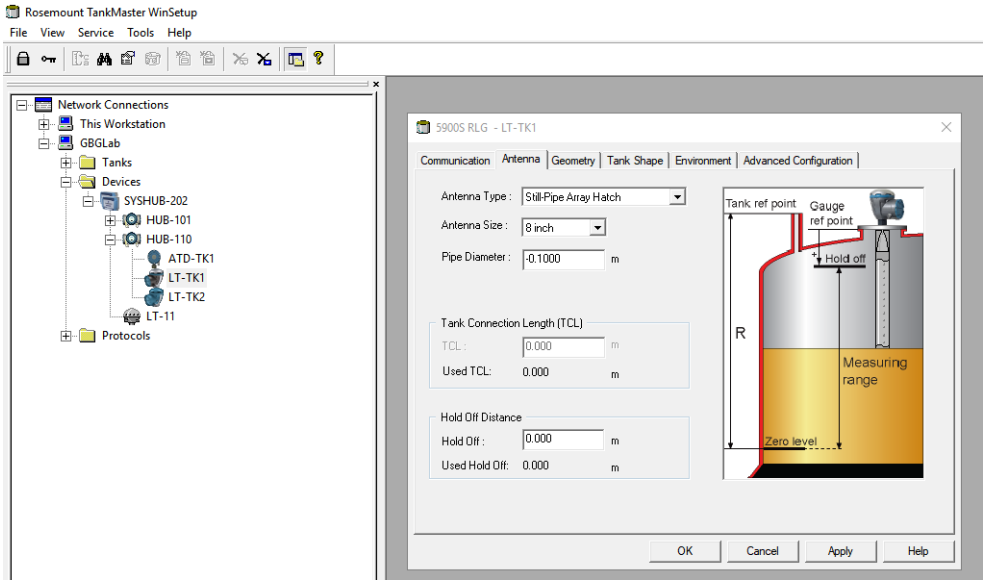
Reference Manual
00809-0300-5100, Rev CA
November 2020

Rosemount™ Tank Gauging

System configuration



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Rosemount™ Tank Gauging

NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

For equipment service or support needs, contact your local Emerson Process Management/Rosemount Tank Gauging representative.

Version

This manual is based on the functionality of TankMaster WinSetup version 6.x.
For older TankMaster versions all functionality described in this manual may not be available and the Graphical User Interface (GUI) may look different.

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Section 1 Introduction

This manual describes the recommended configuration procedure for setting up a Rosemount™ Tank Gauging system. The description is based on using the TankMaster™ Winsetup program as a configuration tool.

For each device (Rosemount 5900S Radar Level Gauge, Rosemount 2240S Multi-input Temperature Transmitter, Rosemount 2410 Tank Hub, etc.) there is a reference manual which provides detailed information on how to install the device (see "Technical documentation" on page 3 and Figure 1-1 on page 4). Mechanical installation and wiring is described as well as service and troubleshooting. Once the device is installed, it needs to be configured. The *Rosemount Tank Gauging System Configuration* manual guides you through the process of setting up a Rosemount Tank Gauging system for proper operation with field devices and tanks.

The Rosemount Tank Gauging product portfolio includes a wide range of components for small and large customized tank gauging systems. The system includes various field devices, such as radar level gauges, temperature transmitters, and pressure transmitters for complete inventory control. The TankMaster software suite provides you with the tools that you need to configure and operate the Rosemount Tank Gauging system.

1.1 Manual overview

The *Rosemount Tank Gauging System Configuration* manual includes the following sections:

Section 1: Introduction

A description of the various components in the Rosemount Tank Gauging system.

Section 2: Device Installation

A description of how to use TankMaster WinSetup to install devices in a Rosemount Tank Gauging system.

Section 3: Tank Installation

A description of how to use TankMaster WinSetup to install tanks and associate devices in a Rosemount Tank Gauging system.

Section 4: Device Handling

A short description of the basic functions for changing device configuration and how to uninstall devices from the WinSetup workspace.

1.2 Technical documentation

The Rosemount Tank Gauging System includes a wide portfolio of user documentation. For a complete list, see the Emerson Automation Solutions web page for Rosemount Tank Gauging System and Rosemount Level Measurement products.

1.2.1 Reference manuals

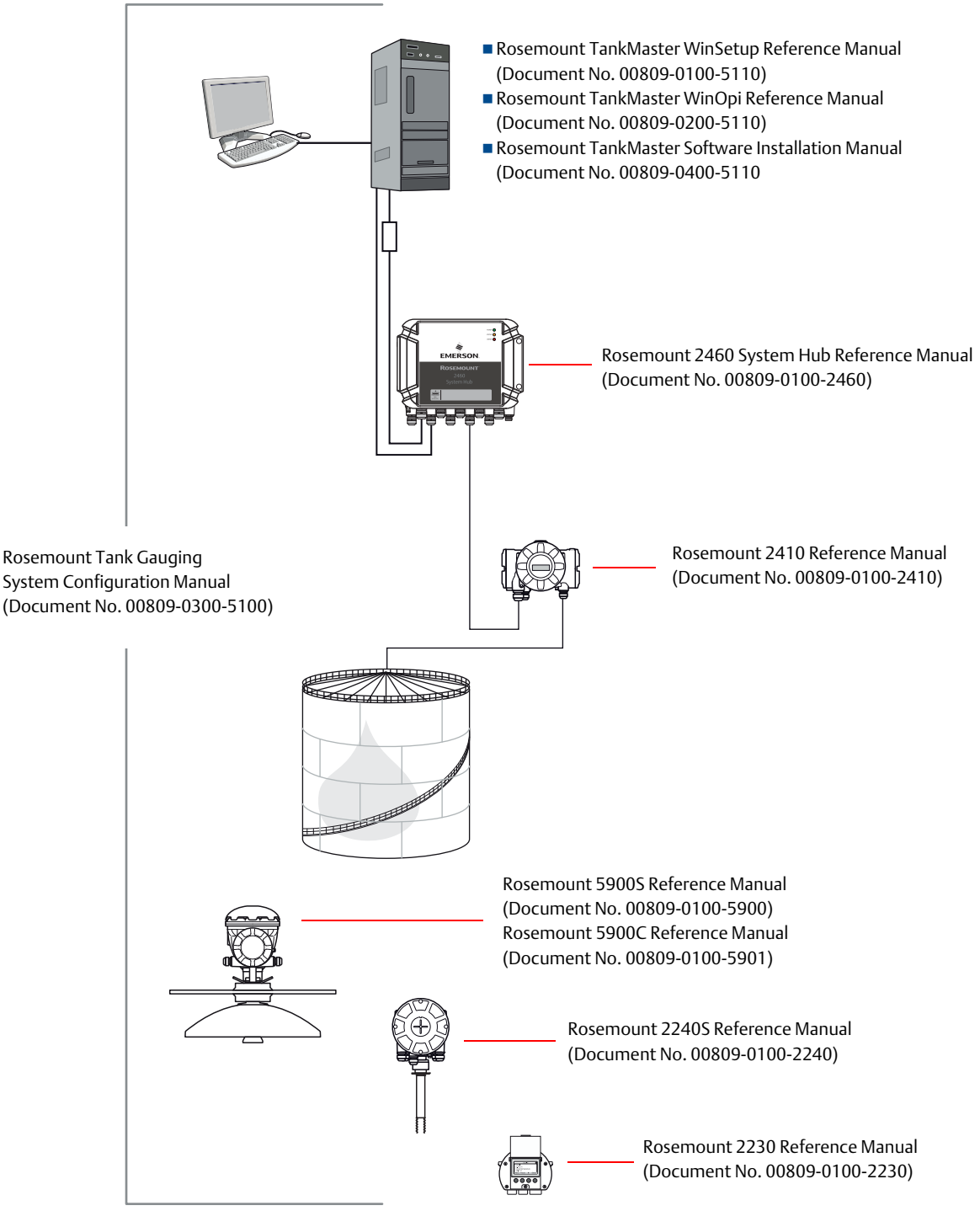
- Rosemount Tank Gauging System Configuration Manual (00809-0300-5100)
- Rosemount 2460 System Hub Reference Manual (00809-0100-2460)
- Rosemount 2410 Tank Hub Reference Manual (00809-0100-2410)
- Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900)
- Rosemount 5900C Radar Level Gauge Reference Manual (00809-0100-5901)
- Rosemount 5900 Proof Test Manual Supplement (00809-0200-5900)
- Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240)
- Rosemount 2230 Display Reference Manual (00809-0100-2230)
- Rosemount 5300 Series Reference Manual (00809-0100-4530)
- Rosemount 5408 Series Reference Manual (00809-0300-4408)
- Rosemount TankMaster Software Installation Reference Manual (00809-0400-5110)
- Rosemount TankMaster WinView Reference Manual (00809-0300-5110)
- Rosemount TankMaster WinOpi Reference Manual (00809-0200-5110)
- Rosemount TankMaster WinSetup Reference Manual (00809-0100-5110)
- Rosemount Tank Gauging Wireless System Reference Manual (00809-0100-5200)
- Rosemount TankMaster Floating Roof Monitoring Reference Manual (00809-0500-5100)

1.2.2 Product data sheets

- Rosemount Tank Gauging System Data Sheet (00813-0100-5100)
- Rosemount 2460 System Hub Product Data Sheet (00813-0100-2460)
- Rosemount 2410 Product Data Sheet (00813-0100-2410)
- Rosemount 5900S Product Data Sheet (00813-0100-5900)
- Rosemount 5900C Product Data Sheet (00813-0100-5901)
- Rosemount 2240S Product Data Sheet (00813-0100-2240)
- Rosemount 2230 Product Data Sheet (00813-0100-2230)
- Rosemount 5300 Product Data Sheet (00813-0100-4530)
- Rosemount 5408 Product Data Sheet (00813-0100-4408)

1.2.3 Document structure

Figure 1-1. System and User Documentation Structure



Section 2 Device Installation

This section describes how to install and configure a Rosemount Tank Gauging system by using the Rosemount TankMaster WinSetup configuration program.

2.1 System configuration overview

2.1.1 Preparations

Before installing a Rosemount Tank Gauging system you should ensure that the following information is available:

- A plan of all field devices and tanks.
- Unit IDs of each device (Unit ID is a unique identifier given to each device at factory).
- Modbus addresses of level devices and ATD devices. The devices are shipped with default addresses which will be changed at system configuration. The Modbus addresses are configured in the Rosemount 2460 System Hub's **Tank Database** as well as the Rosemount 2410 Tank Hub's **Tank Database** as described below.
- Tank geometry parameters and reference distances such as tank Reference height (R) and distance between Zero level (datum plate) and tank bottom.
- Antenna type for the various level gauges.

2.1.2 Installation procedure

Installation and configuration of a Rosemount Tank Gauging system includes the following steps as briefly described below and in Figure 2-1 on page 8:

1. Communication protocol setup

Specify communication protocol parameters:

- The Modbus Master Protocol handles communication between a TankMaster work station and field devices such as the Rosemount 2460 System Hub and the Rosemount 2410 Tank Hub.
- The Slave Protocol handles communication with a host computer.
- Communication with TankMaster can be supervised by logging various error types and function codes.

2. Preferences

Specify measurement units, tag prefixes for tank and device labels, inventory parameters, and parameters to be displayed when viewing tank data.

3. Installation and configuration of the Rosemount 2460 System Hub

The Rosemount 2460 System Hub has to be installed and configured prior to installing other devices such as a Rosemount 2410 Tank Hub and a Rosemount 5900S Radar Level Gauge.

To install a Rosemount 2460 System Hub:

- Assign a Modbus communication address
- For each communication port, configure protocol and appropriate communication parameters
- Configure the Tank Database with information about the devices connected to the fieldbus

4. Installation and configuration of the Rosemount 2410 Tank Hub

The Rosemount 2410 Tank Hub should be installed after the Rosemount 2460 System Hub prior to the other field devices. In case no system hub is used, the tank hub can be connected directly to a TankMaster work station. Installing a Rosemount 2410 Tank Hub includes the following main steps:

- Specify a device tag
- Assign a Modbus communication address
- Configure the Tank Database to map devices to tanks
- Configure the optional local display

5. Installation and configuration of field devices

In a Rosemount Tank Gauging system, the field devices such as level gauges and temperature transmitters, are installed in TankMaster Winsetup as part of the Rosemount 2410 installation procedure. The devices are configured at a later stage by using the *Properties* window of each device.

Installation and configuration of devices include the following steps:

Step	Description
Communication	Specify protocol and address.
Configuration	Specify tank geometry parameters, device specific parameters, temperature element positions, and other parameters depending on the device type.

6. Installation and configuration of tanks

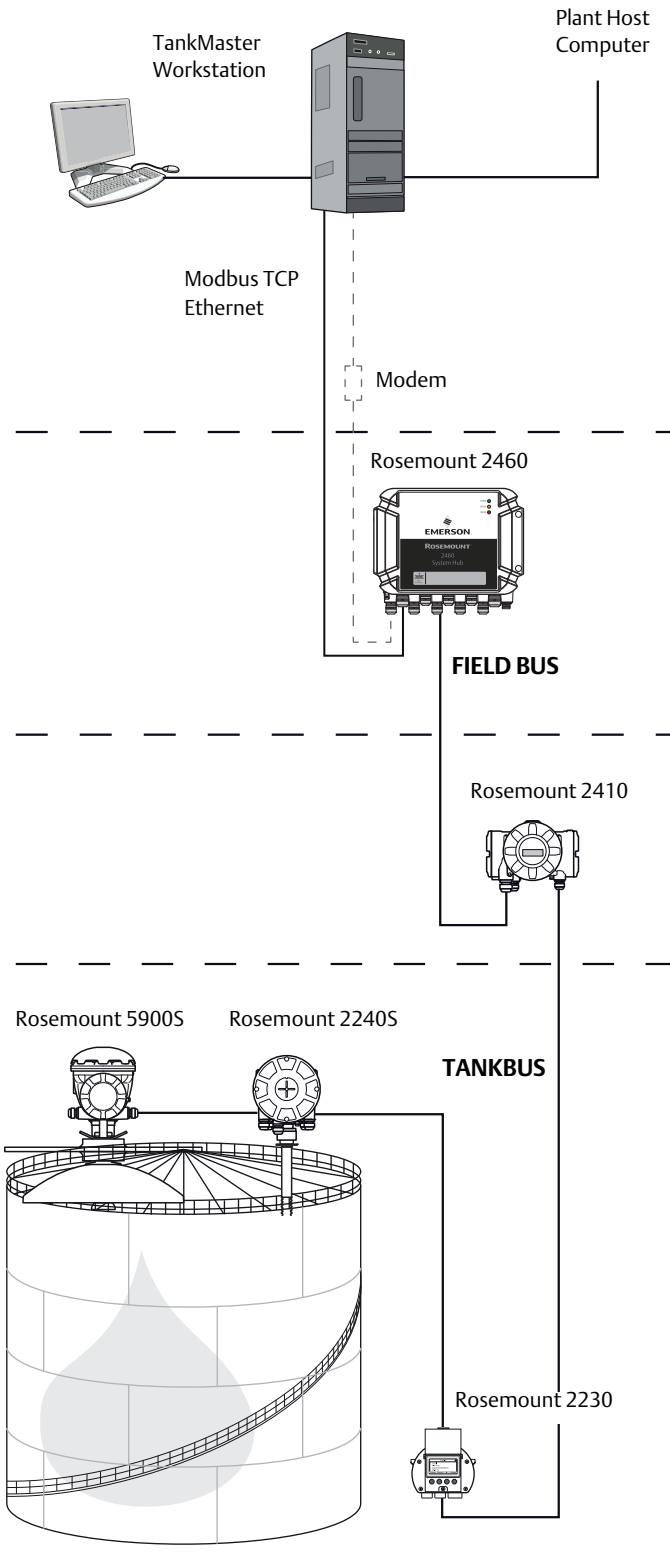
Installing a tank includes the following steps:

Step	Description
Choose tank type	Select one of the available options such as Fixed Roof, Floating Roof, Sphere LPG, Horizontal LPG, or other suitable tank type.
Specify a tank tag	Specify a name to be used as an identifier in the *Workspace* window and other TankMaster windows.
Select devices	Associate devices to the tank.
Configuration	Specify the available source signals for parameters such as Free Water Level, Vapor Pressure and Liquid Pressure.
Value Entry	Specify an approved value range for Level, Ullage, and Free Water Level. In case there is no source instrument available, you can specify manual values to be used instead.

7. Calibration

Once a *Rosemount 5900* Radar Level Gauge is installed and configured, the **Calibration Distance** parameter may have to be adjusted in order to ensure that measured level and actual product level match. The adjustment should be performed once at the final commissioning.

Figure 2-1. Rosemount Tank Gauging system installation procedure



1. Communication setup.
See "Communication protocol setup" on page 10.

2. Preferences.
See "Preferences" on page 20.

3. Rosemount 2460 System Hub installation and configuration.
See "Installing a Rosemount 2460 System Hub" on page 31.

4. Rosemount 2410 Tank Hub installation and configuration.
See "Installing a Rosemount 2410 Tank Hub" on page 32.

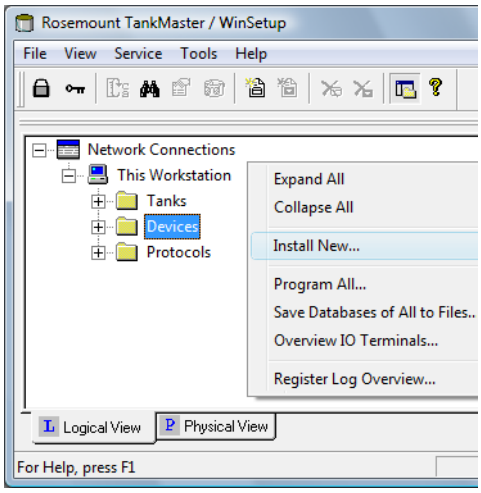
5. Device installation and configuration.
See for example "Installing a Rosemount 5900 Radar Level Gauge" on page 46 and "Installing Auxiliary Tank Devices" on page 75.

6. Tank installation and configuration.
See "Installing a tank" on page 115.

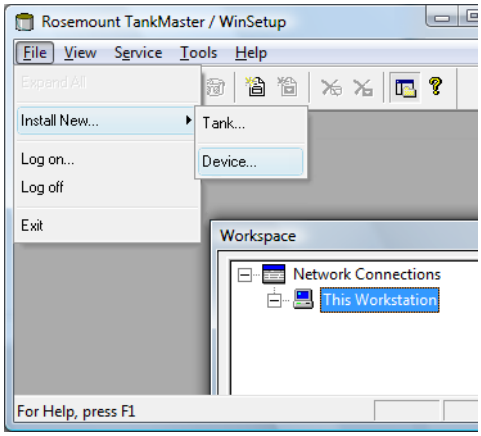
7. Calibration.
See "Level gauge calibration" on page 137.

2.1.3 Using the device installation wizard

The device installation wizard guides you step-by-step through the installation procedure. The wizard can be started in different ways:



1. Select the **Devices** folder.
2. Click the right mouse button and choose **Install New** from the popup menu, or from the **Service>Devices** menu choose **Install New**.



As an alternative you can use the following method:

1. Select the server where your system is installed.
2. From the **File>Install New** menu choose **Device**.

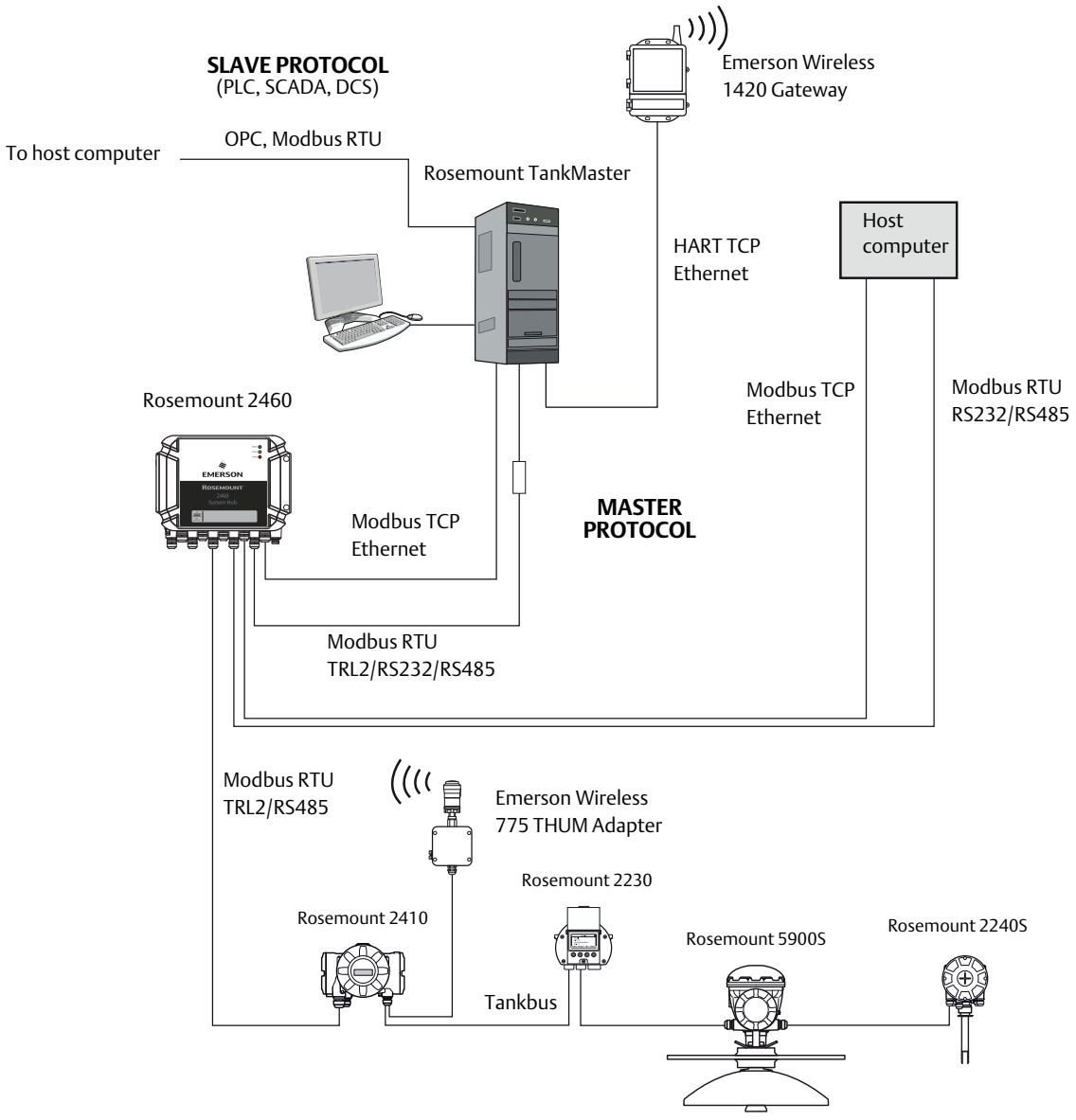
See chapter 2.6 to 2.11 for detailed information on how to install various devices.

2.2 Communication protocol setup

The TankMaster work station can be connected to field devices and host computers by using Master and Slave protocols. The Modbus Master protocol is available as default protocol when the Rosemount TankMaster software is installed on a TankMaster work station. Optional protocols, such as the Modbus Slave protocol for communication with host systems, can be obtained as well. Please contact Emerson Automation Solutions/Rosemount Tank Gauging for more information.

A Modbus protocol offers up to eight channels. Enraf and HART protocols support 16 channels. For each channel you can specify which PC communication port (USB/COM) to connect to, as well as standard communication parameters such as Baud Rate, Parity, and number of Stop Bits.

