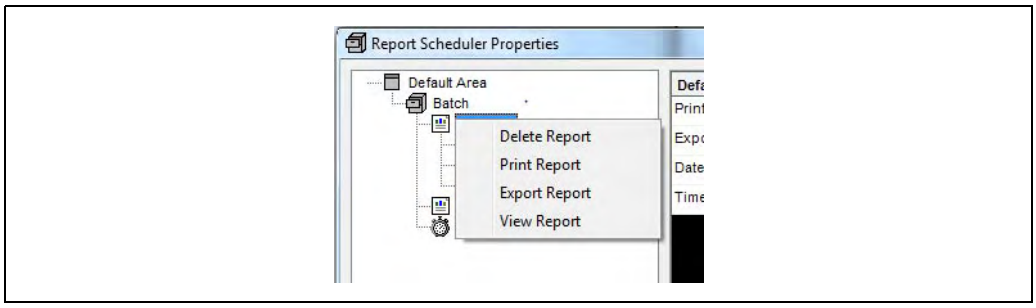
By adding Triggers to Batches it is easy to build up complex scheduling. For example, if it is required that a Batch is run three times a week, add 3 Weekly Triggers to a Batch, specifying a different firing day for each.

To add a Trigger to a Batch, right click on the Batch, select **Add Trigger** and select the trigger type from the submenu.
To remove a Trigger from a Batch, right click on it and select **Delete Trigger**.
You can also specify a period of time over which a trigger will be active on the Trigger Period Settings page.

19.3.6 View, Print and Export Reports

It is possible to print, export or view a Report or Report Document directly from the GUI rather than relying upon Triggers and the service component.

1. Right click on the relevant component and select **Print**, **Export** or **View** from the menu. The configuration is automatically saved should any of these commands be used.



BA00390GEN_0145

Any changes which are made to the report scheduler configuration will only be written to the ReportSchedulerConfig.xml when the user hits **OK** or **Apply**. If the user hits **Cancel** all changes to the configuration will be lost.

20 Messaging

20.1 Message Service

The messaging service is used to queue and distribute messages asynchronously. Messages can be sent to:

- E-mail clients (SMTP mail server required).
- Mobile telephones in the form of SMS messages (GSM modem required).
- Telephones (voice modem required).
- Site Radios (specialist hardware required).

The messaging service configuration is accessed from the application Service Manager icon in the Windows system tray.

BA00390GEN_0133

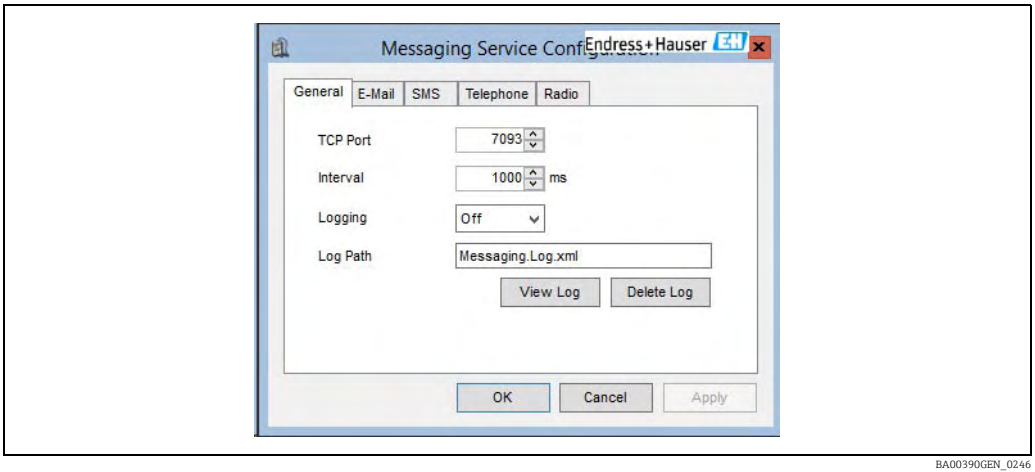
1. Click right on this icon.
2. Select **Messaging Service → Messaging Service Config**.

This will bring up the configuration application, which you can use to view and edit the messaging configuration.
This application contains the following pages:

- General
- E-Mail
- SMS (if the SMS Messaging option has been licensed)
- Telephone (if the Telephone Messaging option has been licensed)
- Radio (if the Radio Messaging option has been licensed)

20.1.1 General

The general page allows configuration of settings relating to the messaging service as a whole:



BA00390GEN_0246

TCP Port

The TCP port which is used to accept messages from client applications. This must match the TCP port configured in the messaging client configuration file.

Interval

The interval in milliseconds at which the service will check for incoming messages.

Logging

The level of logging required. This is used for diagnostic purposes if there are problems with the messaging service. Generally it should be set to **Off**.

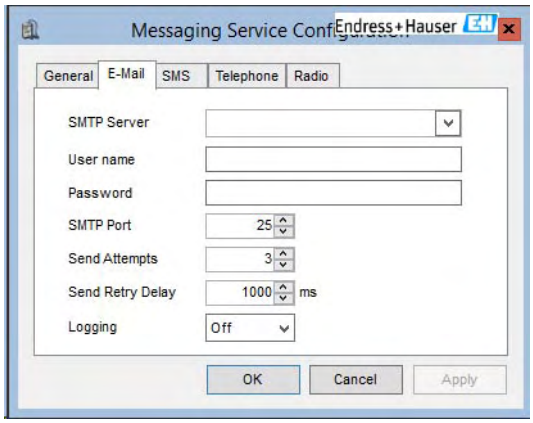
Log Path

The path to the log file.

The current log file can be viewed by clicking on the **View Log** button, or deleted by clicking on the **Delete Log** button.

20.1.2 E-Mail Configuration

The E-Mail page allows configuration of settings relating to sending e-mails:



BA00390GEN_0247

SMTP Server

The SMTP server to be used to send e-mails from the messaging service. (**User name** and **Password** valid for the domain are required for external emails.)

SMTP Port

The port used by the messaging service to connect to the SMTP server.

Send Attempts

The maximum number of times a message should be sent to the SMTP server if it fails for any reason on a preceding attempt.

Send Retry Delay

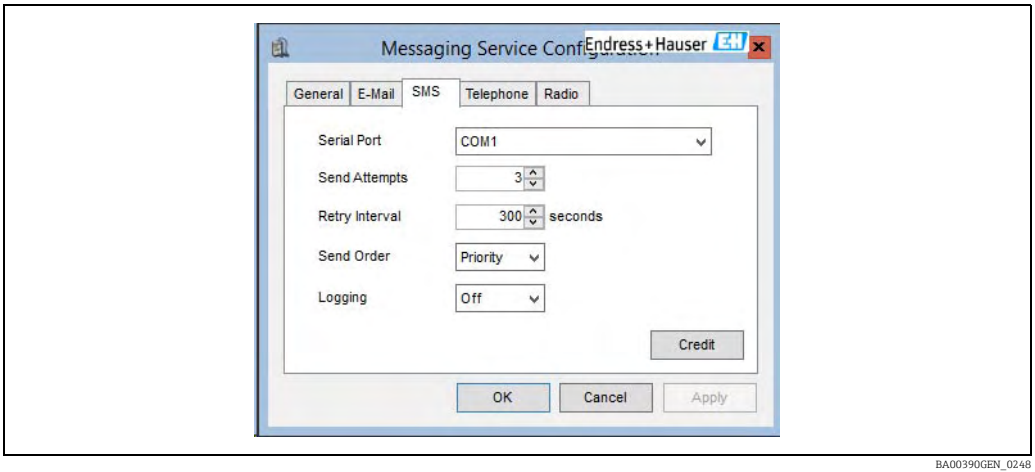
The interval to wait before attempting to resend a message to the SMTP server following a failure.

Logging

The level of logging required. This is used for diagnostic purposes if there are problems with the e-mail part of the messaging service. Generally it should be set to **Off**.

20.1.3 SMS Configuration

The SMS page allows configuration of settings relating to sending SMS messages. It will only be present if the **SMS Messaging** option has been licensed:



BA00390GEN_0248

Serial Port

The serial port to which the GSM modem to be used to send SMS messages is attached.

Send Attempts

The maximum number of times to attempt to send a message via SMS.

Retry Interval

The interval to wait before attempting to resend a message following a failure.

Send Order

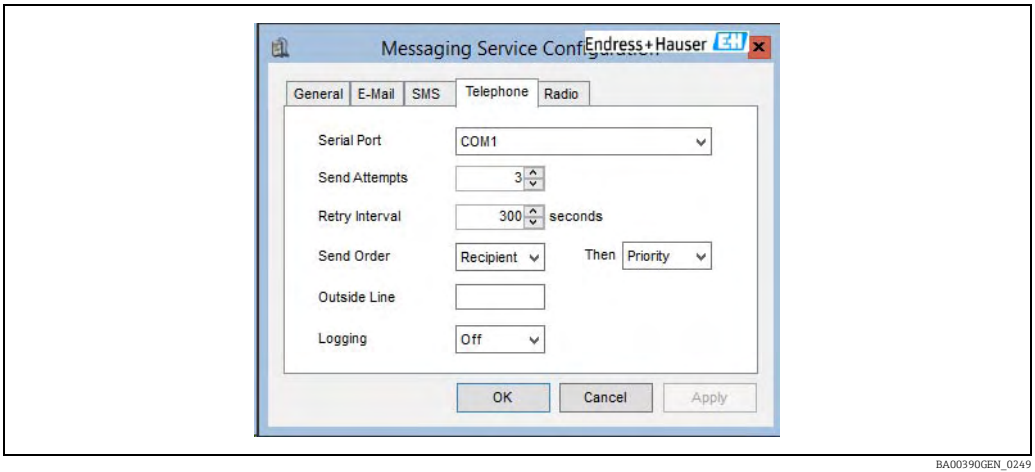
Indicates whether messages are to be sent in priority order, or in the order in which they were received from clients.