Figure 2-2. Communication with Various Rosemount Tank Gauging Devices

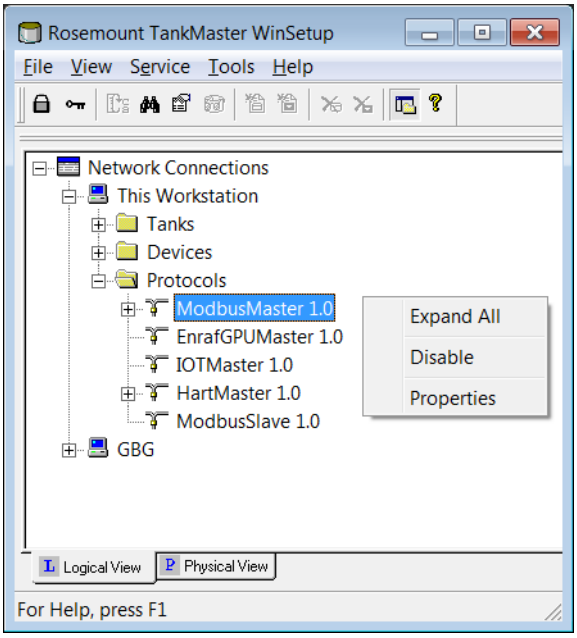


2.2.1 Master protocol channel configuration

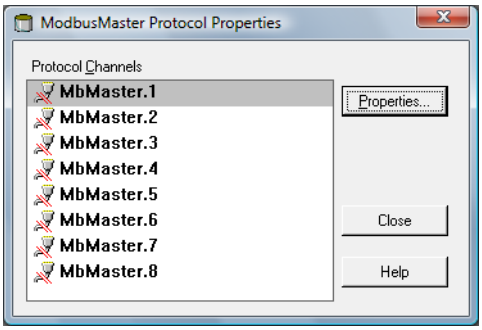
This section describes how to configure the Modbus Master protocol channel for communication with a FBM 2180 modem. The procedure applies to other protocols and modems as well but other parameter settings may be required.

To configure a protocol channel:

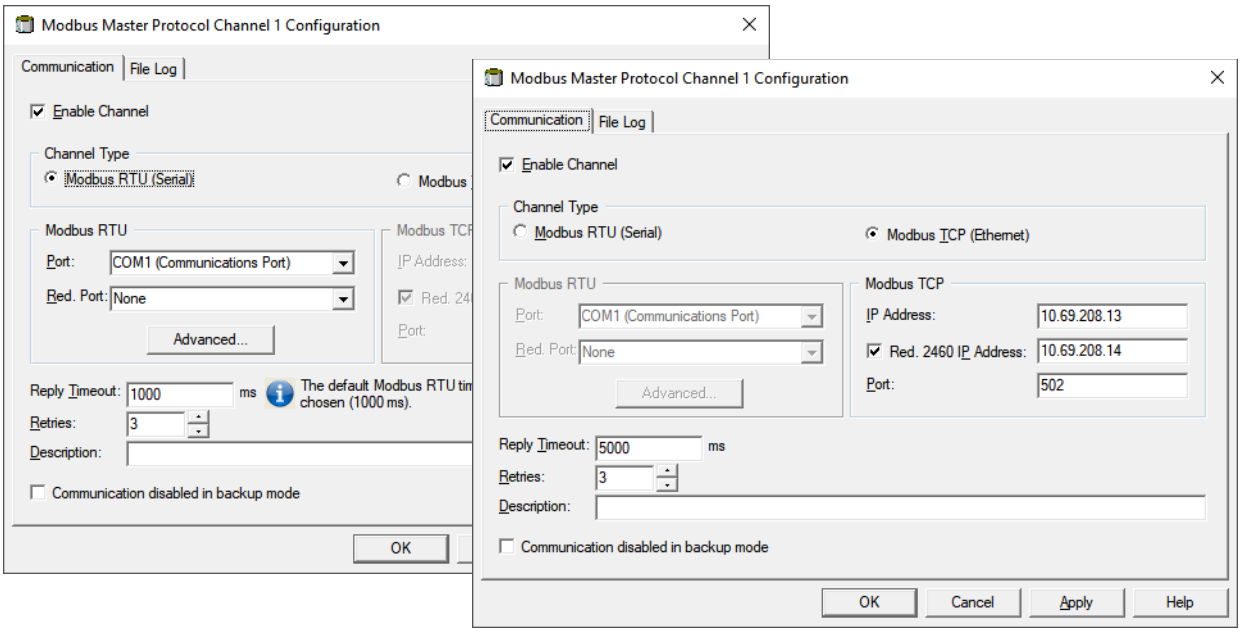
1. Open the **Protocols** folder in the *Workspace* window.
2. Select the icon that corresponds to the particular protocol to be configured (this example shows the Modbus Master protocol).



3. Click the right mouse button and select **Properties**, or choose **Protocols/Properties** from the **Service** menu.



4. The *Protocol Properties* window lists the available protocol channels. For each channel the corresponding icon indicates whether the channel is enabled or disabled.
5. Select the desired channel.
6. Click the **Properties** button to configure the protocol channel.



7. Select the *Communication* tab. It allows you to configure parameters that control the communication between field devices and TankMaster work station.

   a. For Modbus RTU, click the Advanced button in case you need to set communication parameters:

Port	The COM port that the Rosemount 2180 will be connected to
Baud rate	4800
Stop bits	1
Parity	None
Modem	Choose FBM 2180 for the Rosemount 2180 Field Bus Modem
Handshaking	FBM 2180: None FBM 2170/71: RTS/CTS/DTR/DSR RS485: RTS/CTS RS232: None
Reply timeout	1000 ms
Retries	10
Description	Text describing the configured channel

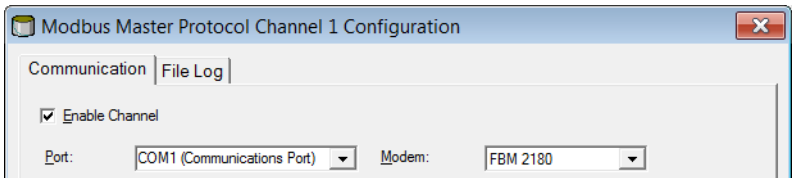
Note
If the communication is interrupted and handshaking includes DSR, no query will be sent from the TankMaster Protocol Server. This may result in a Query Timeout.

   b. For Modbus TCP, specify IP address for the Rosemount 2460 that the TankMaster server is connected to. For redundant system hubs, you may use a separate IP address for the backup server. See the Rosemount 2460 System Hub Reference Manual for more information on how to configure redundant system hubs.

8. The *File Log* tab lets you specify what type of information to be logged and saved to disk in (see also "Log file configuration" on page 18).

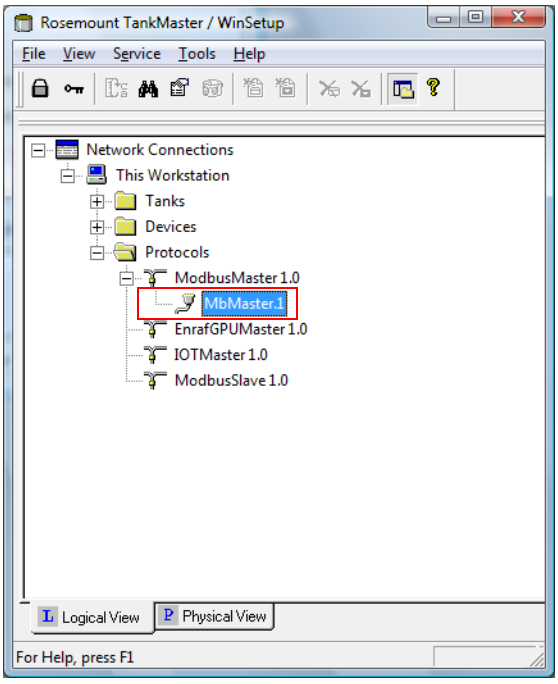
9. The **Comm. disabled in backup mode** check box can be used for systems with redundant tank servers. If the check box is selected, the ModbusMaster will not send any queries if the local tank server is in backup mode.

10. Select the **Enable Channel** check box to activate the protocol channel.



11. Click the **OK** button to store the current configuration and close the configuration window.

12. The Modbus Master Channel icon (channel no. 1 in this example) appears in the WinSetup workspace:



2.2.2 Slave protocol channel configuration

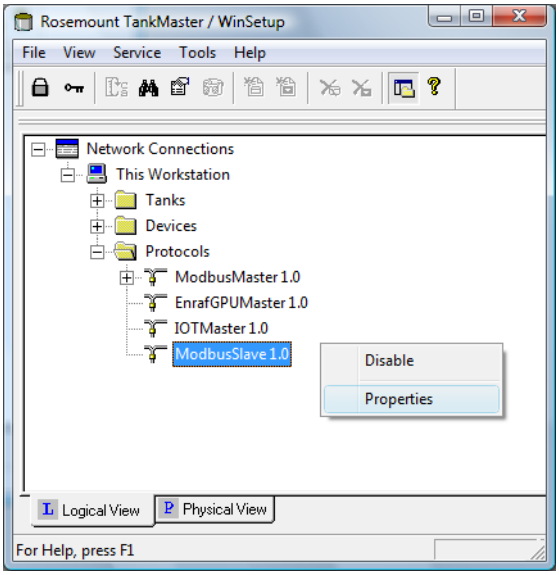
A Slave protocol allows you to collect data from the TankMaster workstation to a host computer.

Note
A hardware key must be installed in order to run a slave protocol server. Host communication needs to be enabled.

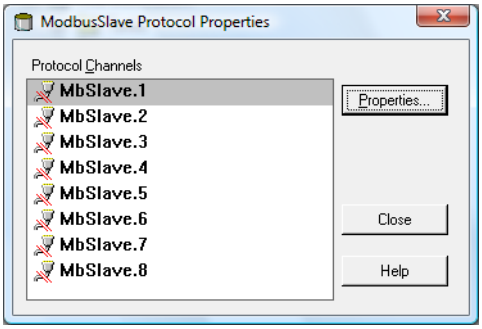
Modbus Communication Setup

To configure the Modbus Slave protocol channel do the following:

1. Open the **Protocols** folder in the *Workspace* window.
2. Select the ModbusSlave protocol icon.

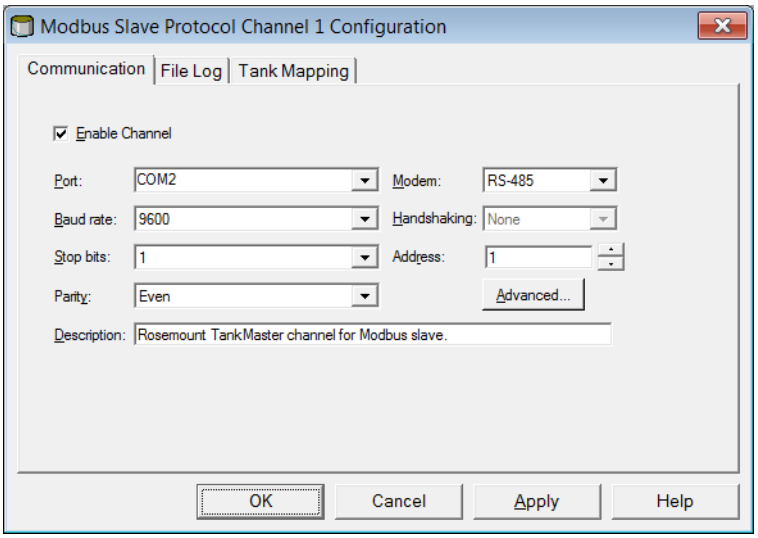


3. Click the right mouse button and select **Properties**, or choose **Protocols>Properties** from the **Service** menu.



4. The *Protocol Properties* window lists enabled and disabled protocol channels.
5. Select the desired channel.

6. Click the **Properties** button to configure the protocol channel.



7. Select the *Communication* tab.

8. Select the **Enable Channel** check box to activate the protocol channel.

9. Ensure that the following communication parameters are set:

Port	Choose the COM port that the host computer will be connected to.
Baud rate	Choose a setting that matches the host setting.
Stop bits	Choose a setting that matches the host setting.
Parity	Choose a setting that matches the host setting.
Modem	Choose the appropriate interface. Select FBM 2180 if you are using a Rosemount 2180 Field Bus Modem.
Handshaking	FBM 2180: None FBM 2170/71: RTS/CTS/DTR/DSR RS485, RS232: See specifications for the communication software used on the host system.
Address	Set the Modbus address to be used by the host computer to identify the TankMaster workstation.
Description	Text that describes the configured channel.

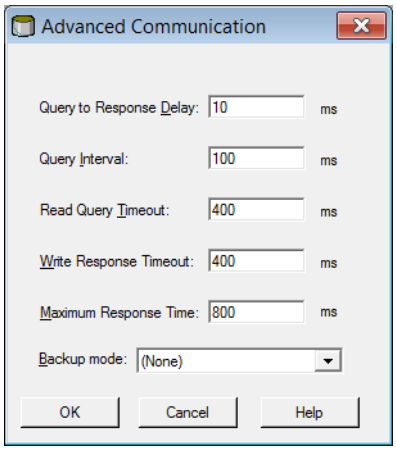
Note
If handshaking includes DSR, no query will be sent from the TankMaster Protocol Server if the communication is interrupted. This may result in a Query Timeout.

10. Click the **OK** button to store the current configuration and close the configuration window.

Advanced configuration

To configure delay times and time-outs perform the following steps:

1. In the *Slave Protocol Channel Configuration* window, select the *Communication* tab and click the **Advanced** button:



2. The following default values are used for the TRL2 Modbus Slave protocol:

Query to Response Delay	10 ms
Query interval	100 ms
Read Query Timeout	400 ms
Write Response Timeout	400 ms
Max. Response Time	800 ms
Backup Mode	None

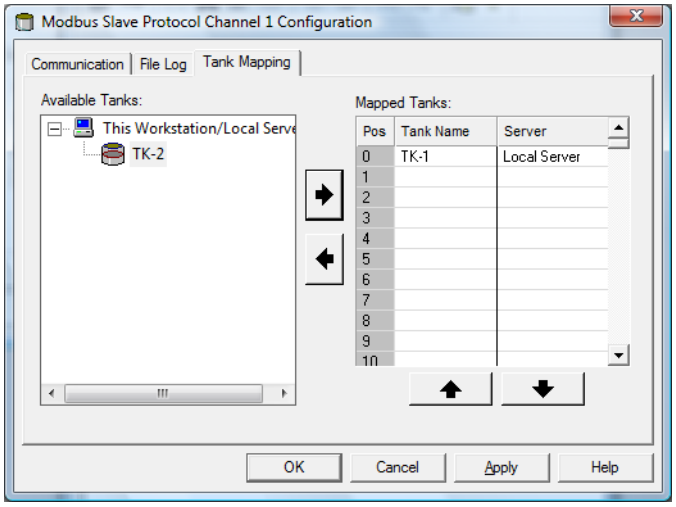
3. Choose one of the following three options for **Backup Mode**:

- None
- *Write Commands Rejected* means that TankMaster does not accept any write commands from the host system to device database registers
- In *Silent* mode the ModbusSlave protocol will not send any replies to requests coming from the host computer while the local tankserver is in backup mode

Tank mapping configuration

The slave protocol allows you to send data from a Rosemount Tank Gauging system to a host computer. In the *Tank Mapping* window you can specify from which tanks to collect data for the host system:

1. In the *Slave Protocol Channel Configuration* window, select the *Tank Mapping* tab:



2. From the list of tanks that appear in the **Available Tanks** pane, select the tanks that the host will connect to.

3. Click the button to move the selected tanks to the list of **Mapped Tanks**. Ensure that the tanks appear in the order required by the host system. When the host sends a query, TankMaster responds by sending tank data in the order as the tanks are listed in the **Mapped Tanks** column. You can easily change the position of mapped tanks by using the and buttons.

4. Click the **OK** button to save the current configuration and close the window.

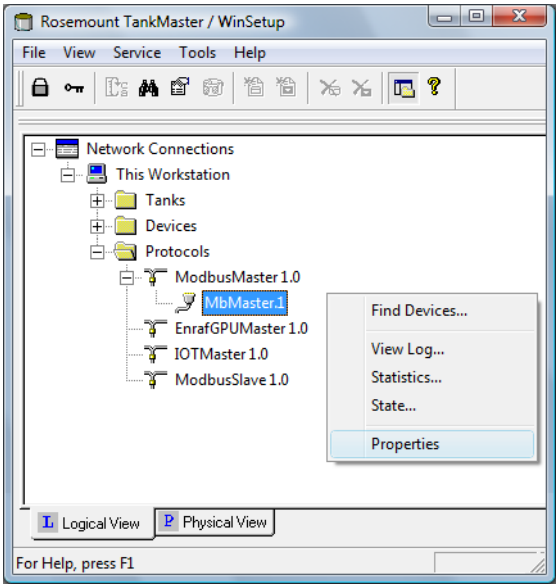
2.2.3 Log file configuration

See the Rosemount TankMaster WinSetup Reference Manual (00809-0100-5110) for more information on how to store a communication log on disk.

2.2.4 Changing the current protocol channel configuration

The channel configuration can be changed at any time. Do the following:

1. In the WinSetup Workspace open the **Protocols** folder and the protocol subfolder with the enabled channels.



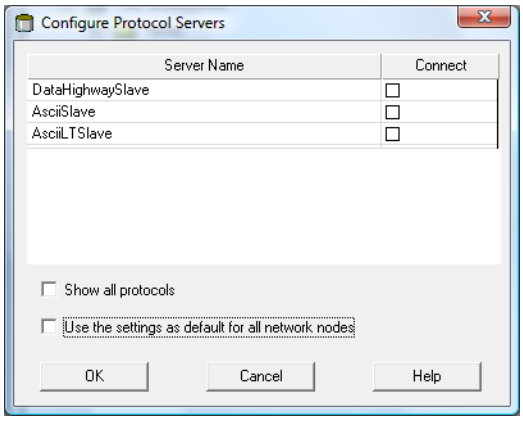
2. Select the channel icon.
3. Click the right mouse button and choose **Properties**, or from the **Service** menu choose **Channels>Properties**.
4. Choose the appropriate tab and change the protocol settings as described in the previous sections.

2.2.5 Protocol server configuration

You can specify which protocol servers that will be connected when starting TankMaster WinSetup.

To change the current configuration do the following:

1. In the WinSetup workspace select the **Protocols** folder.
2. Click the right mouse button and choose **Configure**.



3. In the **Connect** column, select the check box of each protocol to be automatically connected when WinSetup starts up.

You may disable a protocol server at any time by using the Disable command:

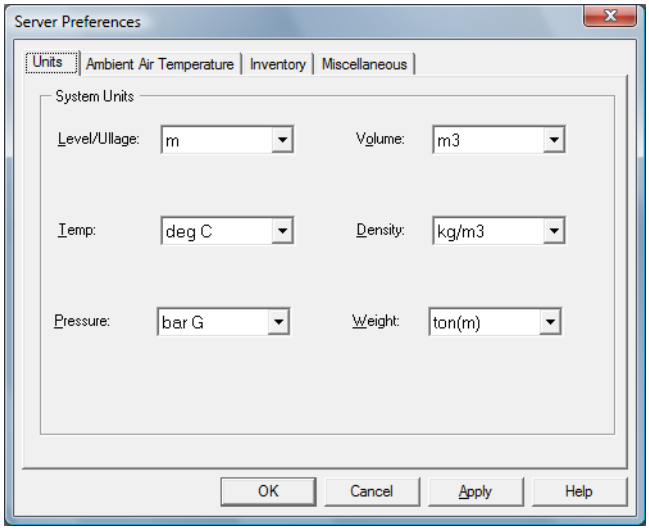
1. In the Winsetup workspace, open the Protocols folder.
2. Click the right mouse button on the desired protocol server icon and choose Disable.

2.3 Preferences

2.3.1 Measurement units

Specify units for inventory calculations and measured variables such as level and temperature. To change measurement units do the following:

1. Select the desired server (e.g. “This Workstation”) in the *WinSetup* workspace.
2. Click the right mouse button and choose **Setup**, or from the **Service** menu choose **Servers>Setup**.
3. In the *Server Preferences* window select the *Units* tab.



4. Choose the desired measurement units for level/ullage, temperature, pressure, volume, density, and weight.
5. Click the **OK** button to save the current setting and close the window.

Note
Make sure that the desired measuring units are specified before installing new tanks and devices.

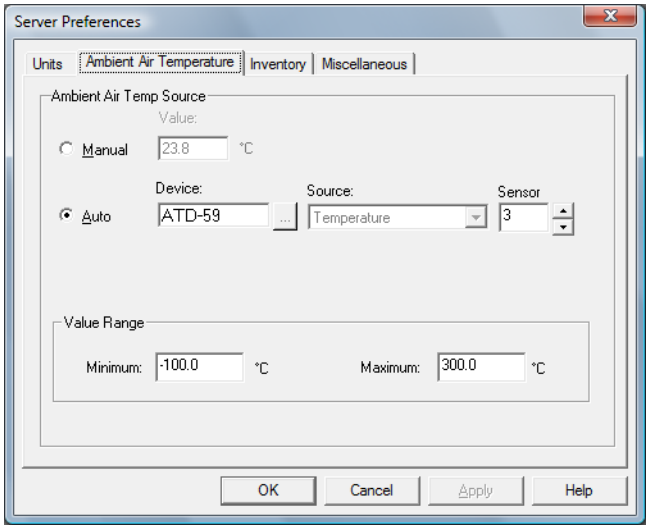
Note that these settings only affect installation of new tanks. Tanks which are already installed in the *WinSetup Workspace* will not be affected. In order to change measurement units for an existing tank you have to do the following:

1. Uninstall the tank.
2. Change measurement units in the *Server Preferences/Units* window (or in the TankMaster WinOpi program choose menu option Setup>System and change units in the *System Setup* window).
3. Install the tank again.

2.3.2 Ambient air temperature

To change the Ambient Air Temperature preferences do the following:

1. Select the desired server (e.g. “This Workstation”) in the *WinSetup* workspace.
2. Click the right mouse button and choose **Setup**, or from the **Service** menu choose **Servers>Setup**.
3. In the *Server Preferences* window select the *Ambient Air Temperature* tab:



4. Choose **Auto** when there is a temperature sensor available that can be used for Ambient Air Temperature measurements. Otherwise, select the **Manual** option and type a value for the Ambient Air temperature.

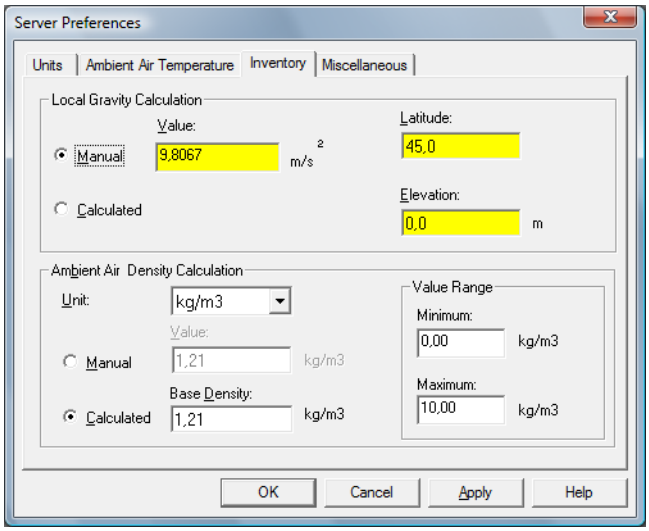
   - **Device**. Click the ... button and select the device to which a temperature sensor is connected.
   - **Ambient Air Temp Source**. Select temperature source associated with the selected device. In a Rosemount Tank Gauging system the associated temperature transmitter has to be configured in the tank database of the Rosemount 2410 Tank Hub (see “Installing a Rosemount 2410 Tank Hub” on page 32 for more information).
   - **Sensor**. Choose a specific sensor to be used for Ambient Air Temperature.
   - **Value Range**. The Value Range defines the minimum and maximum values when Ambient Air Temperature is manually entered.