Logging

The level of logging required. This is used for diagnostic purposes if there are problems with the SMS part of the messaging service. Generally it should be set to **Off**.

20.1.4 Telephone Configuration

The Telephone page allows configuration of settings relating to sending voice messages to a telephone. It will be present only if the **Telephone Messaging** option has been licensed.



BA00390GEN_0249

Serial Port

The serial port to which the modem used to send voice messages is attached. The modem must be a voice modem. To check if the modem is compatible with the messaging service, open HyperTerminal and connect to the modem as a serial device. Then type AT+FCLASS=?. The response should be in the form 0,1,8,80 (followed by OK). This list of supported classes must contain 8 for the modem to be used to transmit voice messages.

Send Attempts

The maximum number of times to attempt to transmit the message to a telephone.

Retry Interval

The interval to wait before attempting to resend a message after a failure.

Send Order/Then

The order in which messages are to be transmitted.

Outside Line

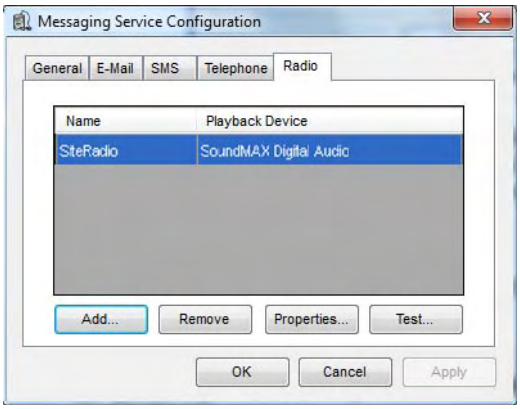
Some locations require a number to be dialed to access an outside line. If this is the case, enter the number in this field.

Logging

The level of logging required. This is used for diagnostic purposes if there are problems with the telephone part of the messaging service. Generally it should be set to **Off**.

20.1.5 Radio Configuration

The Radio page allows configuration of settings relating to broadcasting messages over a radio network. It will be present only if the **Radio Messaging** option has been licensed.



BA00390GEN_0150

Adding a radio network

To add a new radio network click the **Add** button. The settings screen is displayed (→ 167).

Removing a radio network

To delete an existing radio network select it from the list and the click the **Remove** button.

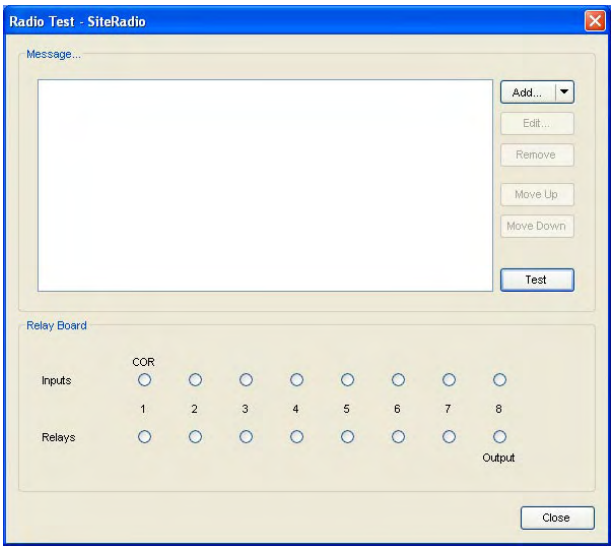
Editing a radio network

To edit an existing radio network select it from the list and then click the **Properties** button. The settings screen is displayed (→ 167).

Testing a radio network

To broadcast a test message, proceed as follows:

1. Click the **Test** button.
   The following screen will be displayed:



BA00390GEN_0151

2. Configure the test message to be broadcast (for more details → 171).

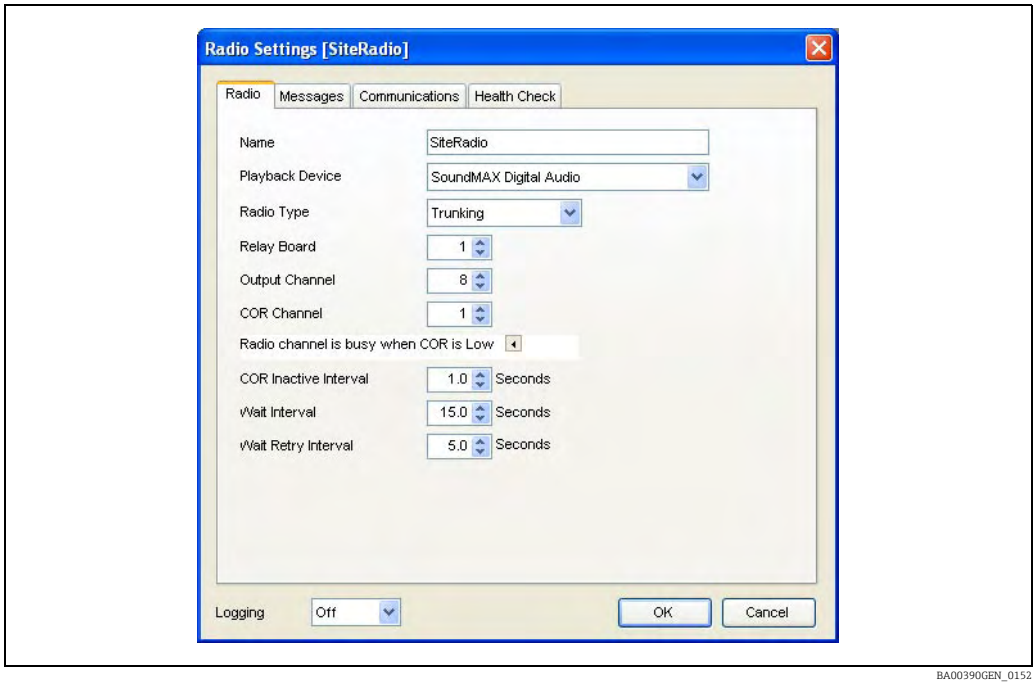
3. Click the **Test** button.

If the radio network has been configured correctly the message should be broadcast over the site radio. The status of the relay board inputs and outputs should be indicated correctly during the broadcast. The status of the inputs and outputs can be used to determine the configuration issues if the message fails to broadcast.

20.1.6 Radio Settings

Radio Settings - Radio

The **Radio** page allows the basic configuration details for a site radio to be set up.

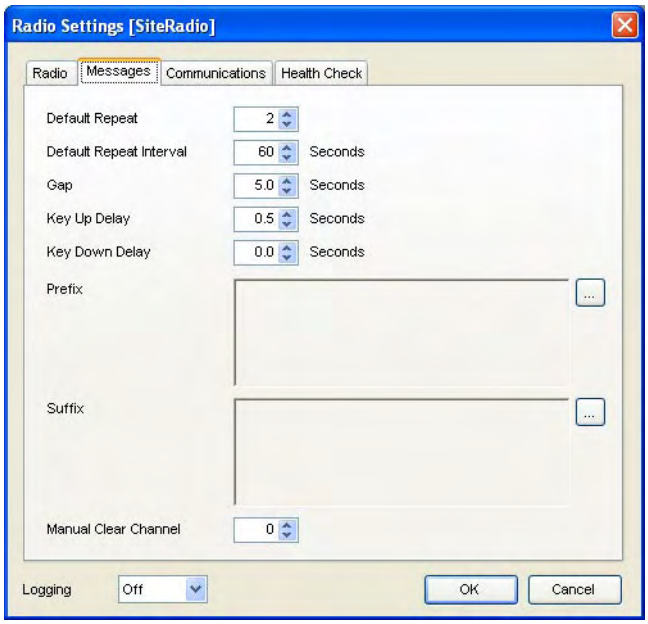


BA00390GEN_0152

- **Name** – The name used to identify this radio configuration.
- **Playback Device** – The playback device on the PC which will be used to generated the audio to be broadcast over the radio. It is strongly recommended that this is not the default playback device for the PC, since that might lead to other audio output from the PC being inadvertently broadcast over the radio.
- **Radio Type** – There are three possible types of radio configuration – simple, standard or trunking. The difference lies in the way that the COR (Carrier On Relay) input is handled. For simple radio systems the COR input is ignored and the message is broadcast immediately, ignoring any other transmissions in progress.
- **Relay Board** – The index of the ArcCom relay board which is connected to the ROB (Radio Output Board) and optionally an alarm panel and/or manual reset switch.
- **Output Channel** – The index of the relay on the ArcCom relay board which is connected to the PTT terminal of the radio output board.
- **COR Channel** – Not applicable for simple radios. The index of the input on the ArcCom relay board which is connected to the COR terminal of the radio output board.
- **Radio channel is busy when COR is High/Low** – Not applicable for simple radios. Indicates whether the radio channel is busy when the COR input is high or low. This may vary from base station to base station.
- **COR Inactive Interval** – Not applicable for simple radios. The number of seconds the COR input needs to be inactive before an attempt is made to broadcast a message.
- **Wait Interval** – Trunking radios only. The number of seconds to wait for the COR input to become inactive after PTT.
- **Wait Retry Interval** – Trunking radios only. The number of seconds to wait before setting the PTT following the COR input failing to become inactive during a transmission attempt.

Radio Settings - Messages

The **Messages** page allows message configuration details to be set up.