5. Click the **OK** button to save the current setting and close the window.

2.3.3 Inventory

Local Gravity and Ambient Air Density calculations are used for automatic density measurements. To change the Inventory settings do the following:

1. Select the desired server (e.g. “This Workstation”) in the *WinSetup* workspace.
2. Click the right mouse button and choose **Setup**, or from the **Service** menu choose **Servers>Setup**.
3. In the *Sever Preferences* window select the *Inventory* tab:



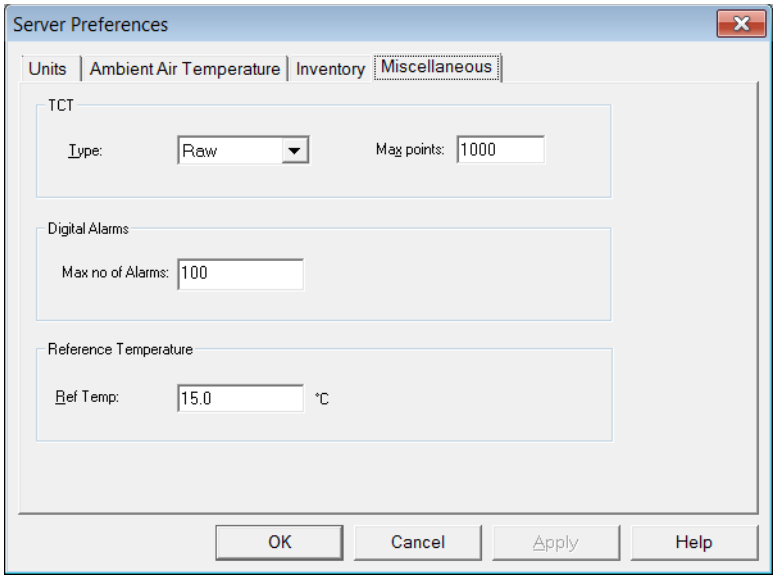
4. Local Gravity.
   The Local Gravity is used for density and weight calculations when an optional pressure transmitter is installed.
   - Select **Manual** if you want to use a specific value for the Local Gravity.
   - Choose **Calculated** if you want the local gravity to be calculated by TankMaster. In this case you need to enter the Latitude and Elevation of the site.
5. Ambient Air Density.
   The Ambient Air Density is used for calculating **Observed Density** and **Weight in Air** (WIA).
   - Select **Manual** if you want to use a specific Ambient Air Density value.
   - Choose **Calculated** if you want the Ambient Air Density to be calculated by TankMaster. The calculated value is based on the **Base Density** and the Ambient Air Temperature.

   See the *TankMaster WinOpi Reference Manual (Document no. 303028EN)* for more information on inventory parameters and calculations.
6. Click the **OK button** to save the current settings and close the window.

2.3.4 Miscellaneous

To change parameters such as type of Tank Capacity Table, or Reference Temperature, do the following:

1. Select the desired server (e.g. “This Workstation”) in the *WinSetup* workspace.
2. Click the right mouse button and choose **Setup**, or from the **Service** menu choose **Servers>Setup**.
3. In the *Server Preferences* window select the *Miscellaneous* tab.



4. Choose the type of Tank Capacity Table (TCT) to be used as default setting when installing new tanks. The default TCT type will automatically be chosen when **strapping tables** are created for new tanks. However, the TCT type can be changed when the strapping table is specified in the *Tank Capacity Setup* window regardless of the settings in the *Server Preferences* window.

   You can choose between TCT type *Raw*, *International,* and *Northern*.

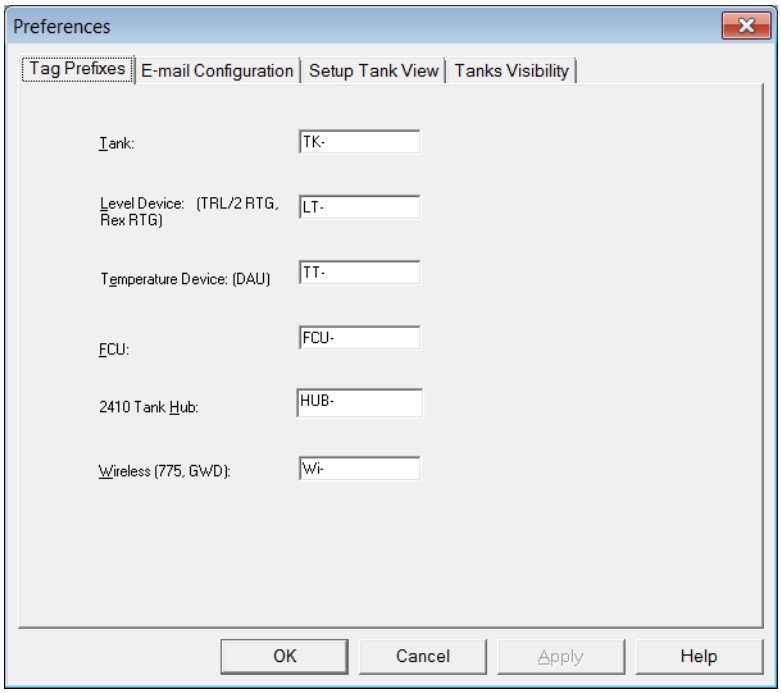
   See the *TankMaster WinOpi Reference Manual (Document no. 303028EN)* for further information.
5. Specify the maximum number of Digital Alarms that will be used.
6. Specify the Reference Temperature to be used for inventory calculations. Normally, the standard value 15 °C is used.
7. Click the **OK button** to save the current settings and close the window.

2.3.5 Setting the name tag prefixes

TankMaster WinSetup allows you to specify default name tag prefixes that will appear automatically when installing new tanks and devices. Note that Tank Tag must begin with a letter. These prefixes can be ignored if you want to use other prefixes instead.

To specify name tag prefixes do the following:

1. From the **Service** menu choose **Preferences**.



2. In the *Preferences* window select the *Tag Prefixes* tab.

3. Type the prefixes to be used for tank names and device names. and click the **OK** button.

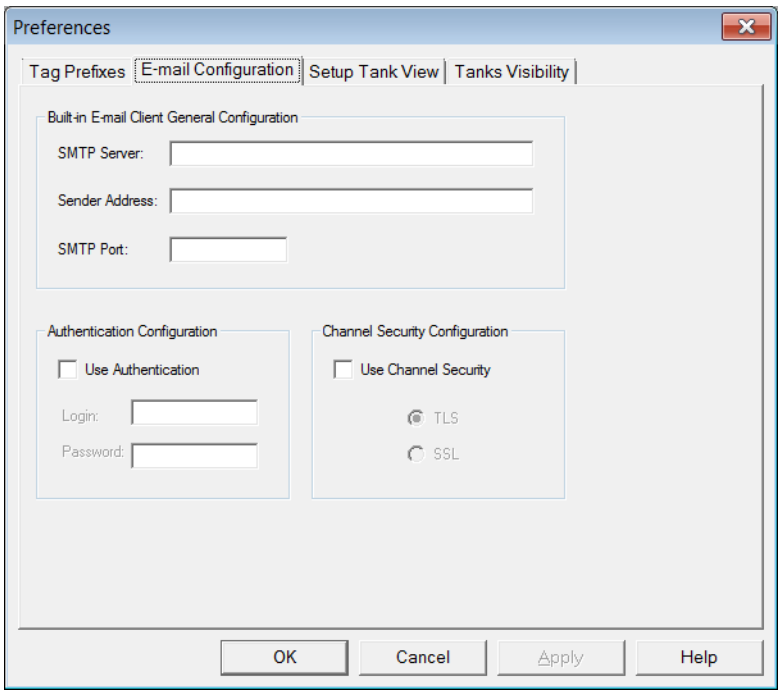
   You can change the prefixes later at any time. Note that this will not affect names of existing tanks and devices.

2.3.6 E-mail configuration

TankMaster WinSetup allows you to setup an e-mail client for alarm notifications and reports.

To setup an e-mail client do the following:

1. From the **Service** menu choose **Preferences**.



2. In the *Preferences* window select the **E-mail Configuration** tab.

3. Enter the following information:

SMTP Server	Specify an SMTP server for outgoing messages. Contact your LAN administrator or Internet Service Provider (ISP) for details.
Sender Address	The e-mail account which will send e-mails from the current workstation must be located on the specified SMTP server.
SMTP Port	Optional. Contact your LAN administrator or ISP for details.
Authentication Configuration	Select this option and enter a *Login* name and *Password* if authentication is required on the mail server. Contact your LAN administrator or ISP for details.
Channel Security Configuration	Select this option if the e-mail client requires the use of channel security. Contact your LAN administrator or ISP for details.
Subject	Enter a title for an e-mail alarm notification. This subject is only used for Alarm notification and is optional. This subject will not be used for other e-mails sent from the built-in e-mail client.

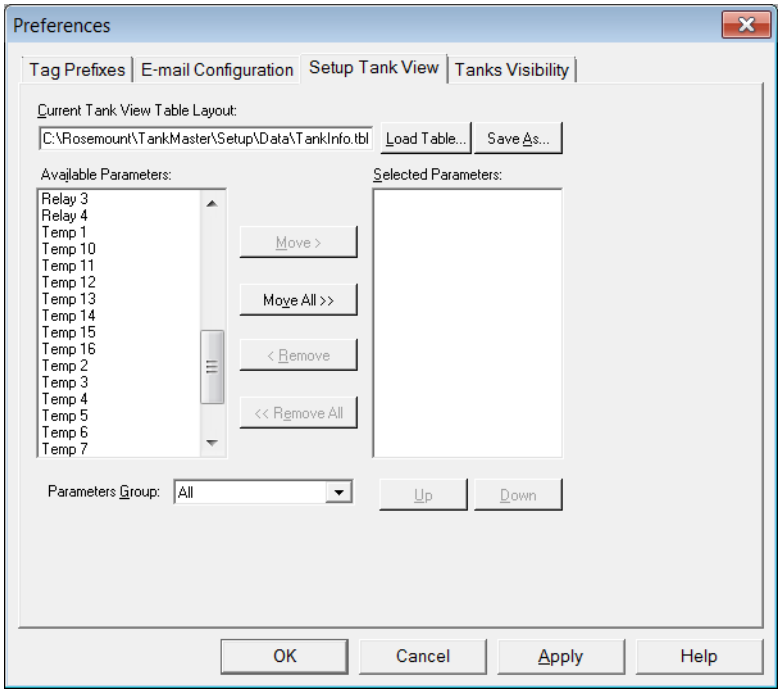
2.3.7 Tank view layout

The *Setup Tank View* tab is used to specify variables to be presented in the *Tank View* window, see the *Rosemount TankMaster WinSetup* manual for more information.

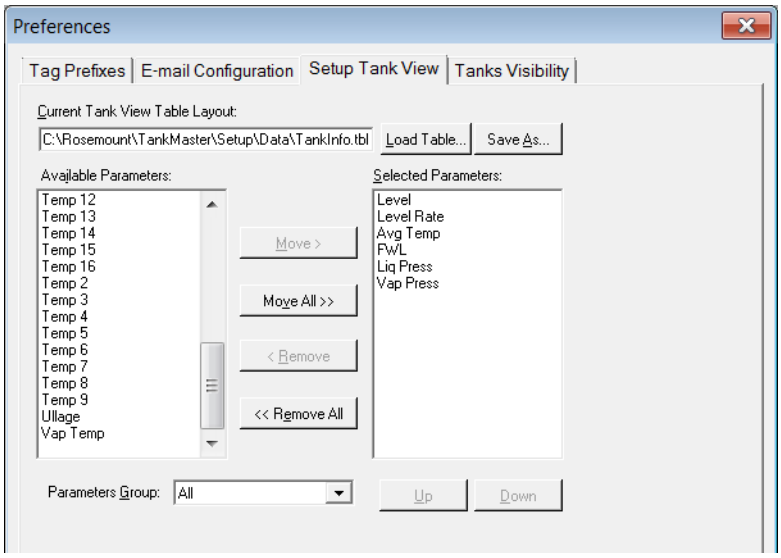
TankMaster WinSetup allows you to create a new tank view layout and store it on disk, or load an existing table layout from disk.

To create a Tank View layout do the following:

1. From the **Service** menu choose **Preferences.**
2. In the *Preferences* window select the *Setup Tank View* tab.



3. Click the **Load Table** button if you wish to edit an existing Table Layout.
4. In the *Available Parameters* pane on the left-hand side of the *Preferences/Setup Tank View* window, select the parameter to be presented in the *Tank View* window (see the *Rosemount TankMaster WinSetup* manual for more information).
5. Click the **Move** button to move it to the *Selected Parameters* pane on the right-hand side of the *Preferences/Setup Tank View* window.
6. Repeat steps 4 to 5 for each parameter you wish to include.
   The **Move All** button allows you to move all variables at once to the *Selected Parameters* list box.
7. Ensure that all parameters to appear in the *Tank View* window are included in the *Selected Parameters* list box as illustrated below:

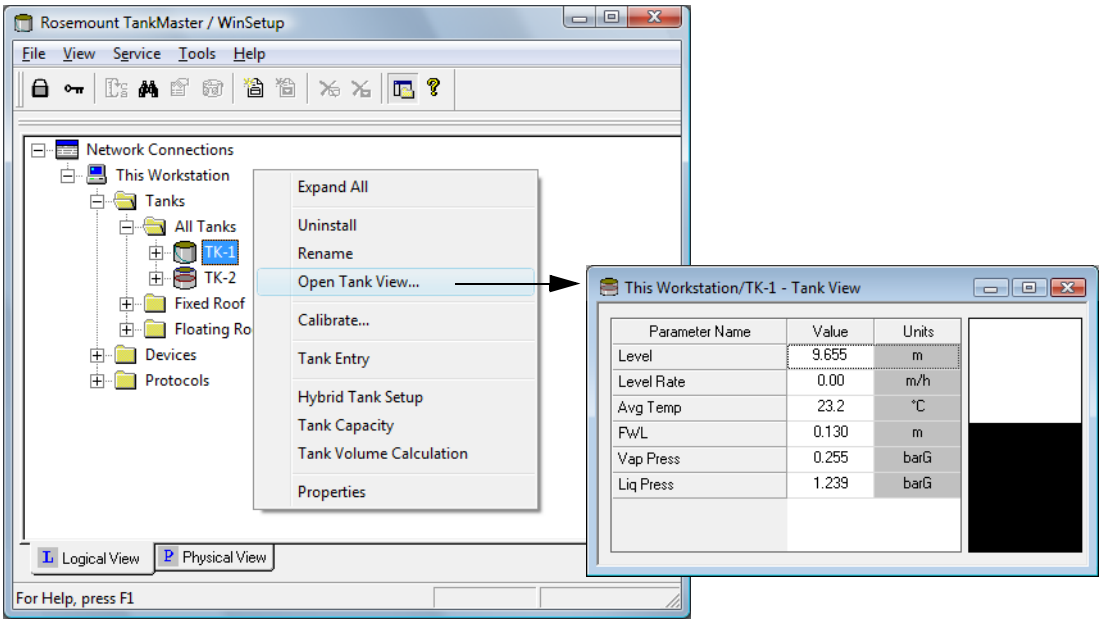


8. Click the **Save As** button if you wish to store the current tank view table for future use.

9. Click the **OK** button to save the current Tank View settings and close the window.

Note
When clicking the **Apply** or the **OK** button, the parameter setup is stored in the table layout that is currently used by the *Tank View* window.

To view the specified tank parameters click the right mouse button and choose the **Open Tank View** option:

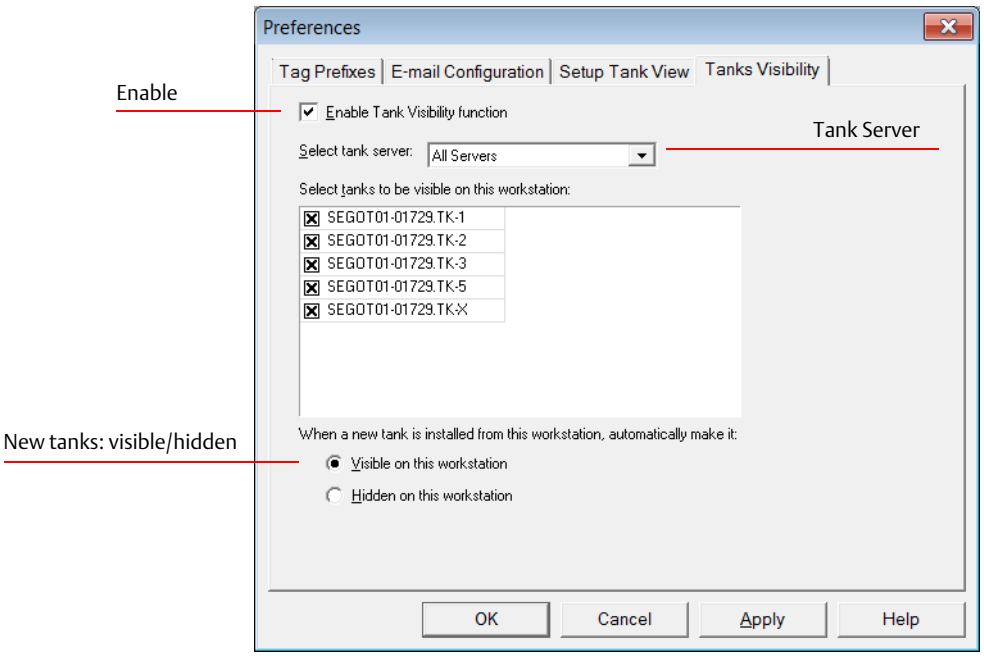


2.3.8 Tank visibility

The *Tanks Visibility* tab lets you configure tanks on a remote tank server to make them visible on the current WinOpi client.

To specify tanks to be visible on the current WinOpi client:

1. From the **Service** menu choose **Preferences** and select the *Tanks Visibility* tab:



2. Select the *Enable Tank Visibility function* check box.
3. From the *Select tank server* drop-down list select the remote tank server on which the tanks are installed.
4. In the **Select tanks to be visible on this workstation** pane, check the tanks you wish to make visible on the current workstation. In the default setting all tanks are visible.
5. Choose the **Visible on this workstation** option to make the selected tanks visible on the current workstation.
6. Click the **OK** button to store the current configuration and close the *Preferences* window.

Figure 2-3. Tanks Visiblity Enabled for All Tanks

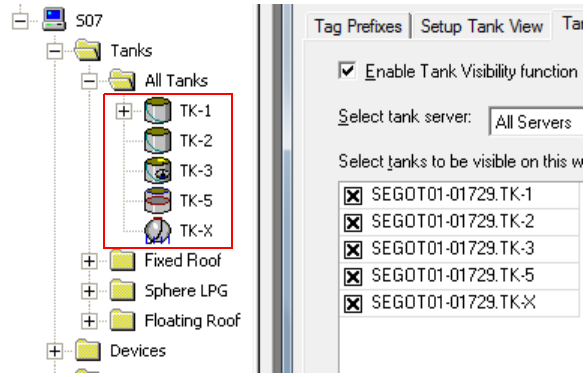
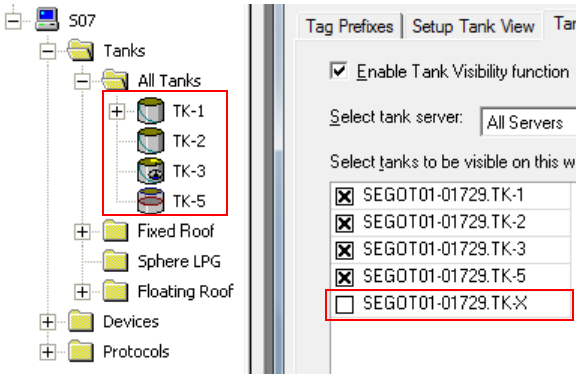


Figure 2-4. One Tank Disabled from Visiblity (TK-X)



2.4 Field device installation - overview

The *Rosemount TankMaster* software supports many field devices, for example:

- Rosemount 2460 System Hub
- Rosemount 2410 Tank Hub
- Rosemount 5900 Radar Level Gauge
- Rosemount 2240S Multi-input Temperature Transmitter
- Rosemount 2230 Graphical Field Display
- Rosemount 5408 Radar Level Transmitter
- Rosemount 5300 Guided Wave Radar
- Rosemount 3051/3051S Pressure Transmitter
- Rosemount 644 Temperature Transmitter

2.4.1 Configuration

A *TankMaster* installation includes configuration of the Rosemount Tank Gauging system for communication with the *TankMaster* work station and field devices as well as configuration of device specific parameters.

Configuration of radar level gauges includes:

- mapping to a specific tank
- communication parameters
- device specific parameters
- tank geometry
- tank environment parameters

Configuration of Auxiliary Tank Devices (ATDs) includes:

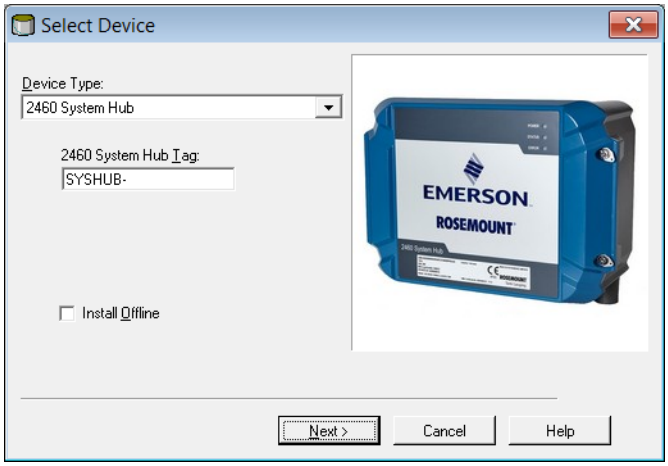
- communication address
- mapping of measurement variables to source devices
- Rosemount 2240S Multi-input Temperature Transmitter or other supported temperature transmitter
- temperature elements
- water level sensor
- Rosemount 2230 Graphical Field Display
- other supported field devices

2.5 Installing a Rosemount 2460 System Hub

This is a brief description of how to install and configure a Rosemount 2460 System Hub in a Rosemount Tank Gauging system. See the Rosemount 2460 System Hub Reference Manual (Document No. 00809-0100-2460) for more information on how to setup the Rosemount 2460.

To setup a Rosemount 2460:

1. Ensure that the Rosemount TankMaster WinSetup program is up and running.
2. Enable and configure a Protocol Channel in order to establish communication with the appropriate port on the TankMaster PC.
3. Start the installation wizard in TankMaster WinSetup:
   a. Click the right mouse button on the **Devices** folder.
   b. Select the *Install new* option.



4. Select device type 2460 System Hub.
5. Specify a name tag in the 2460 System Hub Tag input field. This tag will be used as an identifier of the Rosemount 2460 in various windows and dialogs.
6. Click the Next button to proceed with the installation wizard.
7. Verify communication with the host computer/TankMaster PC.
8. Verify that the Host and Field ports are properly configured. Host ports are used for communication with TankMaster work stations or other host systems. Field ports are used for communication with the Rosemount 2410 Tank Hub, the Rosemount 5900S Radar Level Gauge, and other field devices.
9. Configure the Tank Database. Ensure that the **Modbus Addresses** of the connected devices are properly set. These addresses must correspond to the database settings of the Rosemount 2410 Tank Hub.