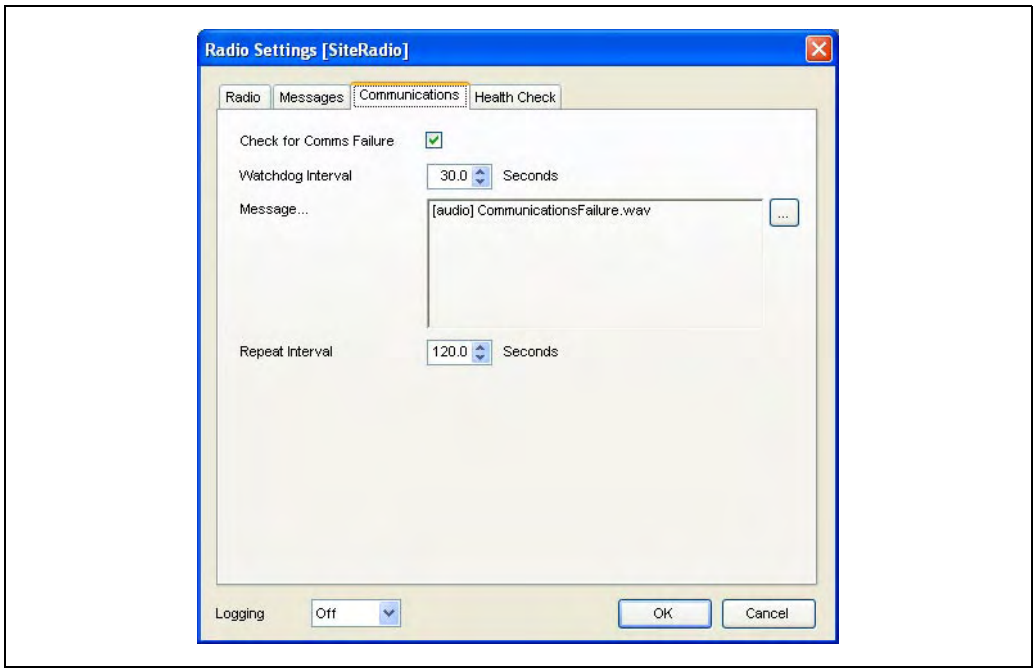


BA00390GEN_0153

- **Default Repeat** – The number of times a message is to be repeated by default unless it is specifically overridden.
- **Default Repeat Interval** – The length of time before a message is to be repeated.
- **Gap** – The length of time to be left before broadcasting the next message.
- **Key Up Delay** – The length of time between setting PTT and beginning to output the audio
- **Key Down Delay** – The length of time between completing the audio output and unsetting PTT.
- **Prefix** – A standard message to be prefixed to all broadcast messages. This can be used to add a standard call sign for example. To edit this message click the ... button to the right of the field. See section on Configuring Audio Messages for more details (→ 171).
- **Suffix** – A standard message to be suffixed to all broadcast messages. This can be used to add a standard sign-off for example. To edit this message click the ... button to the right of the field. See section on Configuring Audio Messages for more details (→ 171).
- **Manual Clear Channel** – The index of the input on the ArcCom relay board to which the manual reset switch is connected. If no manual reset switch is in use, this should be set to 0.

Radio Settings - Communications

The **Communications** page allows configuration of the comms failure functionality.

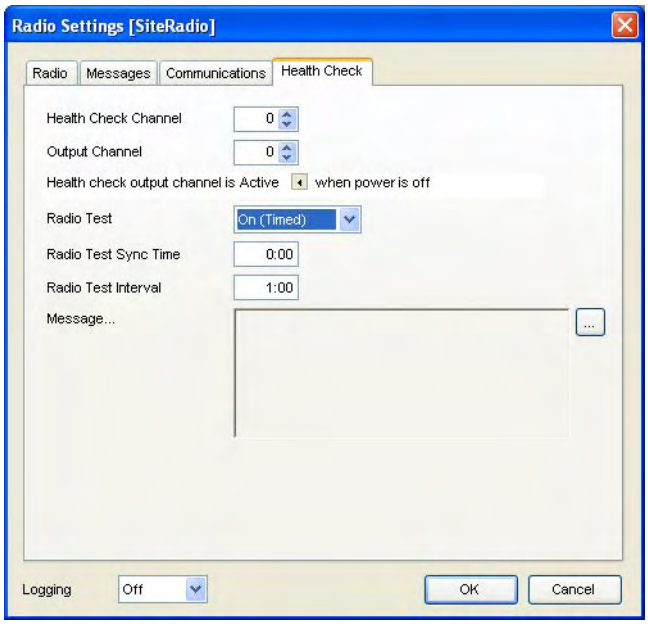


BA00390GEN_0154

- **Check for Comms Failure** – Indicates whether the messaging service is to check whether communications with calling applications is interrupted.
- **Watchdog Interval** – The interval defining what constitutes a communications failure.
- **Message** – The message to be broadcast when a communications failure is identified. To edit this message click the ... button on the right side of the field. See section on Configuring Audio Messages for more details (→ 171).
- **Repeat Interval** – The interval at which the communications failure message is to be broadcast until communications with client applications is restored.

Radio Settings - Health Check

The **Health Check** page allows configuration of the health check functionality.



BA00390GEN_0155

Health Check Channel – The index of the relay on the ArcCom relay board which is connected to the health check terminal on the radio output board. If no health checking is to be performed, this should be set to 0.

Output Channel – The index of the relay on the ArcCom relay board which is connected to an alarm indicator (such as an alarm panel). If no external alarm is being used, this should be set to 0.