2.6 Installing a Rosemount 2410 Tank Hub

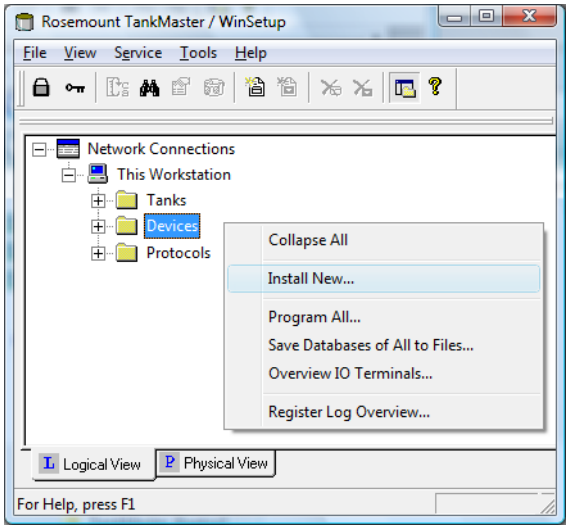
The installation wizard covers basic configuration of a Rosemount 2410 Tank Hub. If further configuration of Primary Bus, Secondary Bus, Relay Output, and Hybrid Density Calculation is required this must be done separately via the *2410 Tank Hub Properties* window, see the Rosemount 2410 Tank Hub Reference Manual (00809-0100-2410).

2.6.1 Installation wizard

It is very important that the Tank Database of the Rosemount 2460 System Hub is properly configured prior to configuring the Rosemount 2410 Tank Hub. This ensures that the system hub is able to collect data from the different field devices. See "Installing a Rosemount 2460 System Hub" on page 31 for more information on how to setup the 2460.

Perform the following steps to start the installation wizard in TankMaster WinSetup:

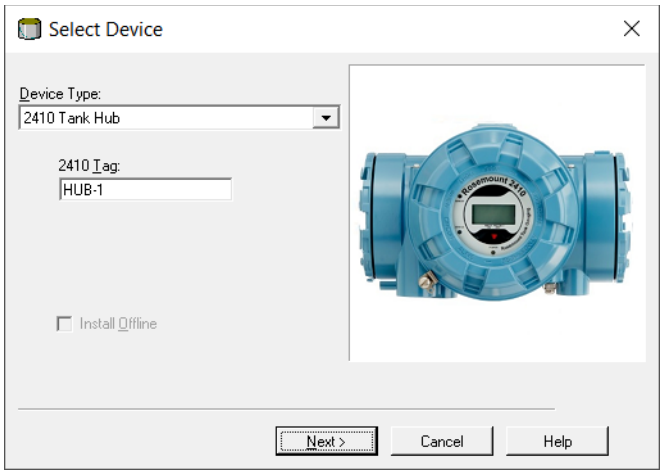
1. In the *Workspace* window select the Devices folder.



2. Click the right mouse button and select **Install New**, or from the **Service** menu choose the **Devices/Install New** option.
Now the *Select Device* window appears.

Device type

1. From the **Device Type** drop-down list, choose the 2410 Tank Hub option.

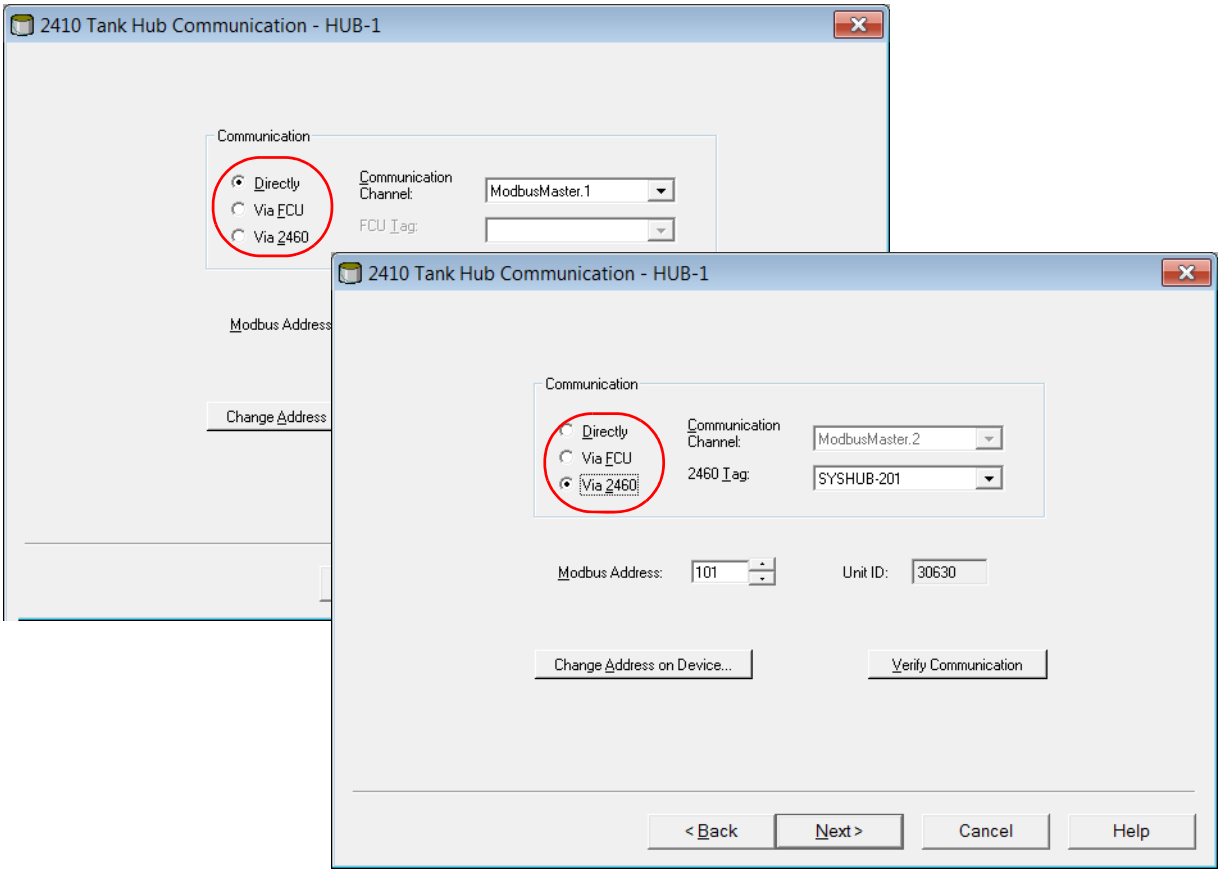


2. Type a name in the **2410 HUB Tag** input field.
   The tag will be used as an identifier for the Rosemount 2410 Tank Hub in various windows and dialogs.

3. Click the **Next** button.

Communication setup

1. Specify whether TankMaster communicates directly with the Rosemount 2410 Tank Hub, or via a Rosemount 2460 System Hub.



2. If the tank hub is connected to a system hub, select the appropriate system hub from the **2460 Tag** drop-down list.

3. If the tank hub is connected directly to a TankMaster PC and not via a system hub, specify the communication protocol channel which is associated with the communication port on the TankMaster workstation. To check which channels are enabled:

   a. in the WinSetup workspace open the **Protocols** folder
   b. click the right mouse button on the **ModbusMaster** protocol icon
   c. choose the **Properties** option

   To check which communication port that is associated with a certain channel:

   a. right-click the protocol channel icon
   b. open the *Communication* tab and check which communication port that is selected.

   See chapter "Master protocol channel configuration" on page 11 for more information on how to configure communication protocols.

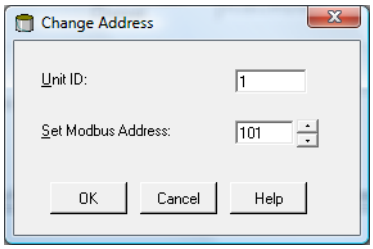
4. To verify communication with the tank hub, type the current Modbus address and click the **Verify Communication** button. The Unit Id will appear if the correct Modbus address was entered (the tank hub is shipped with the default Modbus address=247).

   In case you would like to change the current Modbus address, or the address is unknown, click the **Change Address on Device** button.

Note
In case several Rosemount 2410 Tank Hubs are connected using the same default address (247), you will have to change the addresses before the Verify command can be used. See How to change the Modbus address of the Rosemount 2410 for more information.

How to change the Modbus address of the Rosemount 2410

a. In the *2410 Tank Hub Communication* window click the **Change Address on Device...** button to open the *Change Address* window.



b. Enter the **Unit ID** and the new **Modbus Address**

   When changing the device address, the Unit Id is used as a unique identifier of the device. The Unit Id can be found on a label mounted on the device.

   Tip! If there is no other device connected that uses the same address as the current device, you can find the Unit Id by typing the current address into the Address field in the *2410 Tank Hub Communication* window and clicking the **Verify Communication** button.

c. Click the **OK** button to confirm the address settings and close the *Change Address* window.

d. In the *2410 Tank Hub Communication* window click the **Verify Communication** button to check that communication is established between the TankMaster work station and the Rosemount 2410 Tank Hub. The **Unit ID** will appear when TankMaster finds the tank hub.

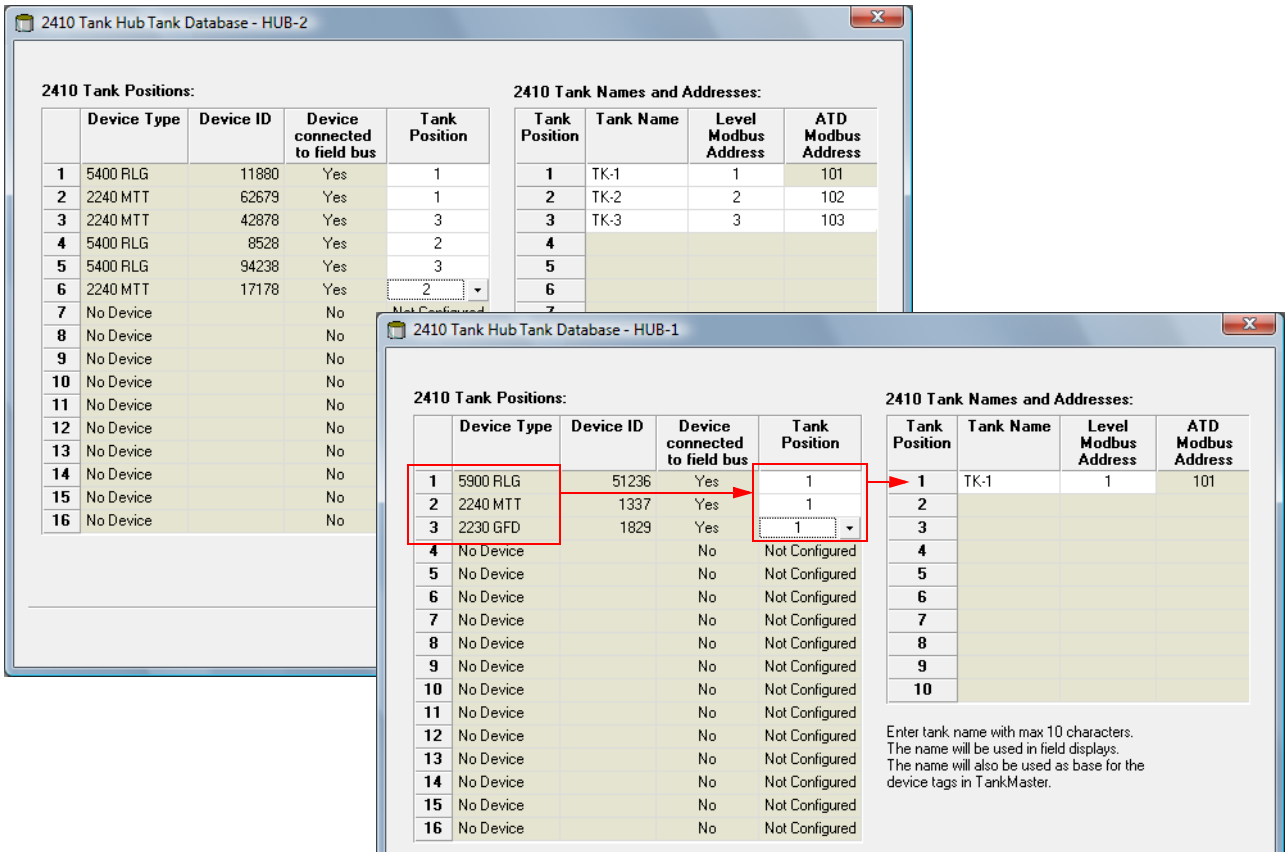
5. In the *2410 Tank Hub Communication* window click the **Next** button to continue the installation procedure of the tank hub.

Tank Database setup

Each tank is represented by a position in the Rosemount 2410 tank database. Each device connected to the Rosemount 2410 is mapped to a tank position. For each tank position, a name is assigned as an identifier of the tank. The tank database maps field devices to the various tanks, and identifies the devices whenever there is a request for measurement data from a Rosemount 2460 System Hub.

1. The **Device Type** column lists all devices that communicate on the Tankbus. Ensure that all devices connected to the Tankbus appear in the **Device Type** list to verify proper communication.

2. In the **Tank Position** column, map each device to a tank by selecting the appropriate number from the drop-down list in the tank database. The example below illustrates two different cases; a single tank connected to a Rosemount 2410 Tank Hub, and another case with three(1) tanks connected to a tank hub. Note that tank positions which are mapped to devices are enabled for editing. You may change tank name and Modbus address in the right-hand side of the *Tank Hub Tank Database* window.



3. Type the desired names in the **Tank Name** field. These tank names should also be used at a later stage when installing the tanks associated with the current Rosemount 2410 Tank Hub, see "Installing a tank" on page 115.

(1) *Mapping more than one tank requires the Multiple tank version of the Rosemount 2410 Tank Hub. See the Rosemount Tank Gauging System Data Sheet (Document No. 00813-0100-5100) for more information.*

4. For each tank, specify a Modbus address in the **Level Modbus Address** column to be associated with the level gauge. This must be the same Modbus address as configured in the tank database of the Rosemount 2460 System Hub. The Level Modbus Address is used to identify level gauges when distributing requests for measurement data from the system hub.

5. The various non-level devices on a tank are represented by a single ATD device in the Rosemount Tank Gauging system.

   In tank position 1, the Rosemount Tank Gauging system uses the Modbus address of the Rosemount 2410 Tank Hub itself as the ATD Modbus address. In the example above, the tank hub has Modbus address 101. This address is automatically used as the ATD Modbus address as well.

   For tank positions 2 to 10 you have to specify Modbus addresses in the **ATD Modbus Address** column to be associated with the different ATD devices. The ATD Modbus addresses must be the same as configured in the Rosemount 2460 System Hub's tank database.

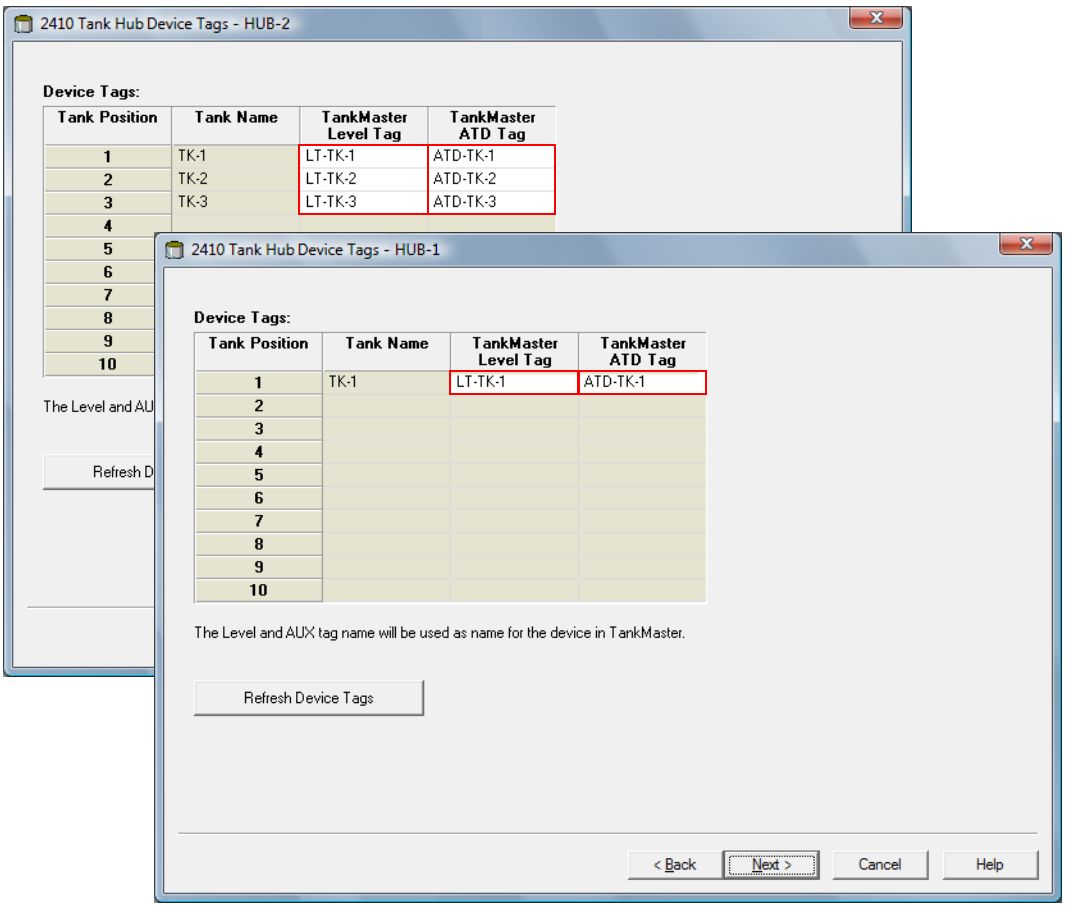
   An empty ATD Modbus address field indicates that no ATD device is mapped to that particular tank position.

   See "Installing a Rosemount 2460 System Hub" on page 31 and the *2460 System Hub Reference Manual* (Document No. 00809-0100-2460) for further information on how the tank databases of the Rosemount 2460 and Rosemount 2410 are related to each other.

6. Click the **Next** button to continue the installation procedure.

Device Tag setup

Level Tags and **ATD Tags** are configured automatically based on tank names in the *2410 Tank Hub Tank Database* window and the configuration of tag prefixes in the *Preferences/Tag Prefix* window, see "Setting the name tag prefixes" on page 24. However, it is possible to edit the Level Tag and ATD Tag fields.

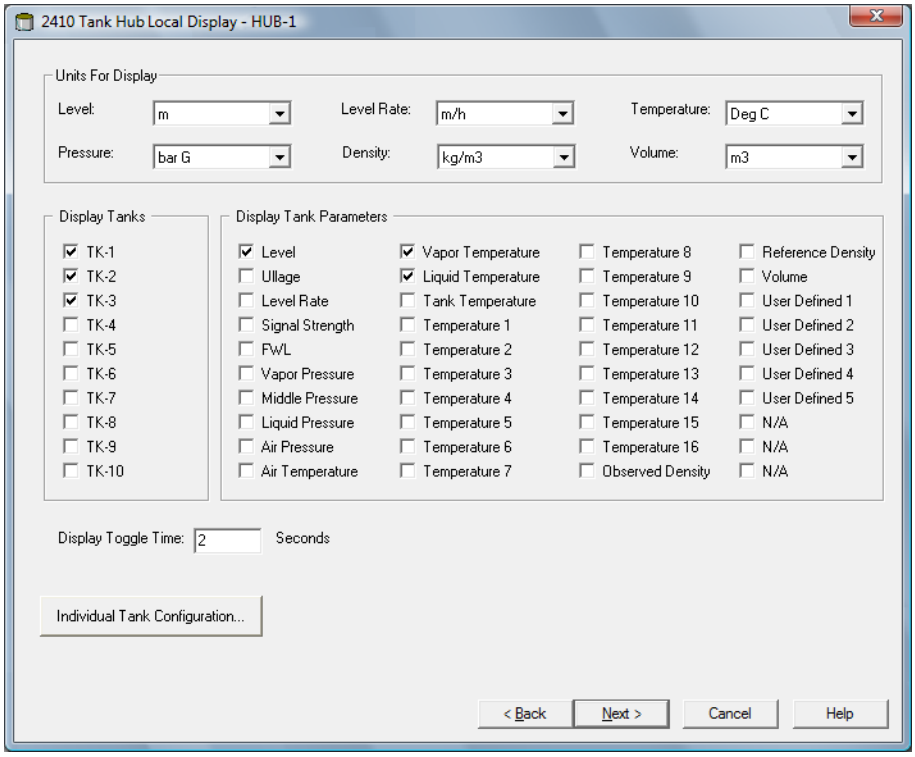


1. Verify that the **TankMaster Level Tag** is correct or type a new one.
2. Verify that the **TankMaster ATD Tag** is correct or type a new one.
   If the ATD tag field is empty and disabled then no ATD device is associated with that tank position.
3. Click the **Next** button to continue the installation procedure.

Local Display setup

Choose the parameters to be displayed on the integral display panel on the Rosemount 2410 Tank Hub. The display will alternate between the selected items at a rate given by the **Display Toggle Time**.

1. In the *Units for Display* pane, choose the desired measurement units from the drop-down lists. These measurement units will be used by the 2410 local display when presenting the various tank variables.



2. In the *Display Tanks* pane, select check boxes for the tanks that you want to present in the Rosemount 2410 integral display.

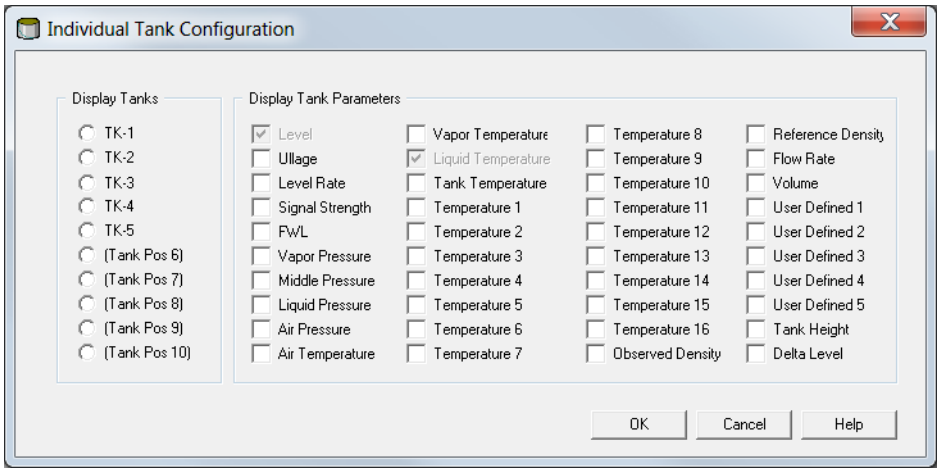
3. In the *Display Tank Parameters* pane, choose the tank parameters to be displayed by checking the appropriate boxes. See Table 2-1 below for more information on available parameters:

Table 2-1. Various Tank Parameters can be Presented on the Local Display

Variable	Description
Level	The current product level in the displayed tank.
Distance	Distance (ullage) is measured from the Tank Reference point to the product surface.
Level rate	The speed at which the product surface moves when emptying or filling the tank.
Signal strength	The signal strength of the radar level gauge measurement signal.
Free water level	Water surface level at the bottom of the tank. Available when a water level sensor is installed in the tank.
Vapor pressure	Tank vapor pressure.
Liquid pressure	Product liquid pressure.
Air pressure	Ambient air pressure.
Air temperature	Ambient air temperature.
Vapor temperature	Tank vapor temperature.
Product temperature	Average temperature of the product.
Tank temperature	Average temperature of product and vapor in the tank.
Temperature 1, 2 ...	Temperature value measured by element 1, 2, etc.
Observed density	The actual product density at the current product temperature.
Reference density	Density at reference temperature (used for inventory calculations).
Volume	Total observed volume.
User defined 1 to 5	Variables for advanced configuration.

4. Enter the **Display Toggle Time**. Information on the local display alternates between the selected items at a rate given by the Display Toggle Time value.

5. The tank hub can be configured to show different parameters for each tank on the Tank Bus. In the *2410 Tank Hub Local Display* window click the **Individual Tank Configuration** button:



6. The *Display Tanks* pane has a list of all tank positions in the tank database. Tank positions within brackets, for example (Tank Pos 6), are not configured in the Rosemount 2410's tank database.

7. Select the desired tank position and choose which parameters to show on the display. Repeat this procedure for each tank position.

8. Click the OK button to store the configuration and return to the *2410 Tank Hub* window.

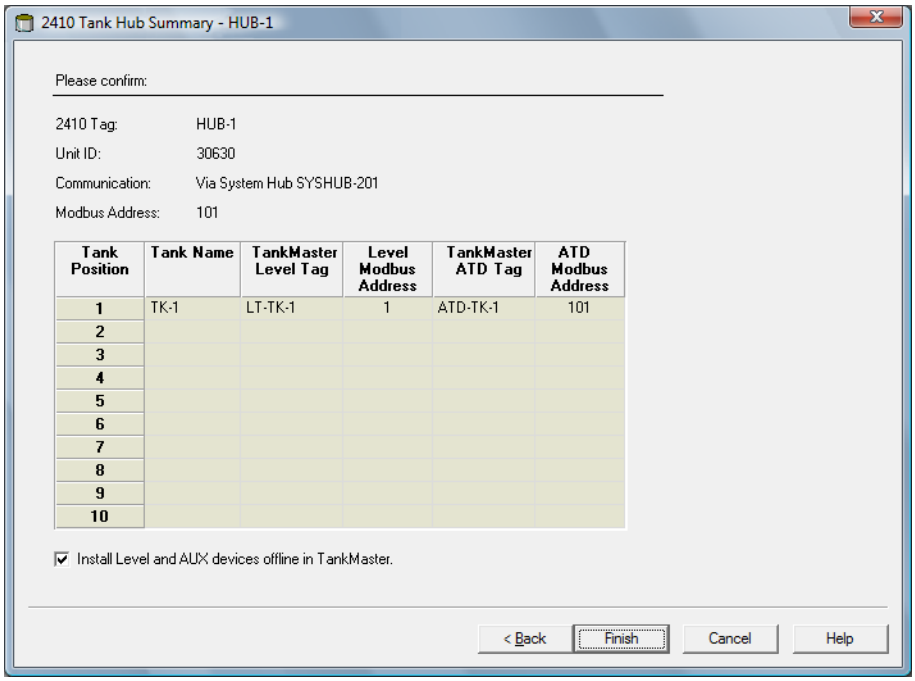
9. Click the **Next** button to continue the installation procedure.

Configuration summary

The *2410 Tank Hub Summary* window shows information about all devices included in the Rosemount 2410's tank database.

1. Verify that all Modbus addresses, level tags and ATD tags presented in the *2410 Tank Hub Summary* window are correct.

   In case you would like to make any changes, click the **Back** button until the appropriate configuration window appears.



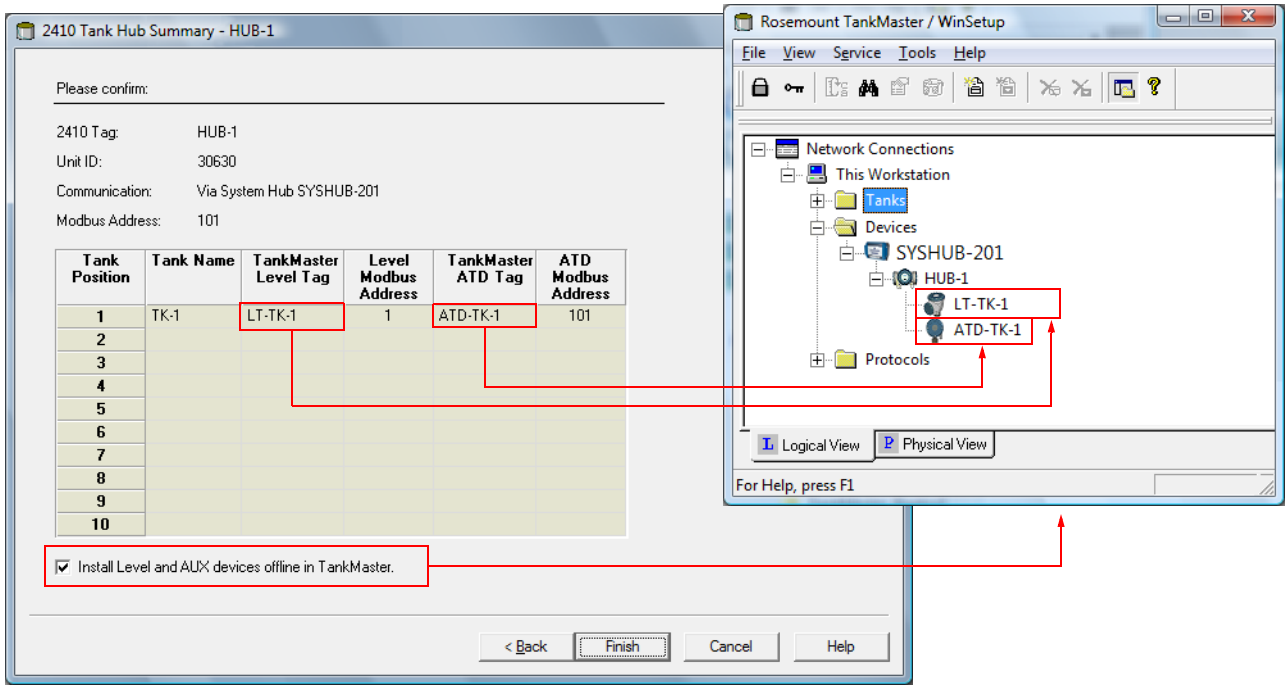
2. By selecting the **Install Level and AUX devices...** check box, field devices connected to the tank hub will automatically be installed in the TankMaster workspace as illustrated in Figure 2-5 on page 43. The check box is selected by default and this is the recommended setting.

   Devices need to be configured via the *Properties* window. See for example "Installing a Rosemount 5900 Radar Level Gauge" on page 46 and "Installing Auxiliary Tank Devices" on page 75.

   The installation procedure will be facilitated by using the **Install Level and AUX devices...** check box. However, the field devices (level gauge and ATD) can be installed at a later stage by using the device installation wizard for the respective device, see "Using the device installation wizard" on page 9.

3. Click the **Finish** button to confirm the installation. The installed devices will appear in the *Workspace* window as illustrated in Figure 2-5 on page 43.

Figure 2-5. Devices Appear in the WinSetup Workspace Window



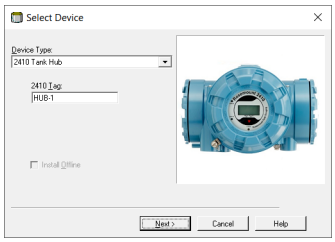
Advanced Configuration

The installation wizard does not include all configuration options available for a Rosemount 2410 Tank Hub. Further configuration can be done via the *2410 Tank Hub Configuration* window:

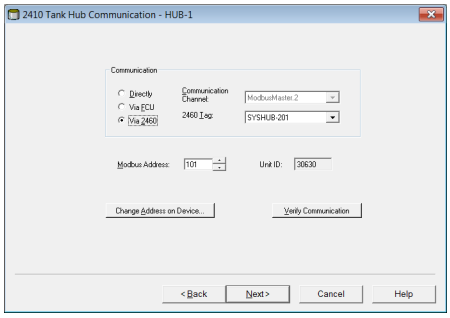
- host communication parameters for the Primary Bus
- host communication and emulation parameters for the Secondary Bus
- virtual relays
- hybrid density calculation

See the Rosemount 2410 Tank Hub Reference Manual (00809-0100-2410) for more information on how to configure a Rosemount 2410 Tank Hub.

2.6.2 Summary of Tank Hub installation and configuration



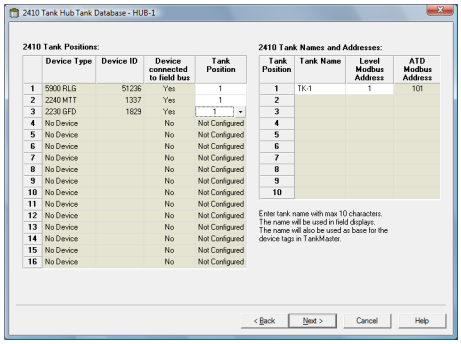
Select device type
Rosemount 2410 Tank Hub.



Communication setup.

Choose how the Rosemount 2410 connects to the TankMaster workstation.

Assign address and select communication channel.

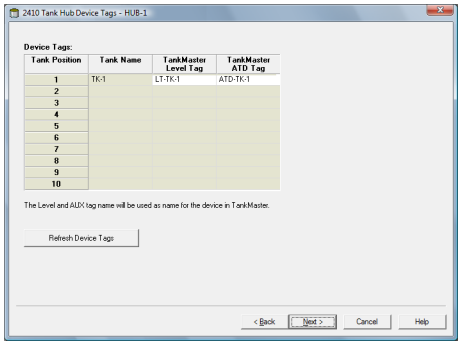


Tank Database setup.

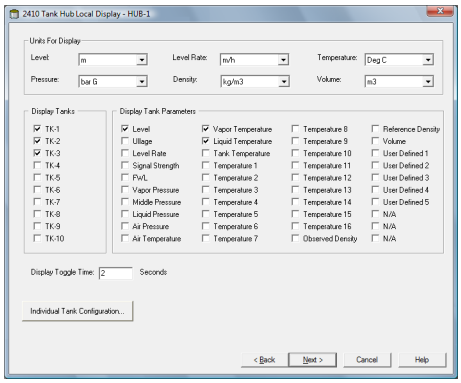
Map devices to tank position.

Specify tank name.

Assign Modbus address for level devices and ATD devices.



Enter level tags and ATD tags.

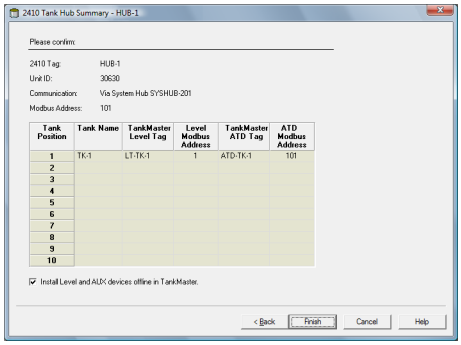


Local Display Setup.

Choose the desired measurement units for different tank parameters.

Select tanks and parameters.

Set the display parameter toggle time.



Verify the configuration.

Choose whether field devices should be installed automatically in the TankMaster workspace or not.

2.7 Installing a Rosemount 5900 Radar Level Gauge

This is a description of how to setup a Rosemount 5900 Radar Level Gauge by using the TankMaster WinSetup configuration software. It applies to the Rosemount 5900S as well as the Rosemount 5900C. Pictures in the examples below will show the Rosemount 5900S in most cases, but the functionality is the same for the Rosemount 5900C if not otherwise stated.

The Rosemount 5900 Radar Level Gauge is typically installed in TankMaster WinSetup as part of the Rosemount 2410 Tank Hub installation procedure. In a following step, the Rosemount 5900 is configured via the *5900 RLG Properties* window, see "Configuration via the Properties window" on page 47. The *5900 RLG Properties* window includes tabs for basic and advanced configuration.

When connecting a Rosemount 5900 Radar Level Gauge to a Rosemount 2410 Tank Hub in an existing Rosemount Tank Gauging system, the level gauge needs to be mapped to the appropriate tank in the tank hub's database. Configuration is performed via the *5900 RLG Properties* window. See "Adding a tank" on page 128 for further information.

A Rosemount 5900 is most conveniently installed by utilizing the integrated option included as part of the Rosemount 2410 Tank Hub installation procedure.

A Rosemount 5900 can be installed and configured by using the WinSetup installation Wizard (see "Installing a Rosemount 5900 using the installation wizard" on page 54). This method should only be used in special cases when, for example, the 5900 is connected to the Tankbus at a later stage and not available when installing the Rosemount 2410 Tank Hub.

The following configuration steps are included in the Rosemount 5900 Radar Level Gauge basic configuration:

- communication parameters
- antenna type
- tank geometry

Configuration of a Rosemount 5900 may also include:

- Tank Scan
- Empty Tank Handling

Due to the properties of the product, the tank shape, or other circumstances, further configuration may be needed in addition to the basic configuration. Disturbing objects and turbulent conditions in the tank may require that advanced measures are taken. Advanced configuration options include:

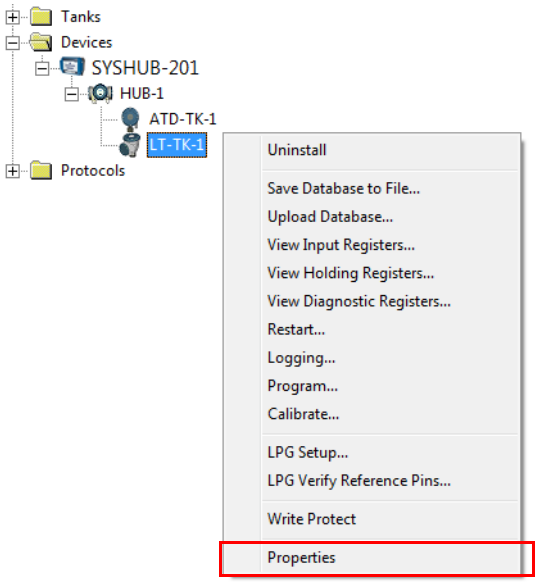
- Tank Environment
- Tank Shape
- Surface Echo Tracking
- Filter Settings

See "Advanced configuration" on page 58 for further information on the advanced configuration options.

2.7.1 Configuration via the Properties window

The basic configuration procedure of a Rosemount 5900 Radar Level Gauge is straightforward and easy to perform. All configuration options are available in the *Rosemount 5900 RLG Properties* window. For a basic configuration of the Rosemount 5900 do the following:

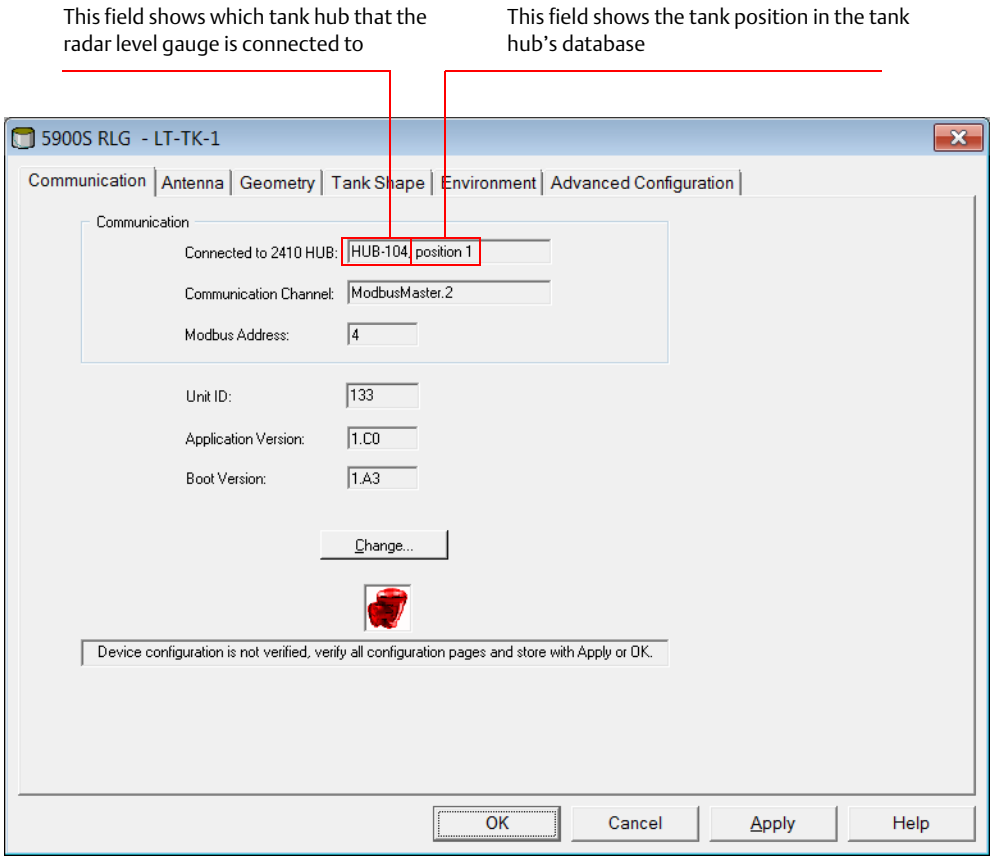
1. In the *WinSetup Workspace* window, open the **Devices** folder and select the Rosemount 5900S Radar Level Gauge icon.



2. Click the right mouse button and select **Properties**, or from the **Service** menu select the **Devices/Properties** option.

   Response: the *5900 RLG Properties* window appears.

   The *Communication*, *Antenna*, and *Geometry* tabs cover basic configuration of the Rosemount 5900.



3. Select the *Communication* tab. Note that a red gauge icon means that the device needs to be configured.

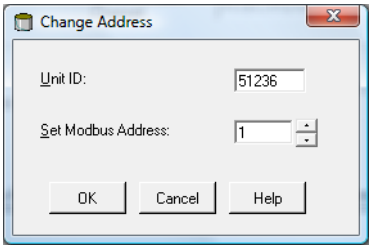
4. Verify the communication settings. The *Connected to HUB* field indicates which tank position that the Rosemount 5900 is associated with in the Rosemount 2410 tank database. Normally, the single tank version of the Rosemount 2410 is used for Rosemount 5900S level gauges. In this case the *Position in 2410 HUB* field will be equal to 1 since there is only one tank position that is used in the tank hub's database.

   In case the multiple tank version of the Rosemount 2410 is used to connect several tanks, the level gauge can be mapped to another tank through the *2410 Tank Hub Properties/Tank Database* window:

   a. in the WinSetup workspace click the right mouse button on the Rosemount 2410 icon,
   b. select the Properties option, and open the *Tank Database* tab.
   c. select the desired tank position.

   See "Tank Database setup" on page 36 for more information on Rosemount 2410 tank database setup.

5. Verify that the Modbus address is correct. To change the Modbus address:
   a. Click the **Change** button to open the *5900 RLG Communication* window.
   b. Click the Change Address on Device button to open the *Change Address* window:



c. Enter the **Unit ID**.
When changing the device address, the Unit Id is used as a unique identifier of the device. The Unit Id can be found on the Rosemount 5900 main label.

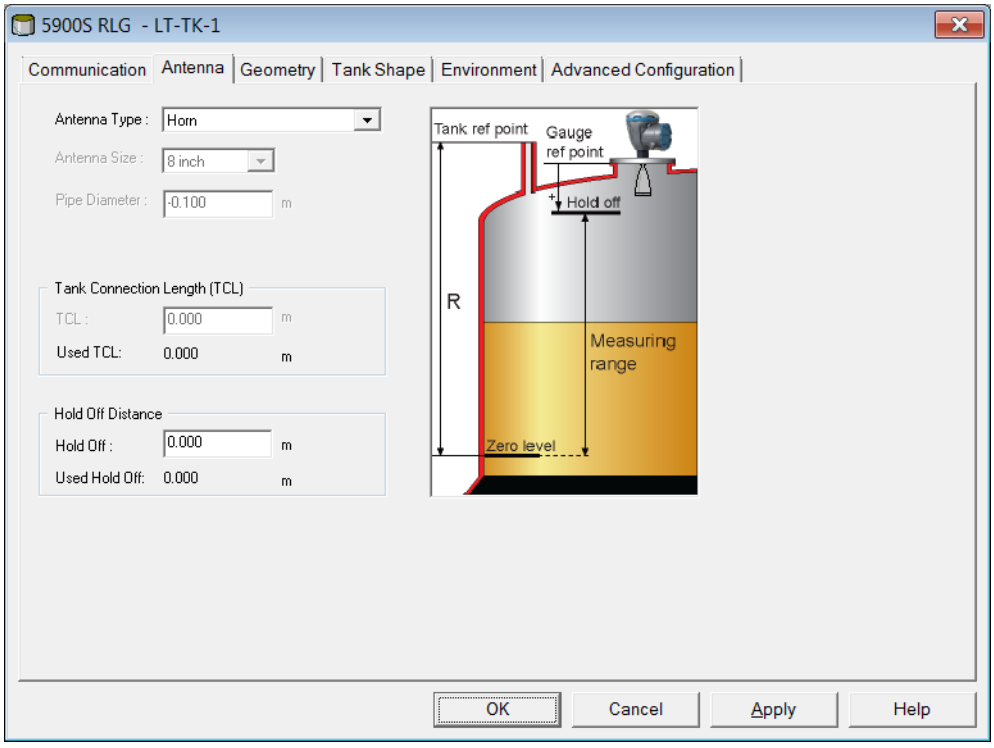
d. Set the desired address in the **Set Modbus Address** input field.

e. Click **OK** to confirm the settings and to close the *Change Address* window.

f. Click **OK** to close the *5900 RLG Communication* window.

6. In the *5900 RLG Properties/Communication* window click the **Apply** button to store the Modbus address in the 5900 holding register.

7. In the *5900 RLG Properties* window select the *Antenna* tab:



8. Select one of the predefined **Antenna Types** to match the antenna attached to the level gauge. For predefined antennas, a number of parameters are configured automatically in order to optimize measurement performance.

For non-standard antennas you may choose one of the User Defined antennas. However, it is recommended that you contact Emerson Automation Solutions/Rosemount Tank Gauging for advice before using this advanced option.

The following antenna types are available:

5900 with Horn Antenna

- Horn

5900 with Parabolic Antenna

- Parabolic

5900 with Still-pipe Array Antenna

- Still-Pipe Array Fixed
- Still-Pipe Array Hatch

5900 with LPG Antenna

Depending on the pressure rating of the flange, select one of the following options:

- LPG/LNG 150 PSI + Valve
- LPG/LNG 150 PSI
- LPG/LNG 300 PSI + Valve
- LPG/LNG 300 PSI
- LPG/LNG 600 PSI + Valve
- LPG/LNG 600

5900C with Cone Antenna

Available options:

- Cone 4” PTFE
- Cone 4” Quartz
- Cone 6” PTFE
- Cone 6” Quartz
- Cone 8” PTFE
- Cone 8” Quartz

5900C with Cone Pipe Antenna

Available options:

- Cone Pipe PTFE
- Cone Pipe Quartz

Pipe Diameter

For **Still-pipe Array**, **LPG**, and **Cone Pipe**(1) antennas you need to specify Pipe Diameter. The Pipe Diameter parameter compensates for the lower microwave propagation speed inside a still-pipe. See also "Using the Calibrate function" on page 138 for information on how to calibrate the 5900 for still-pipe installations.

For Cone Pipe(1) antennas it is very important that the accurate pipe diameter is input to WinSetup in order to avoid scale factor deviations which may result in inaccurate level readings. For Cone Pipe antennas supplied by factory the following nominal values are recommended as input in TankMaster WinSetup:

Antenna	Nominal Pipe Diameter
Cone Pipe 1"	30 mm
Cone Pipe 2"	56 mm

Antenna Size

For Still-pipe Array antennas, various antenna size options are available: 5, 6, 8, 10, and 12 inch.

User Defined antenna (advanced)

The User Defined option should only be used for special applications when using non-standard antennas:

a. Choose the appropriate antenna type:
   - User Defined Free Propagation
   - User Defined Still-Pipe
   - User Defined Still-Pipe Array

b. Enter the **Tank Connection Length** in the **TCL** input field.

c. For still pipe applications, type the inner diameter of the still pipe in the **Pipe Diameter** input field.