Health check output channel is Active/Inactive when power is off – This field allows configuration of the default state of the external alarm indicator. This means that the system can be configured to display an external alarm if the PC is shut down.

Radio Test – This field allows a periodic test to be carried out to ensure that the audio output from the PC is reaching the radio output board. This can be one of the following values:

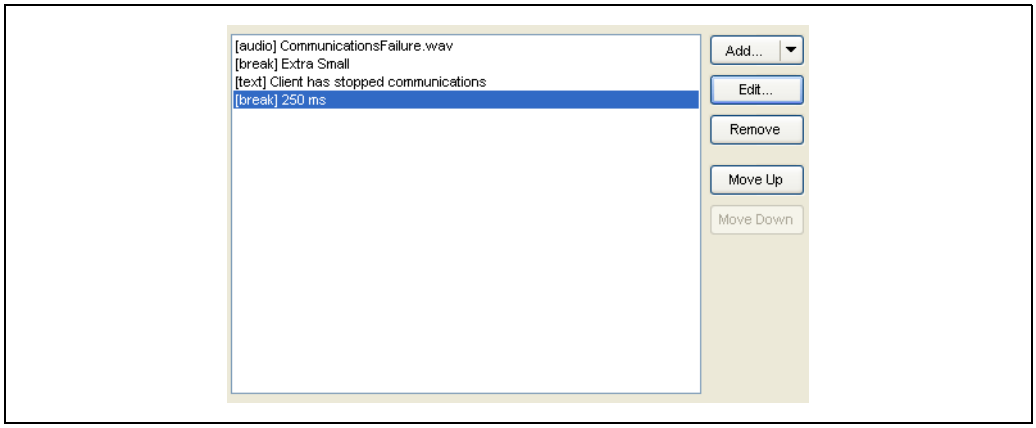
- **Off** - No test performed.
- **On** - The test message is broadcast over the radio if no message has been broadcast in the time defined in the **Radio Test Interval** field.
- **On (Timed)** - The test message is broadcast over the radio at intervals defined by the **Radio Test Sync Time** and **Radio Test Interval** fields irrespective of when the last message was broadcast over the radio.
- **Silent** - The audio message is to be transmitted to the radio output board if no message has been broadcast in the time defined in the **Radio Test Interval** field.However, PTT is not set so the message is not actually broadcast over the radio.
- **Silent (Timed)** - The audio message is to be transmitted to the radio output board at intervals defined by the **Radio Test Sync Time** and **Radio Test Interval** fields irrespective of when the last message was broadcast over the radio. However, PTT is not set so the message is not actually broadcast over the radio.

Message – The message to be broadcast. To edit this message click the ... button on the right side of the field. See section on Configuring Audio Messages for more details (→ 171).

20.2 Configuring Audio Messages

Configuring Audio Messages is a relatively simple process. However, in the interests of integrity and flexibility fields containing audio messages cannot be edited directly. Throughout the system where a message field is used, it is read-only and has a ... button next to it.

1. To edit the message click on the ... button.
   This will bring up a separate screen allowing editing of the message. Although these screens may differ in detail they will always contain the following fields:

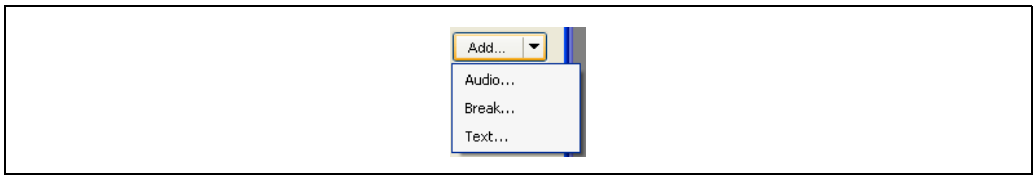


BA00390GEN_0156

Adding a message element

1. To add a new message element click the **Add** button.

- Clicking on the arrow on the button will display a dropdown menu allowing selection of the element type:



BA00390GEN_0157

- Clicking on the main part of the button automatically selects the previous message element type (defaulting to **Audio** if no previous selection has been made).

A configuration screen for the message element will be displayed (→ 172, → 174).

2. Click the **OK** button on the configuration screen.
   The message element is added to the message.

Editing a message element

To edit a message element, proceed as follows:

1. Select the message element in the list.
2. Click the **Edit** button.
   The relevant configuration screen for the message element will be displayed (→ 172, → 174).
3. Click the **OK** button on the configuration screen.
   The message element is updated.