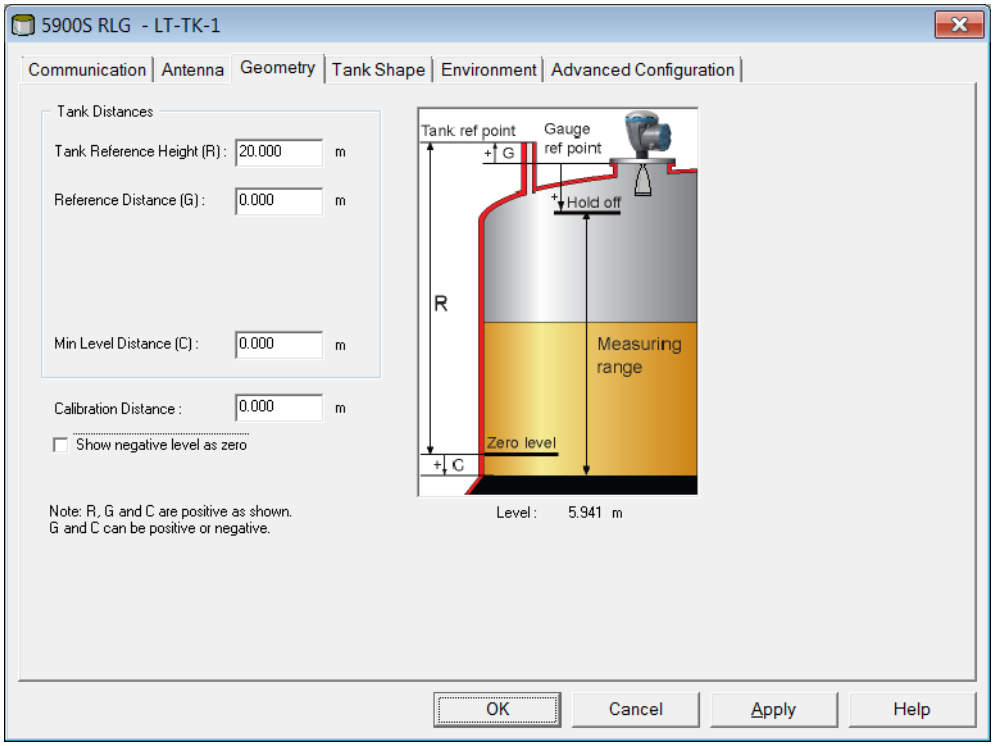
d. In case there are disturbances close to the nozzle you may need to adjust the **Hold Off Distance**. By increasing the Hold Off distance, the measurement range is reduced in the upper part of the tank.

9. In the *5900 RLG Properties/Antenna* window click the **Apply** button to save the configuration.

See the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900) and the Rosemount 5900C Radar Level Gauge Reference Manual (00809-0100-5901) for more information on antenna configuration.

(1) Rosemount 5900C only

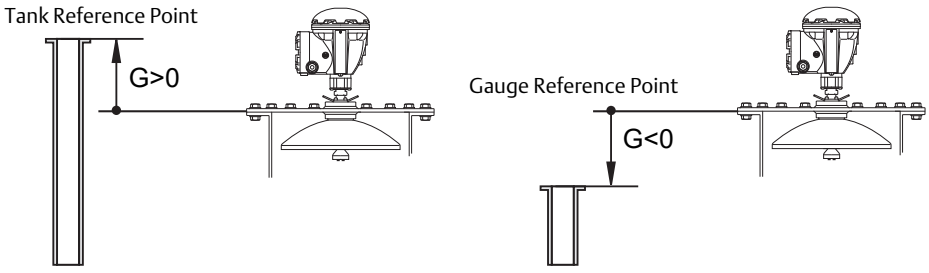
10. In the *5900 RLG Properties* window select the *Geometry* tab:



11. Enter the following tank geometry parameters:

a. **Tank Reference Height (R)**
This is the distance from the hand dip nozzle (Tank Reference Point) to the Zero Level (Datum Plate) close to the bottom of the tank.

b. **Reference Distance (G)**
This is the distance from the Gauge Reference Point to the Tank Reference Point, which is located at the side of the flange that meets the tank nozzle.
G is positive if the Tank Reference Point is located above the Gauge Reference Point, otherwise G is negative.



When using a Rosemount 5900 with Still-pipe Array antenna and hinged hatch, the Tank Reference Point is located at the hand-dip plate inside the hatch. The hand-dip plate is also used as the Gauge Reference Point for this antenna type, which means that G=0.

c. **Minimum Level Distance (C)**
This is defined as the distance between the Zero Level (Dipping Datum Point) and the minimum level for the product surface. By specifying a C-distance the measuring range can be extended to the bottom of the tank.

C>0: the level gauge presents negative level values when the product surface is below the Zero Level.
The **Show negative level values as zero** check box lets you present product levels below the Zero Level (Datum plate) as equal to zero.

C=0: measurements below the Zero Level will not be approved, i.e. the RLG will report "invalid level" if the product level is below the Datum Plate.

12. Enter the Calibration Distance.
Use this parameter to calibrate the level gauge so that measured product levels match hand dipped levels. A minor adjustment may be necessary when the gauge is installed if, for example, there is a deviation between the actual tank height and the height given by tank drawings.

For **still-pipe** applications the **Calibrate** function in the TankMaster WinSetup program is a useful tool to configure the Calibration Distance and the Correction Factor, see "Level gauge calibration" on page 137 for more information.

13. Click the **OK** button to save the configuration and close the configuration window.

In addition to the configuration steps described above, a basic configuration of the 5900 may include using the Tank Scan function to verify that there are no disturbing objects in the tank that may interfere with the level measurements. Also, the Empty Tank Handling function may be used to optimize measurement performance near the tank bottom.

See "Basic Configuration" in the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900) and the Rosemount 5900C Radar Level Gauge Reference Manual (00809-0100-5901) for more information

Further configuration options are available in the *Tank Shape, Environment*, and *Advanced Configuration* tabs, see "Advanced configuration" on page 58.

2.7.2 Installing a Rosemount 5900 using the installation wizard

The installation wizard in TankMaster WinSetup is a tool that may be used to install and configure a Rosemount 5900 Radar Level Gauge and other devices.

Normally a Rosemount 5900 is installed as part of the installation procedure for a Rosemount 2410 Tank Hub. However, the installation wizard lets you install a Rosemount 5900 in TankMaster separately from the tank hub installation:

1. Ensure that the tank databases of the **Rosemount 2460 System Hub** and the **Rosemount 2410 Tank Hub** are properly configured and include the new Rosemount 5900 Radar Level Gauge. Ensure that the correct level gauge Modbus address is used (see "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).

2. Install and configure the Rosemount 5900 as described in "Using the installation wizard" on page 55.

3. Verify that the Rosemount 5900 communicates with the Rosemount 2410 Tank Hub. Use for example the tank hub's Device Live List function to see all devices connected to the tank hub. The live list is available by right clicking the tank hub's device icon.

In most cases the following procedure is recommended when installing a new Rosemount 5900 Radar Level Gauge:

1. Install and configure the Rosemount 2460 System Hub and the Rosemount 2410 Tank Hub. Ensure that the correct level gauge Modbus address is configured for the new Rosemount 5900 (see "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).

2. In the *2410 Tank Hub Summary* window select the **Install Level and AUX devices** check box to automatically install the Rosemount 5900 in the TankMaster workspace.

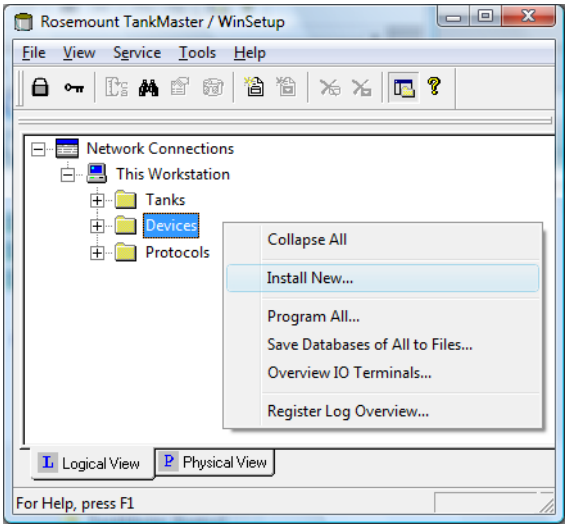
3. Configure the Rosemount 5900 (see "Configuration via the Properties window" on page 47).

See also "Adding a tank" on page 128 for further information on adding tanks and devices to a Rosemount Tank Gauging system.

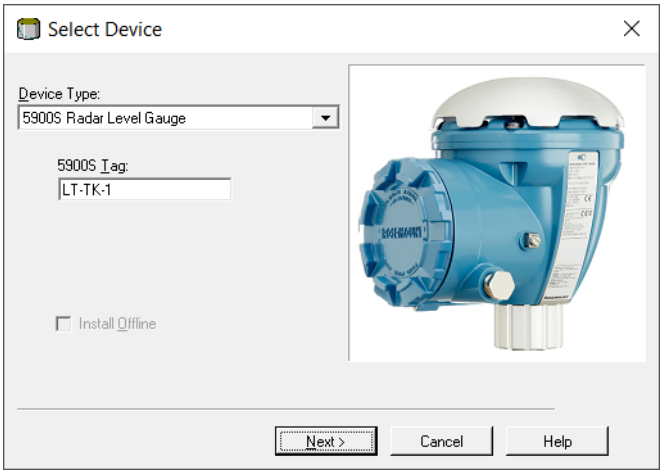
Using the installation wizard

To configure a Rosemount 5900 by using the WinSetup installation wizard follow these steps:

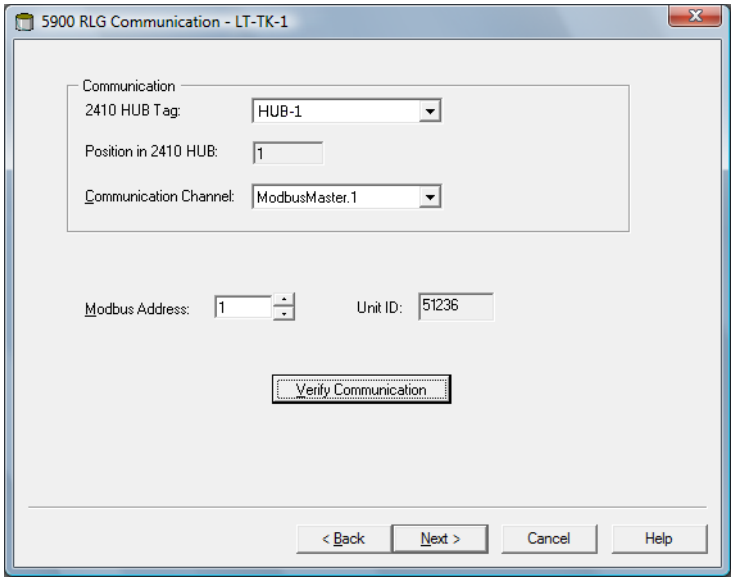
1. In the *Workspace* window select the **Devices** folder.



2. Click the right mouse button and select **Install New**, or from the **Service** menu select **Devices/Install New**.
The *Select Device* window appears:



3. Select **Device Type** *5900S/5900C Radar Level Gauge* from the drop-down list.
4. Enter the level tag to be used for identifying the Rosemount 5900.
5. Click the **Next** button to open the *5900 RLG Communication* window:



6. In the 2410 HUB Tag drop-down list, choose the tank hub that the Rosemount 5900 Radar Level Gauge is connected to. Normally, there is one tank hub for each tank equipped with a Rosemount 5900.

7. Enter the **Modbus address** for the level gauge. This address must be available in the tank databases of the Rosemount 2460 System Hub and the Rosemount 2410 Tank Hub.

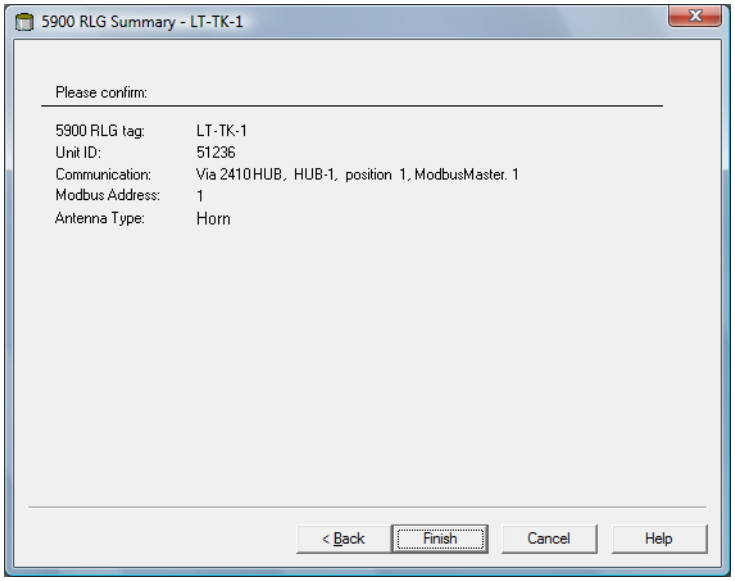
8. Click the **Verify Communication** button to verify that the TankMaster PC communicates with the level gauge. The Unit ID will appear when contact is established.

9. Check the Position in 2410 HUB field to verify that the Rosemount 5900 is mapped to the correct tank position in the Rosemount 2410 tank database. Normally, the single tank version of the Rosemount 2410 Tank Hub is used for a Rosemount 5900 level gauge. In this case the Position in 2410 HUB field will be equal to 1 since there is only one tank position that is used in the Rosemount 2410 tank database.

   In case the multiple tank version of the Rosemount 2410 Tank Hub is used for several tanks, the level gauge can be mapped to the desired tank via the *2410 Tank Hub Properties/Tank Database* window (in the WinSetup workspace, click the right mouse button on the 2410 icon and choose the Properties option).
   See "Tank Database setup" on page 36 for more information on 2410 Tank Database setup.

10. Click the **Next** button to proceed with configuration of the Rosemount 5900.

11. For descriptions of the *5900 RLG Antenna* and the *5900 RLG Geometry* windows, refer to the appropriate parts in chapter "Configuration via the Properties window" on page 47.



12. In the *5900 RLG Summary* window, click the **Finish** button to verify the configuration and finish the installation wizard. In case some part of the configuration needs to be changed, click the **Back** button until the desired window appears.

See “Basic Configuration” in the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900) or the Rosemount 5900C Radar Level Gauge Reference Manual (00809-0100-5901) for more information.

Further configuration options are available in the *5900 RLG Properties* window, see “Advanced configuration” on page 58.

2.7.3 Advanced configuration

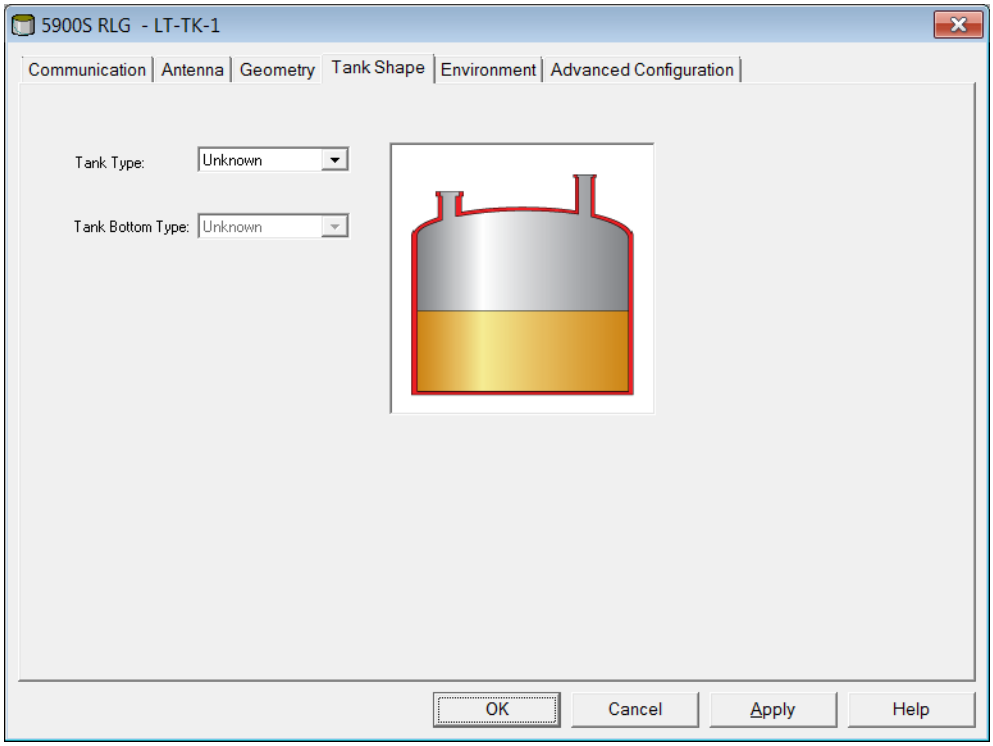
In addition to the basic configuration, there are advanced configuration options available for the Rosemount 5900 Radar Level Gauge. These may be used to optimize measurement performance for certain applications.

Tank Shape

The **Tank Type** and **Tank Bottom Type** parameters optimize the Rosemount 5900 for various tank geometries and for measurements close to the tank bottom.

To configure the Rosemount 5900 for a certain tank shape, do the following:

1. In the *5900 RLG Properties* window select the *Tank Shape* tab:



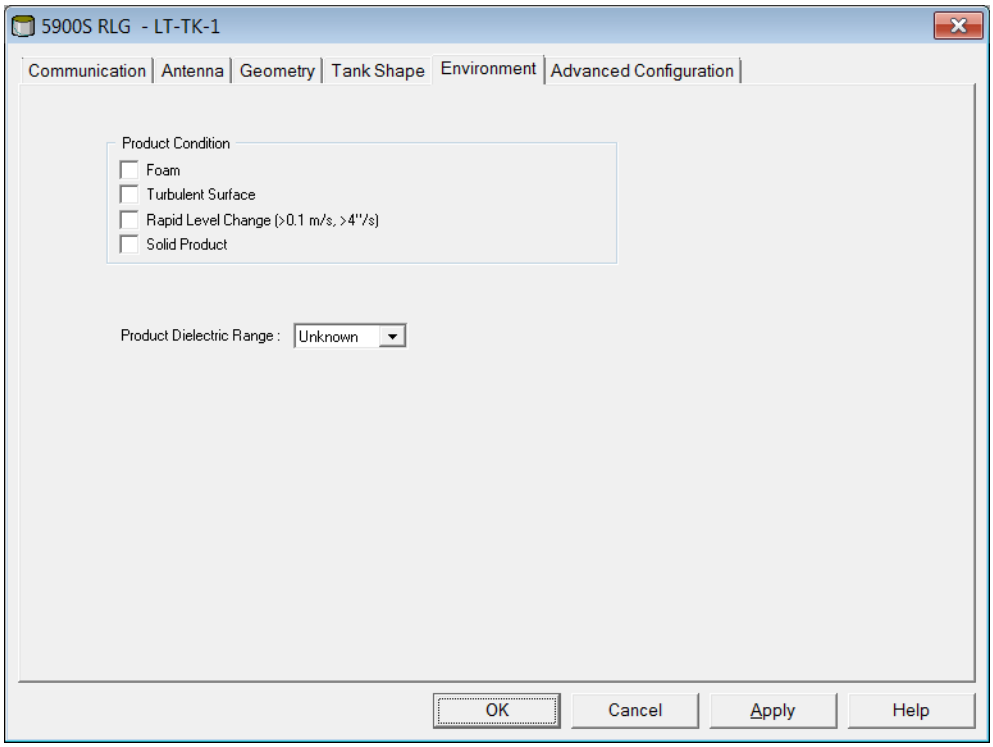
2. Select a **Tank Type** option that is similar to the actual tank. Choose *Unknown* if there is no applicable option.
3. Select **Tank Bottom Type** that matches the actual tank. Choose *Unknown* if there is no applicable option.
4. Click the **OK** button to save the configuration and close the window.

Tank Environment

Certain tank conditions may require additional configuration of the Rosemount 5900 Radar Level Gauge in order to optimize measurement performance. By considering environmental conditions in the tank, the Rosemount 5900 can compensate for conditions such as rapid level changes, weak echo signals, or varying surface echo amplitudes.

To configure a Rosemount 5900 Radar Level Gauge for special tank conditions:

1. In the *5900 RLG Properties* window select the *Environment* tab:



2. Select the check boxes that correspond to the conditions in the tank.
   Use as few options as possible. It is recommended that no more than two options are used simultaneously.

3. Select **Product Dielectric Range** from the drop-down list.
   Select the *Unknown* option if the correct value range is unknown or if the contents of the tank is changing on a regular basis.

4. Click the **OK** button to save the configuration and close the window.

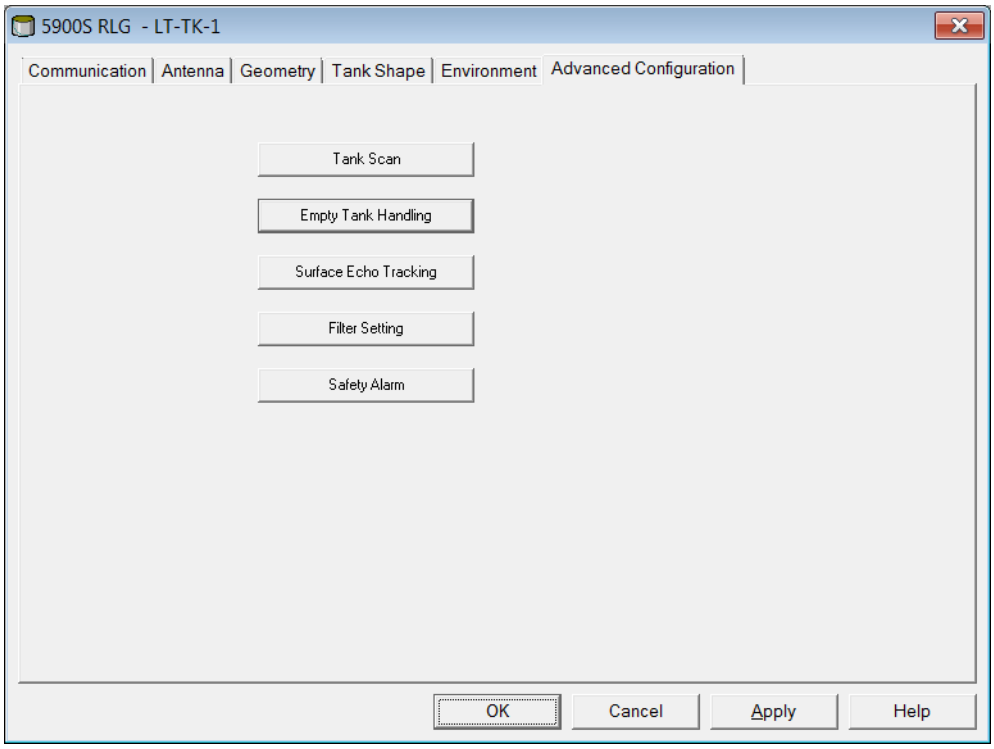
See the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900) or the Rosemount 5900C Radar Level Gauge Reference Manual (00809-0100-5901) for more information for more information.

The Advanced configuration tab

The *Advanced Configuration* tab provides further configuration options. The following options are available:

- Tank Scan(1)
- Empty Tank Handling(1)
- Surface Echo Tracking
- Filter Settings
- Safety Alarm (only used for SIL safety systems)

Figure 2-6. The *5900S RLG Properties/Advanced Configuration* window



For information on the *Advanced Configuration* tab features, see the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900) or the Rosemount 5900C Radar Level Gauge Reference Manual (00809-0100-5901.

(1) *May also be used in Basic configuration.*

2.8 Installing the Rosemount 5900S 2-in-1 version

2.8.1 Overview

Installing a 2-in-1 Rosemount 5900S Radar Level Gauge is in most parts similar to installing a standard 5900S. A significant difference though, is that in the TankMaster operator's interface the Rosemount 5900S 2-in-1 version will be configured as two separate gauges, and each gauge will be associated with its own tank.