Removing a message element

To remove a message element, proceed as follows:

1. Select the message element in the list.
2. Click the **Remove** button.

Moving a message element up or down

To move a message element to earlier in the message, proceed as follows:

1. Select the message element in the list.
2. Click the **Move Up** button until the required position is reached.

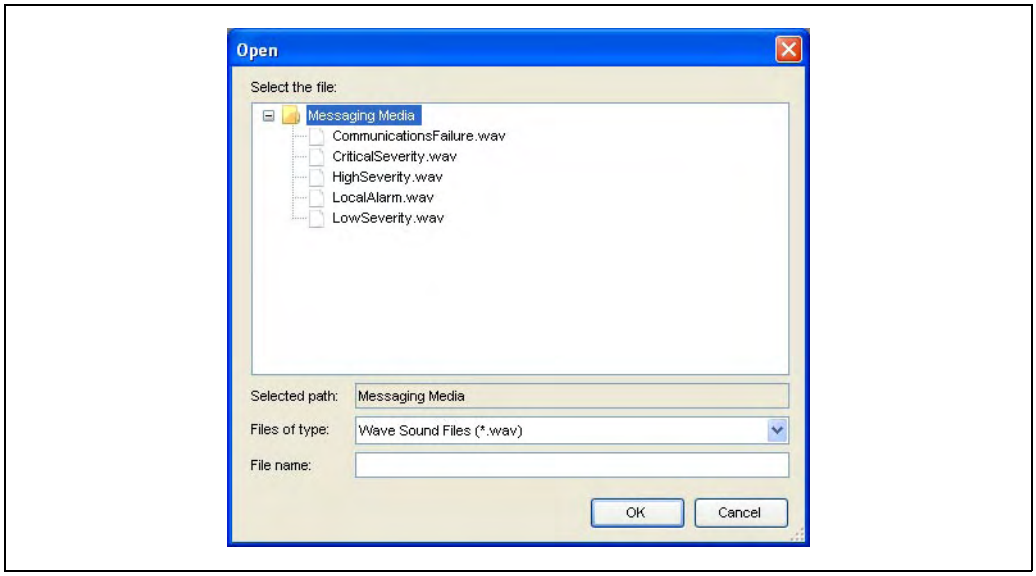
To move a message element to later in the message, proceed as follows:

1. Select the message element in the list.
2. Click the **Move Down** button until the required position is reached.

20.2.1 Audio Element

The audio element simply plays an audio file as part of the message.

1. Select the audio file on the audio configuration screen.



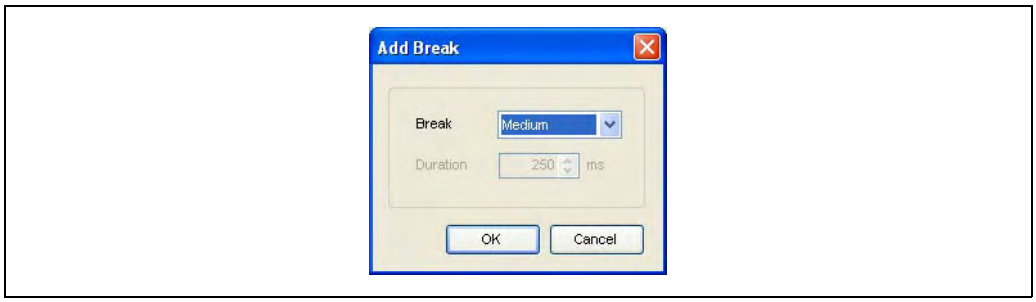
BA00390GEN_0158

The audio files available to the messaging service are stored in a directory called **Messaging Media** which can be found under the directory that the messaging service is installed in.

2. Click the **OK** button.

20.2.2 Break Element

The Break element allows the insertion of a break between other message elements. The break can either be a pre-defined length, or explicitly specified.



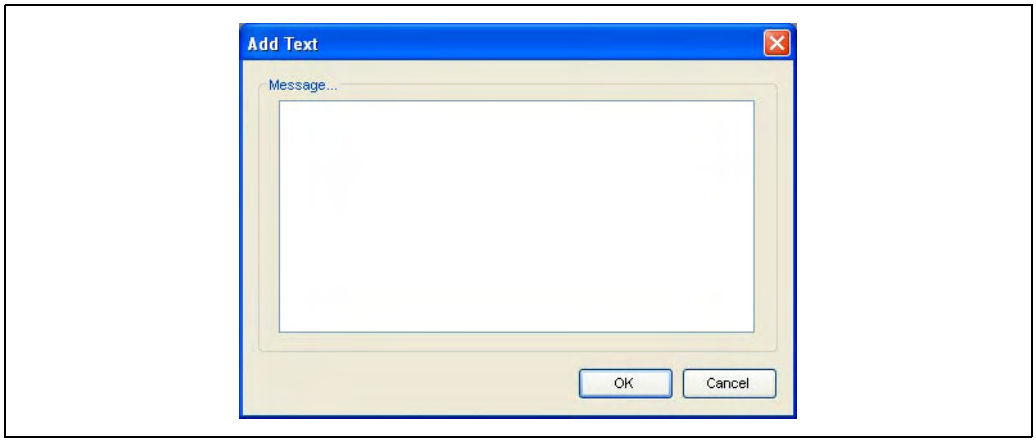
BA00390GEN_0159

To explicitly specify the length of a break, proceed as follows:

1. Select **Timed** from the dropdown list of break types.
2. Enter the duration of the break in milliseconds in the **Duration** field.

20.2.3 Text Element

The Text element allows the use of free format text which will be synthesized using the text to speech functionality of Windows.



BA00390GEN_0160

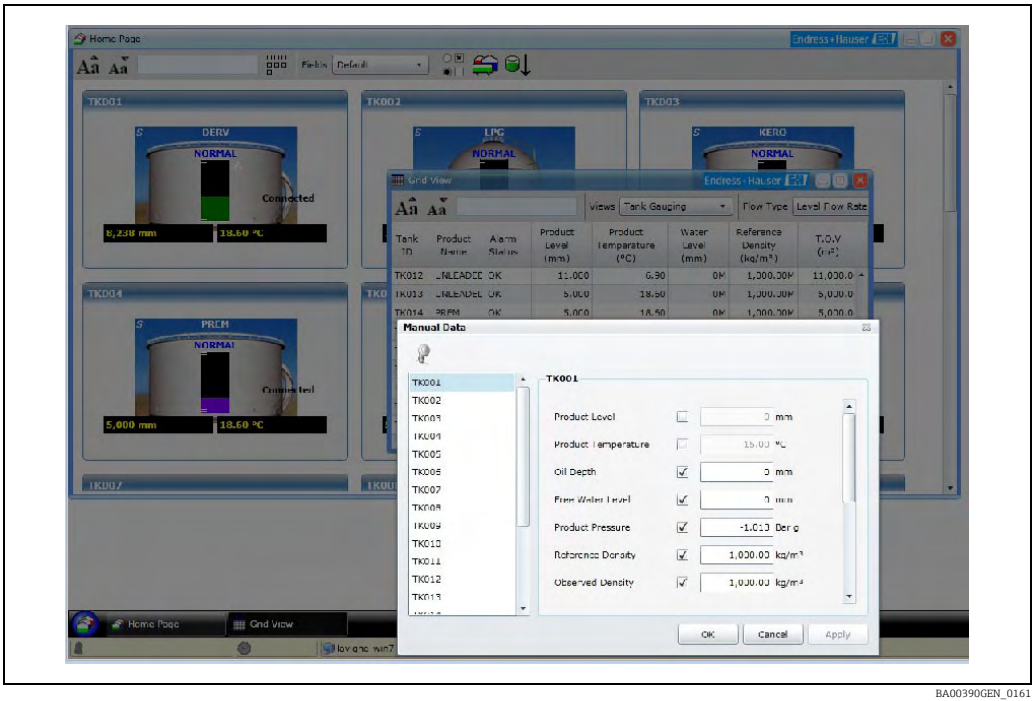
21 Web Server

The install package now includes a web server. If you have 1 or more concurrent web clients available in your license then you can connect to your tank gauging server using a browser. You do not need to install IIS or go through the procedure for creating virtual directories.

21.1 Server

The only indication within the main product is the presence of the Janus Web Server in the list of services in Service Manager and the ability to configure the web and data services through that option.

Web server uses the security manager to control access to its features.



BA00390GEN_0161

The web server permits the users to view tank gauging data in a number of displays mimicking the appearance of the main tank gauging applications and to control certain aspects remotely such as gauge commands and manual data.

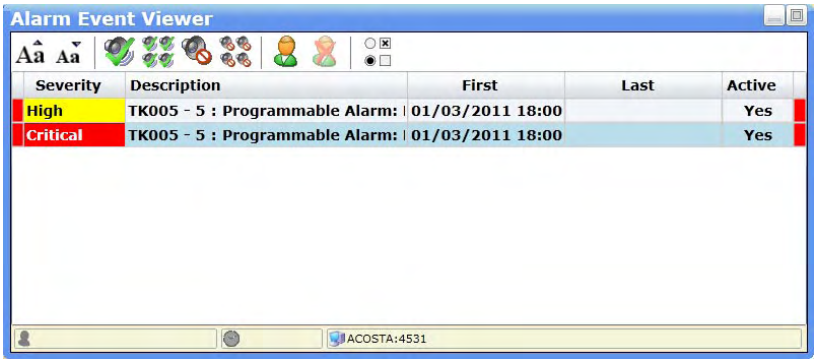
Security on the web interface is configured in the same way as the main applications, the settings being shared between the main application and the web interface. For instance if a user is denied access to manual data in the main application, the same will be true of the web interface.

21.2 Web Clients

The clients for the web server need to have Silverlight 4 installed to be able to display the tank gauging information, which means that although the users have a fairly free hand in their choice of browser they must use one of the operating systems supported by Silverlight, which at the time of writing is Windows and Mac OS X.

To install the Web Client, navigate to the appropriate URL (e.g. "http://tanks" – where "tanks" is the name of the Tank Gauging server PC).

In addition to the tank gauging user interface, there is also an event viewer for the web interface. If your machine is called "tanks", then if you browse to "http://tanks/alarms" you will have the option of installing a web alarm event viewer on your client machine.



BA00390GEN_0162

This alarm event viewer enables the user to receive notification of alarm situations on site in real time and even acknowledge them.

Index

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