To install and configure a 2-in-1 version of the Rosemount 5900S level gauge:

1. In Rosemount TankMaster WinSetup, configure the Rosemount 2460 System Hub's tank database by adding two Rosemount 5900S gauges.
2. In Rosemount TankMaster WinSetup, install the Rosemount 2410 Tank Hub.
3. Configure the new tank hub's tank database:
   a. map the two Rosemount 5900S gauges to two different tank positions, i.e. configure the Primary and Secondary gauges as if they are installed on two different tanks
   b. assign a Level Modbus address for each Rosemount 5900S
4. Assign tags for the Rosemount 5900S Radar Level Devices and the Auxiliary Tank Device(1) (ATD). The ATD includes various non-level devices such as temperature transmitters, displays, and pressure transmitters.
5. Install the devices in the TankMaster workspace. This is done automatically by the installation wizard for the Rosemount 2410 in case the Install Level and AUX devices... check box is selected in the *Rosemount 2410 Tank Hub Summary* window.
6. Configure the level gauges and ATD devices (right-click the device icon and select Properties).
7. Install two new tanks to be associated with the primary and secondary Rosemount 5900S radar level gauges.
8. Assign a Rosemount 5900S and an ATD for the primary tank.
9. Assign a Rosemount 5900S for the secondary tank. Note that the primary and secondary tanks in TankMaster workspace represent one tank in real life.
10. Configure the tanks.
11. Open the TankMaster workspace to verify correct installation of tanks and devices.

(1) *Auxiliary Tank Device (ATD) is used in the Tank Database of the Rosemount 2410 Tank Hub to designate various devices such as temperature and pressure transmitters, displays and other non-level devices. See* "Installing a Rosemount 2410 Tank Hub" on page 32 *for more information on the Auxiliary Tank Device (ATD) concept.*

Configuration example of Rosemount 5900S 2-in-1

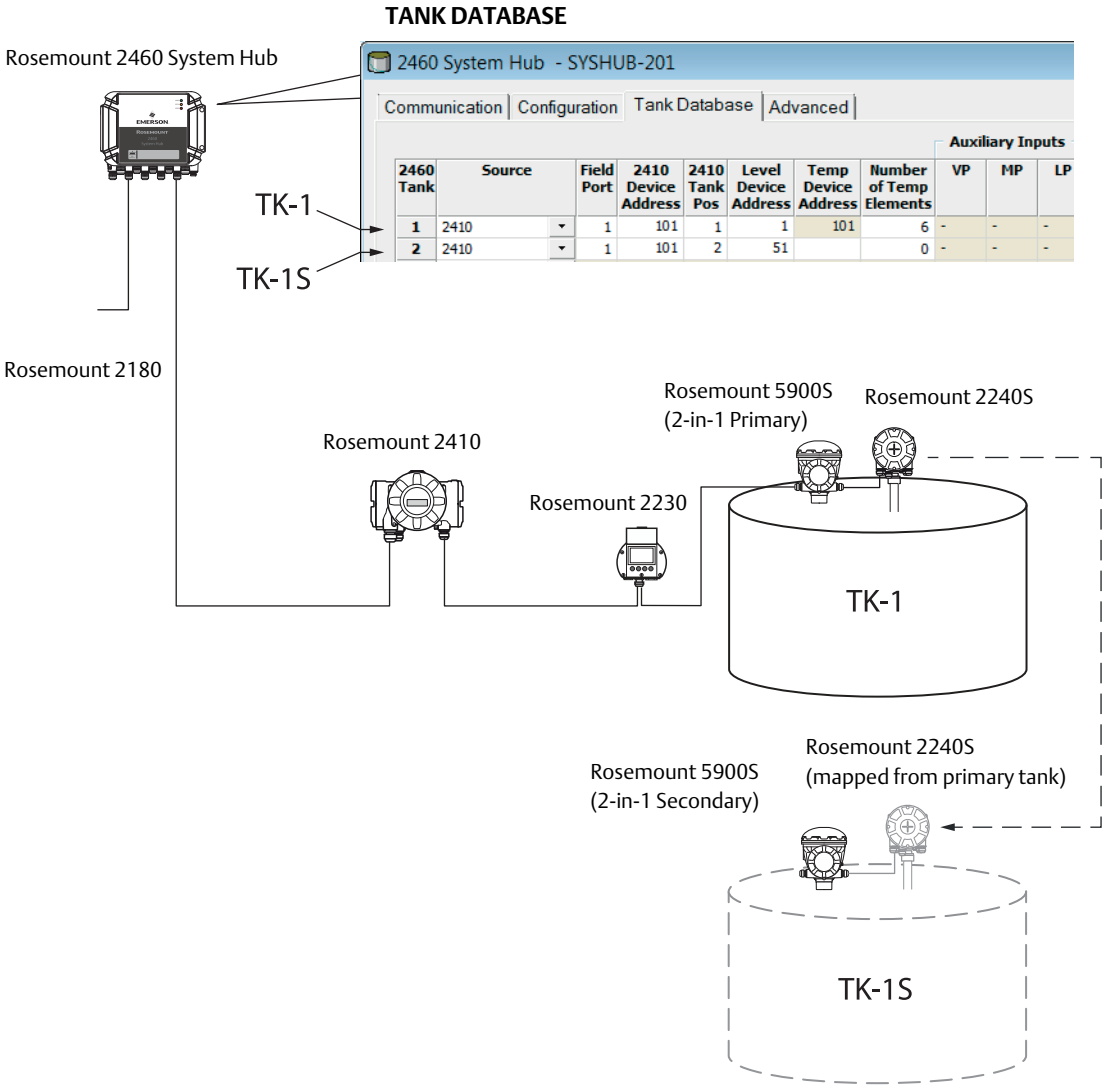
The Rosemount 5900S 2-in-1 version is installed and configured in TankMaster as a tank gauging system with two tanks. Various configuration options are possible:

a. Primary tank with 5900S and ATD[(1)] (2240S, 2230 ...).
Secondary tank with 5900S.

b. Primary tank with 5900S and ATD (2240S, 2230 ...).
Secondary tank with 5900S. ATD on Primary tank mapped to secondary tank (see example in Figure 2-7).

c. Primary tank with 5900S and ATD (2240S, 2230...).
Secondary tank with 5900S and redundant ATD.

Figure 2-7. Example of a Rosemount 5900S 2-in-1 System



(1) *See* "Installing a Rosemount 2410 Tank Hub" on page 32 *for more information on the Auxiliary Tank Device (ATD) concept.*

2.8.2 Installation and configuration

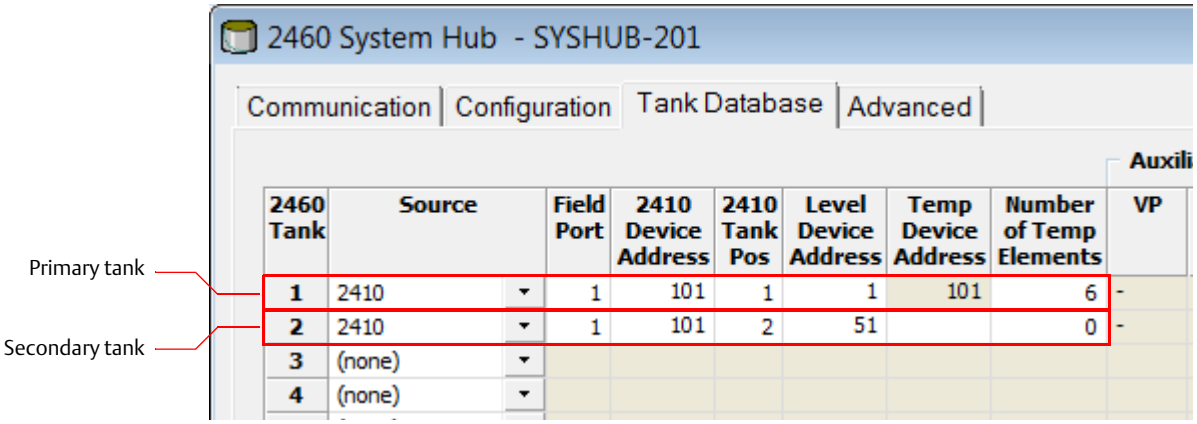
To install and configure the 2-in-1 version of the Rosemount 5900S, follow these steps:

1. Start the *TankMaster Winsetup* program.
2. Configure the Rosemount 2460 System Hub's tank database.
   Since the Rosemount 5900S 2-in-1 version includes two separate gauges, you will have to add two Level Device addresses in the Tank Database.

Assign Modbus addresses for the Rosemount 5900S 2-in-1 level devices. Example of primary and secondary addresses for the 2-in-1 version of the Rosemount 5900S:

Primary tank TK-1: address=1

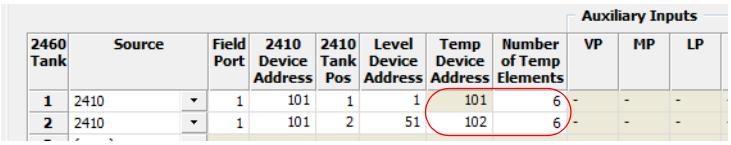
Secondary tank TK-1S: address=51



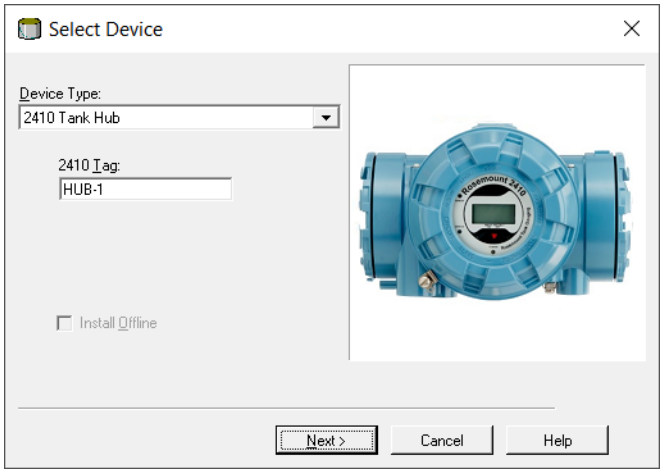
- It is recommended that Modbus address 50 + "X" is used for the secondary level device, where "X" is the address of the primary level device.
- For the Primary tank the temperature device will automatically be assigned the same Modbus address as the Rosemount 2410 Tank Hub.
- For the Secondary tank you will not need to enter a "Temp Device Address".
- Do not configure any temperature elements (Number of Temp Elements=0) for the Secondary temperature device.

Optional

In case two temperature transmitters are installed on the tank, one to be associated with the Primary and the other to the Secondary tank, you will need to configure Temp Device Address as well as Number of Temp Elements for both tanks. This configuration is like a standard configuration with one Rosemount 2410 connected to two separate tanks.



3. Proceed with installing a Rosemount 2410 Tank Hub. In the WinSetup workspace, select the *Devices* folder, click the right mouse button and select **File>Install New**:



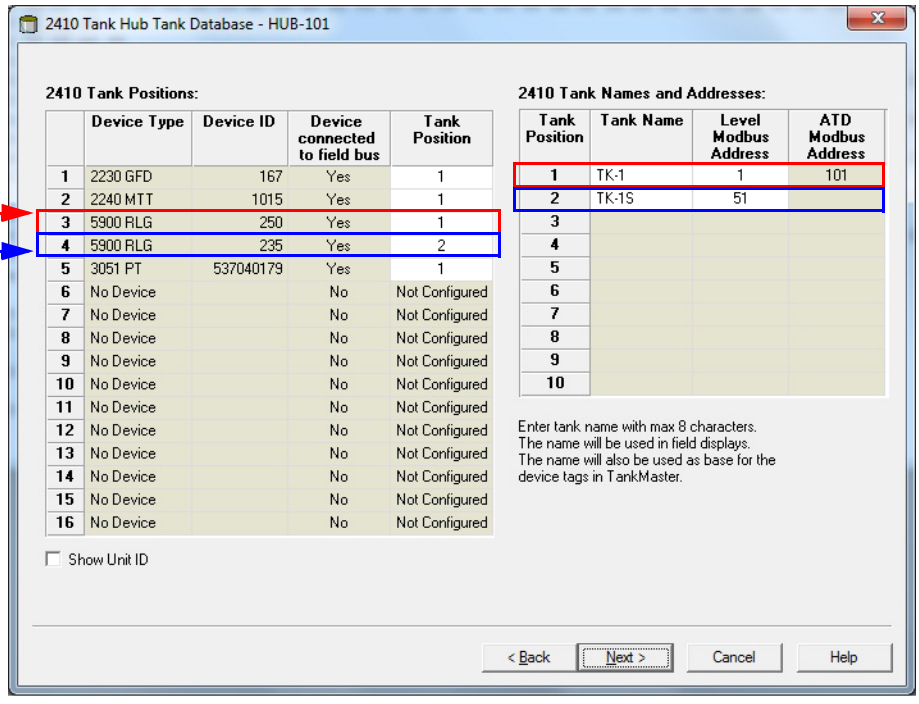
4. In the *Select Device* window, select Device Type **2410 Tank Hub** and assign a *2410 Tag*.

5. Click the Next button to proceed to the *Tank Database* configuration window.

6. Configure the tank hub's tank database:

Primary level gauge on TK-1

Secondary level gauge on TK-1S



In the tank database, the Rosemount 5900S 2-in-1 will appear as two separate level gauges. The two gauges are mapped to different tank positions and will be associated with different tanks in the WinSetup workspace.

Tank Name

Assign the same name on the two tanks. Add “S” to the secondary tank name, for example:

primary tank: TK-1

secondary tank: TK-1S

Address

Assign Level Modbus Addresses to the gauges.

Example:

TK-1: 1

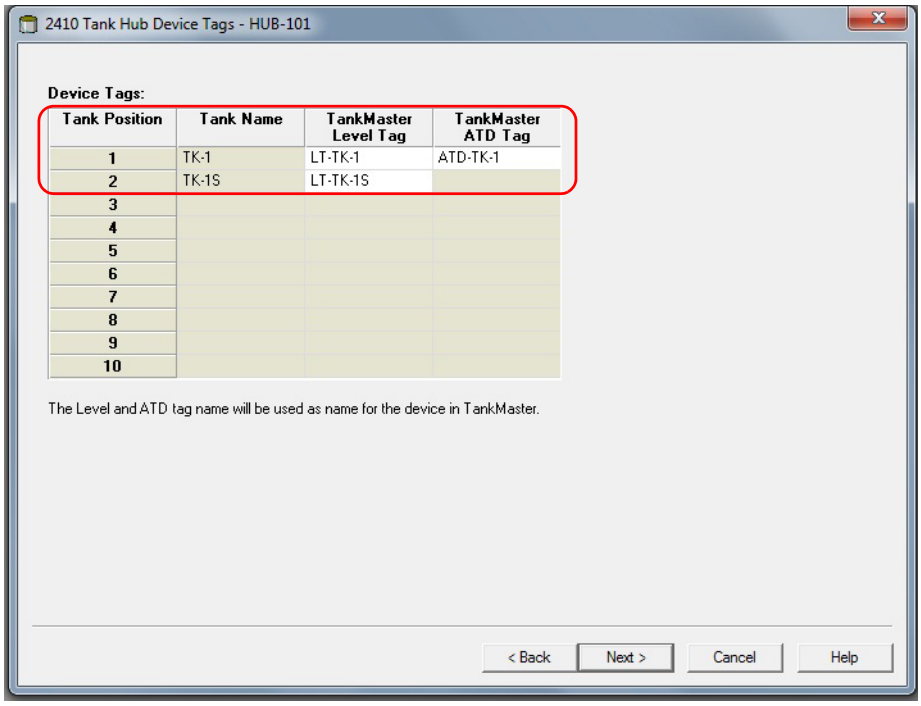
TK-1S: 51

It is recommended that Modbus address 50 + “X” is used for the secondary device, where “X” is the address of the primary radar level gauge.

Ensure that the same addresses are configured in the Tank Database of the **Rosemount 2460 System Hub** and the **Rosemount 2410 Tank Hub**, respectively.

7. Click **Next** to proceed to the *Device Tags* window.

8. Verify Level Tags for the primary and secondary Rosemount 5900S gauges, and ATD Tag for the other devices (temperature transmitter, field display, pressure transmitter). The tags can be changed later if needed.

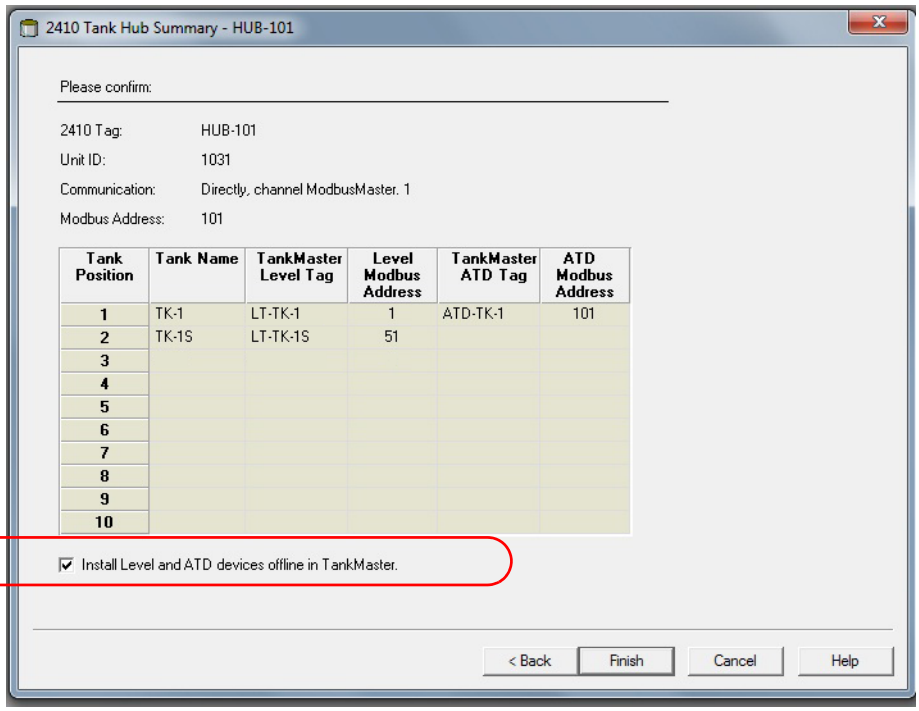


9. Summary.
In the final step of the Rosemount 2410 installation wizard, check that all device tags and Modbus addresses are correct. Note that if a Rosemount 2460 System Hub is used, the Modbus addresses in the Rosemount 2410's tank database must match the addresses configured in the Rosemount 2460's tank database.

   Ensure that the "Install Level and ATD devices" check box is selected in case you like to enable automatic installation of devices in the TankMaster workspace. This is the recommended setting.

Note
If new devices are added to an existing Rosemount 2410 Tank Hub, the Install Level and ATD devices check box may not be active. Then you will have to add the new devices manually.

Enable automatic installation of tanks and devices in the TankMaster workspace

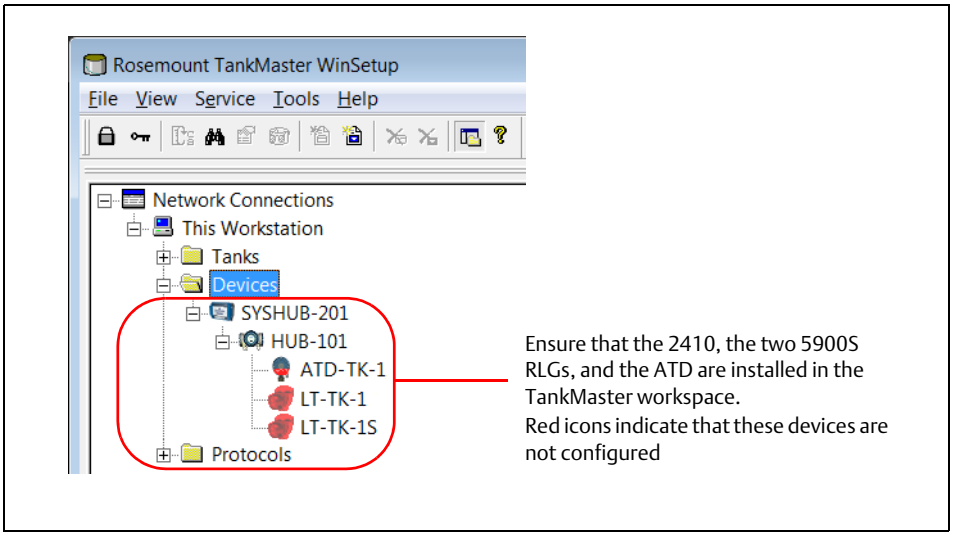


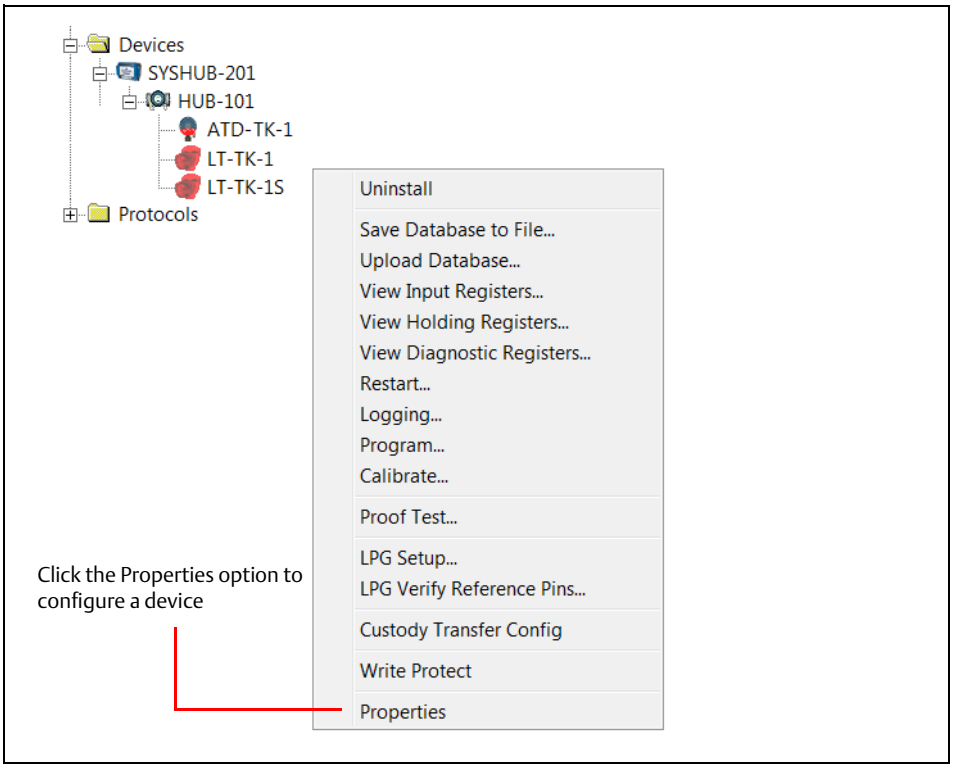
10. Verify that the devices appear in the WinSetup workspace.The Rosemount 2410 Tank Hub, the two Rosemount 5900S RLGs, and the ATD are automatically installed in the TankMaster WinSetup workspace if the check box is marked in the *2410 Tank Hub Summary* window.

Note
The new device icons are red indicating that these devices need to be configured.

Once the tank hub and associated level and ATD devices are installed in TankMaster you will have to configure each device.

11. Right-click the device icon and select **Properties**. See "Installing a Rosemount 5900 Radar Level Gauge" on page 46 and "Installing Auxiliary Tank Devices" on page 75 for further information.

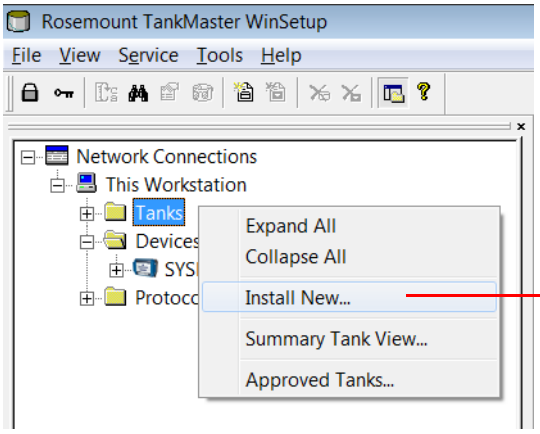




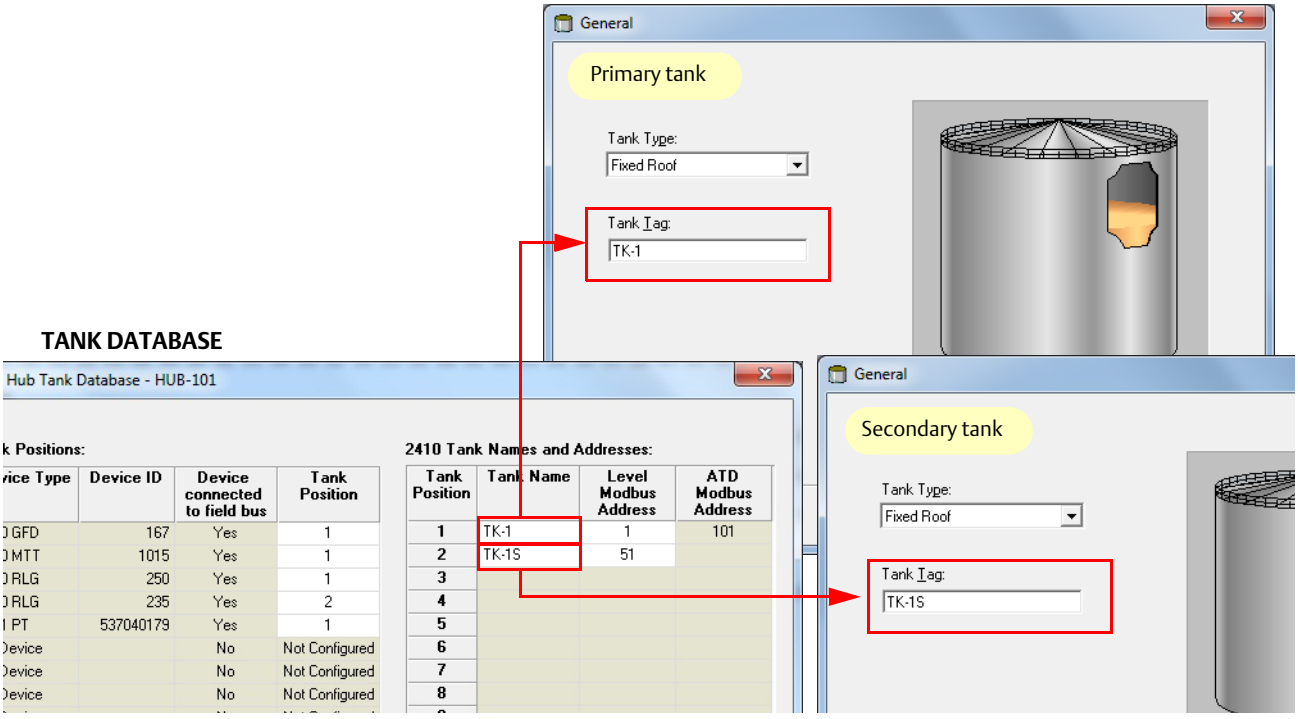
12. Finally, when devices are installed and configured you will have to install and configure the **two** tanks to be associated with the 2-in-1 Rosemount 5900S.

In the following description one tank will be associated with the **primary** level gauge (LT-TK-1 in this example), and the other tank will be associated with the **secondary** level gauge (LT-TK-1S).

Select the Tanks folder, click the right mouse button, and select the **Install New** option. Install and configure the primary tank first and then the secondary tank.



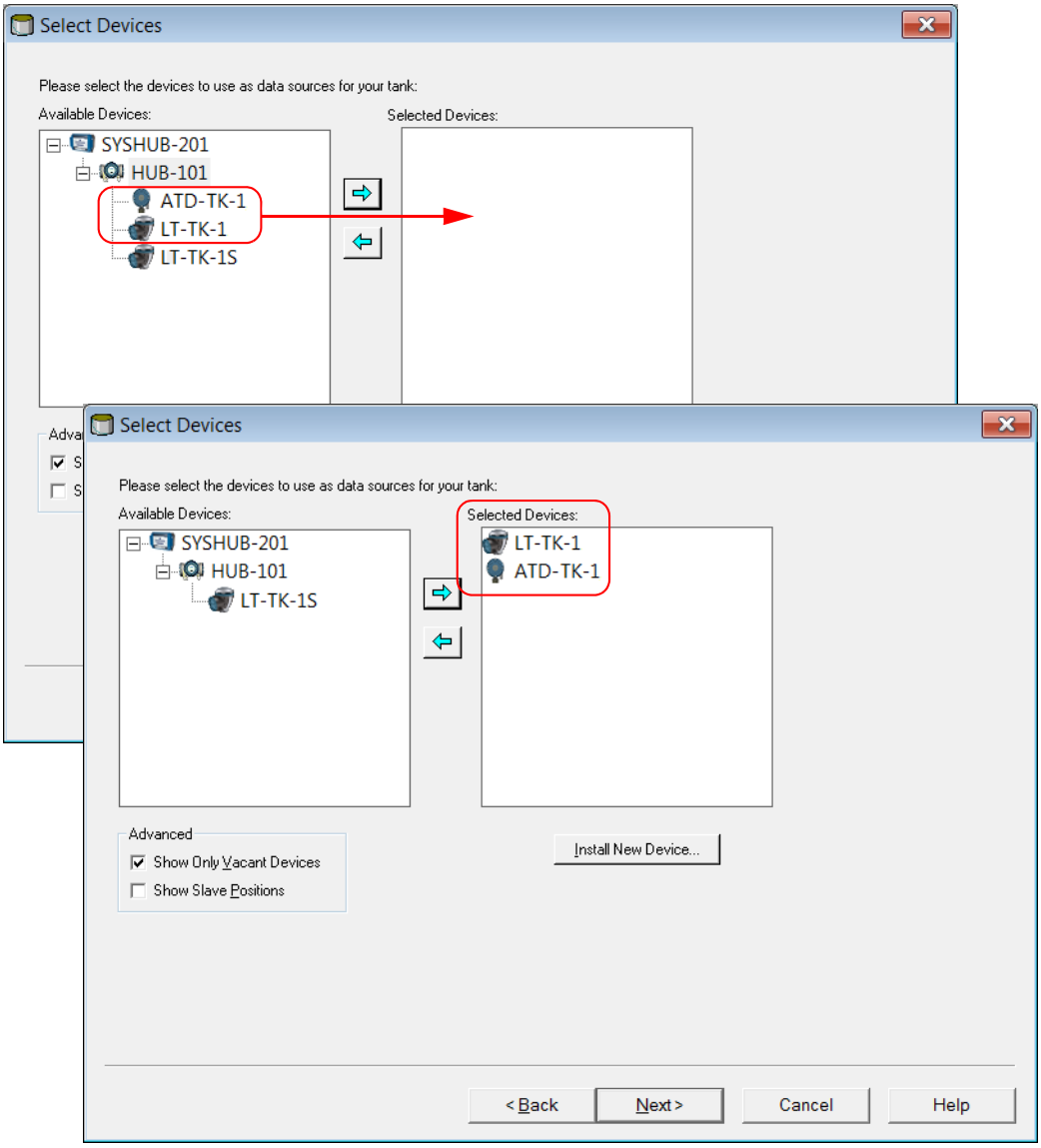
For each tank, select Tank Type and assign a Tank Tag. It is recommended that you use the same tank name as specified in the tank database of the Rosemount 2410 Tank Hub.



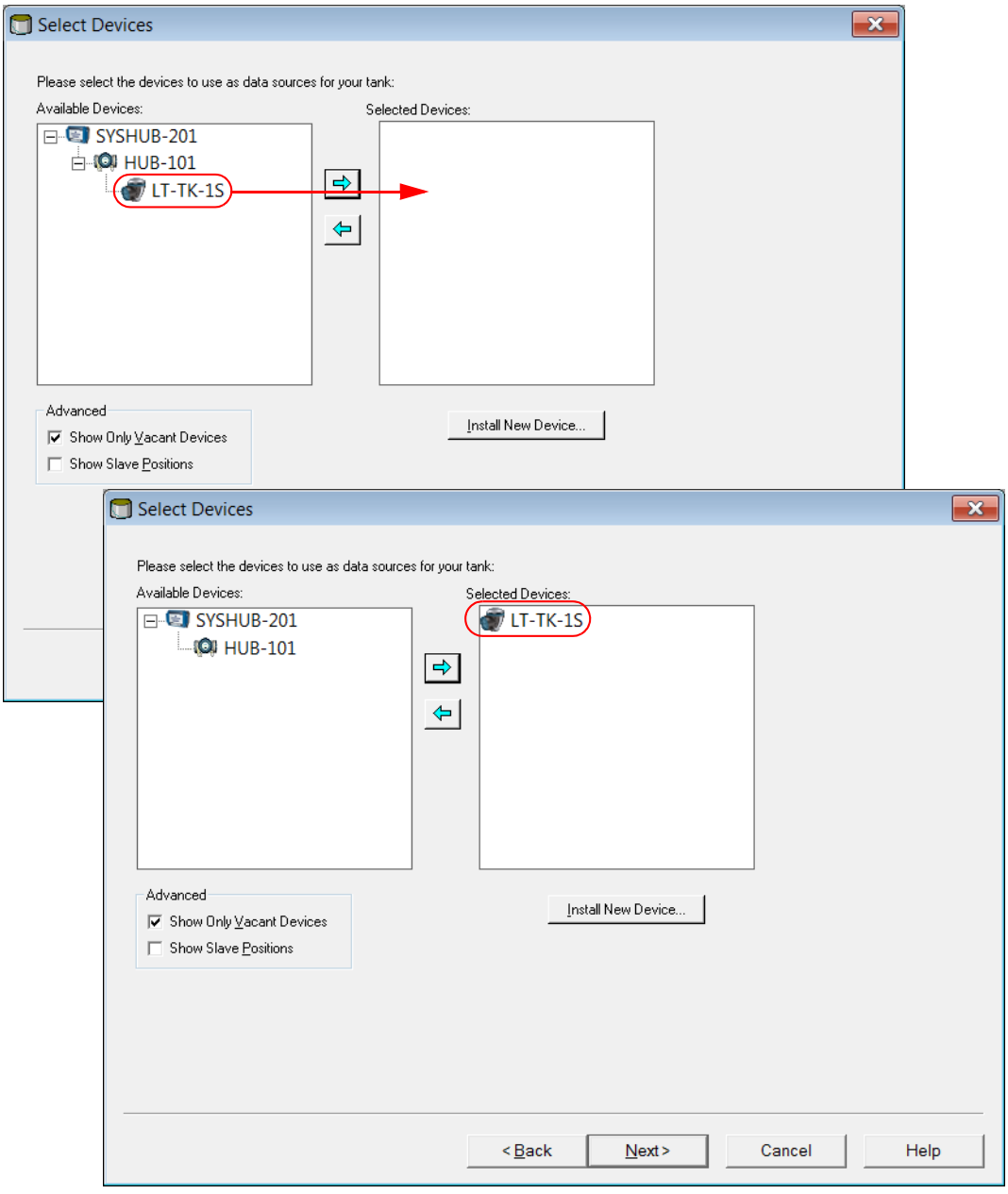
13. Assign devices to the **primary** tank TK-1:

    a. Primary Rosemount 5900S level gauge (LT-TK-1)

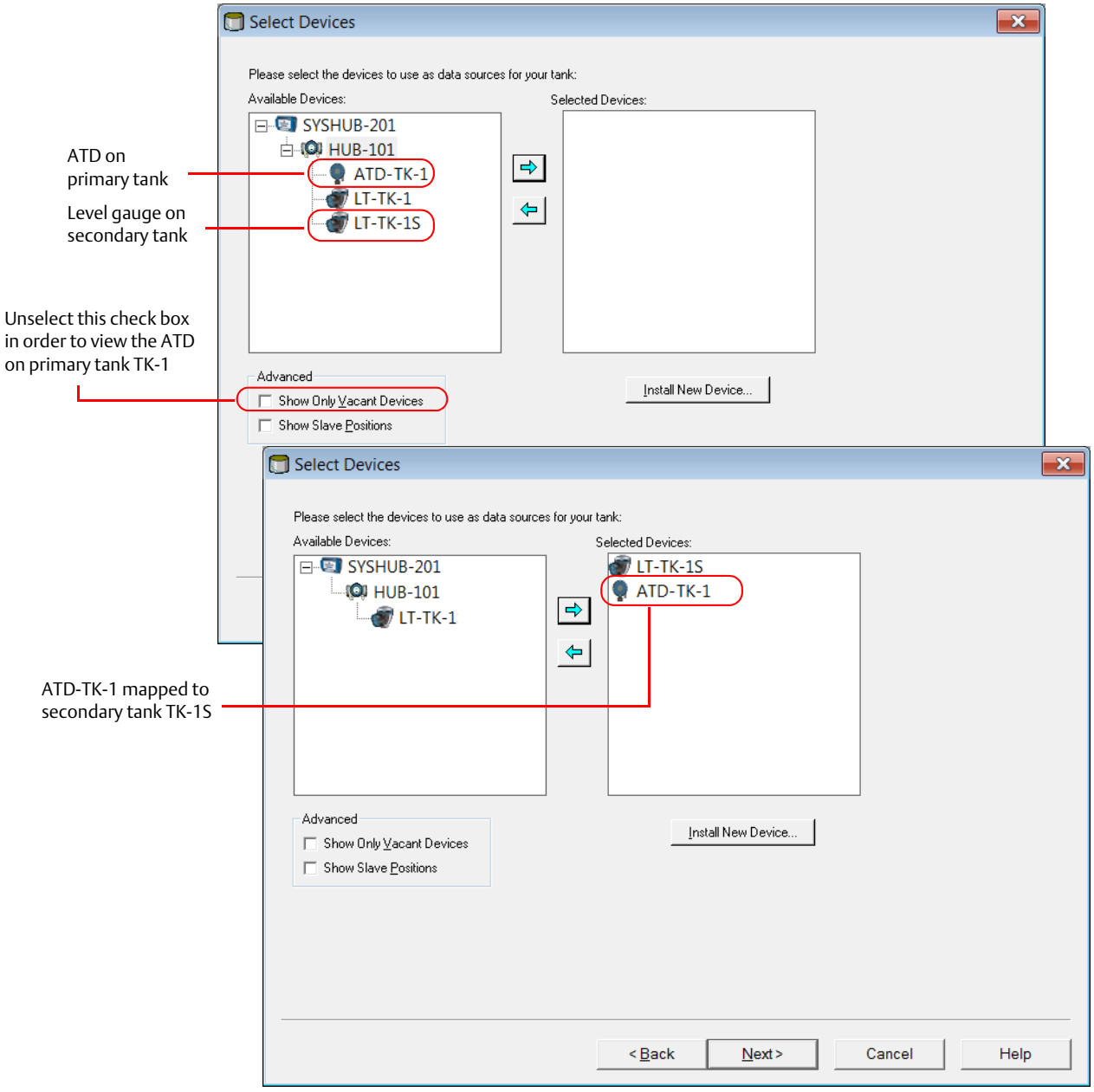
    b. ATD device (ATD-TK-1) in case the tank is equipped with non-level devices such as a Rosemount 2240S Temperature Transmitter, a Rosemount 2230 Graphical Field Display, Water Level Sensor, or a Rosemount 3051S Pressure Transmitter.



14. For the **secondary** tank TK-1S assign the secondary 5900S level gauge (LT-TK-1S) as shown below:

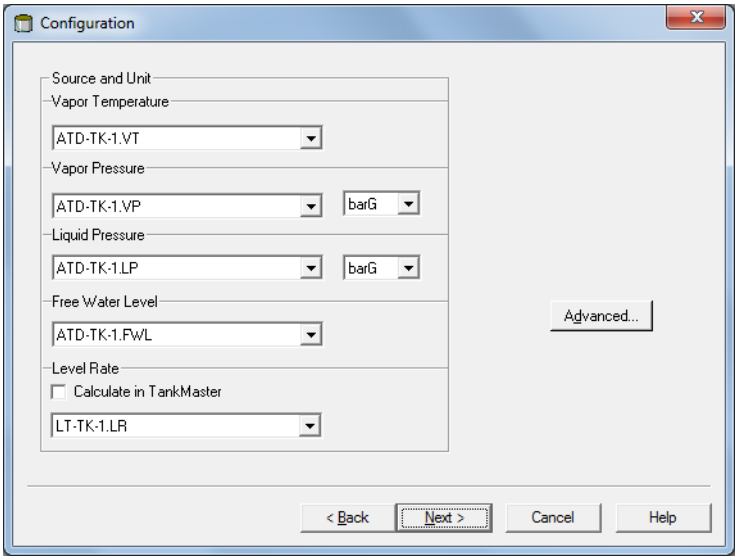


15. Optional: you may map the ATD device on the primary tank to the **secondary** tank TK-1S as shown below. This allows you to view temperature data, such as Average Temperature, for the secondary tank as well.

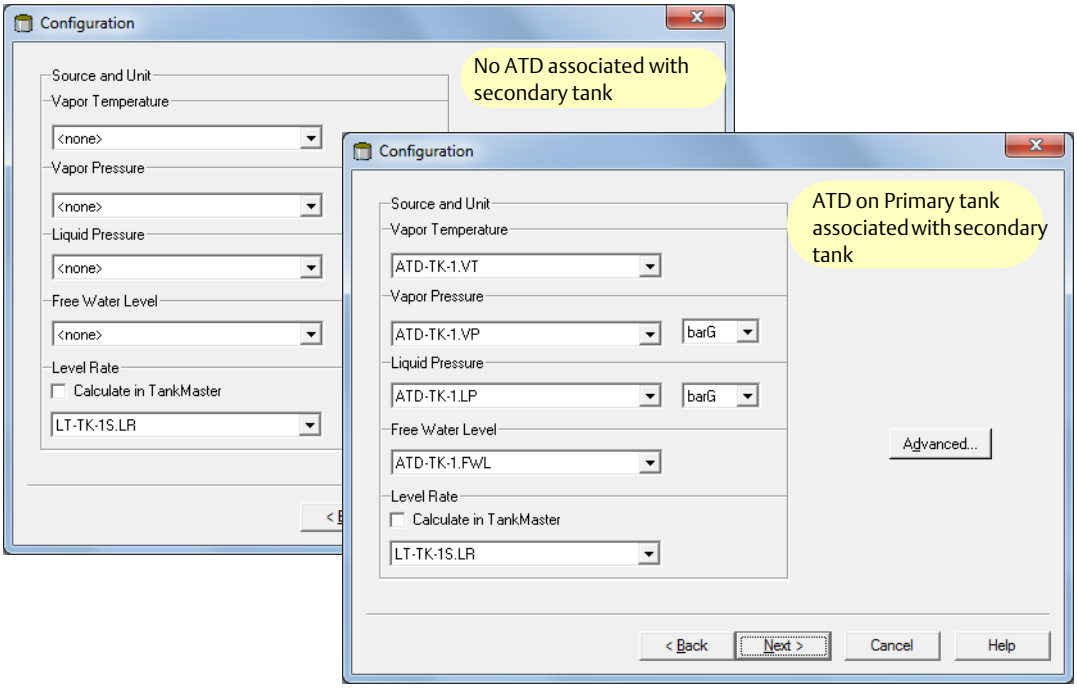


16. Choose the desired tank measurement variables. For the primary tank, variables associated with the ATD device automatically appears in the *Configuration* window.

Note
The available source variables may vary depending on the actual devices connected to the Rosemount 2410 Tank Hub.

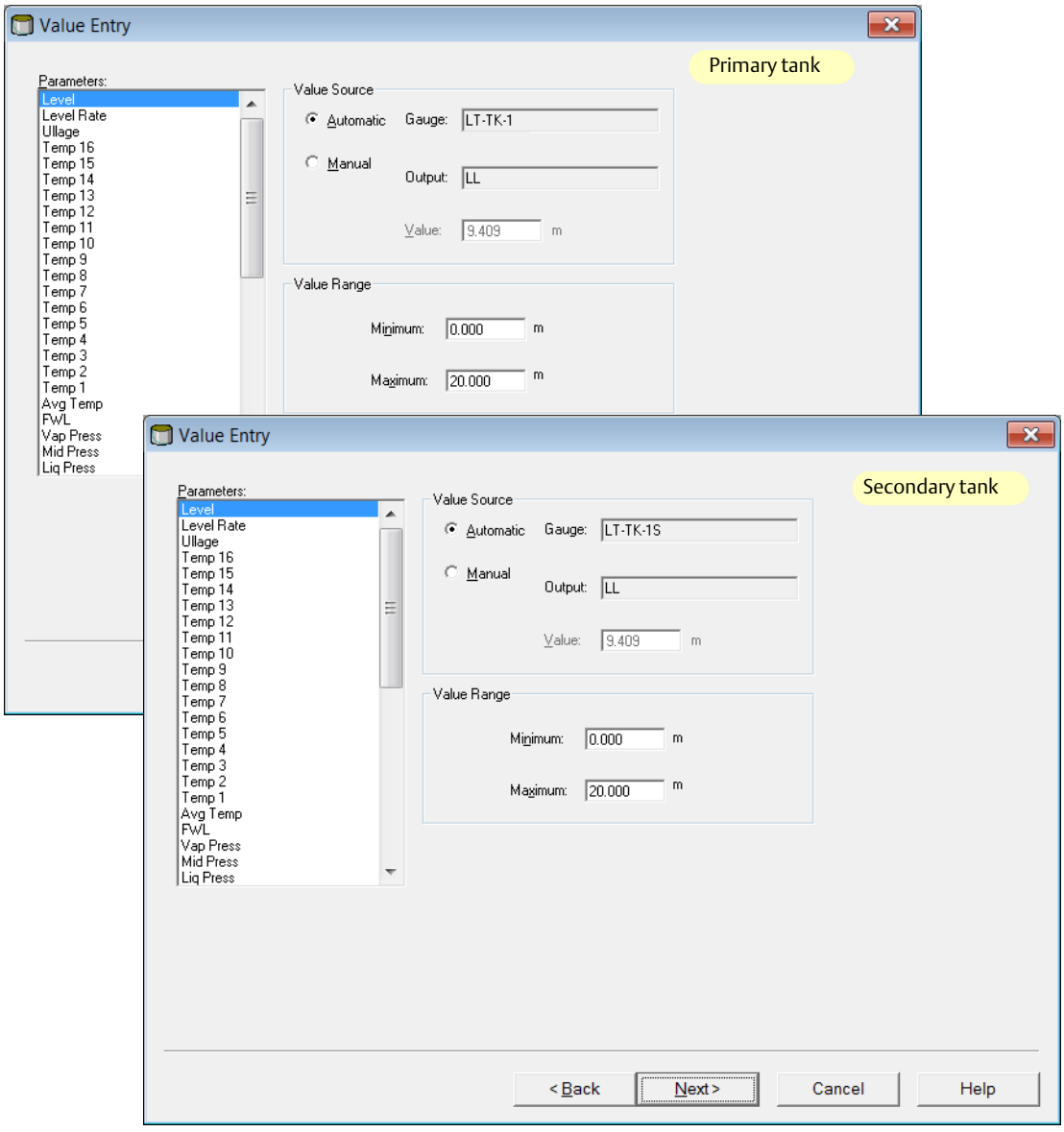


For the secondary tank, “none” is automatically selected for temperature and pressure variables as well as for Free Water Level. In case the ATD device on the primary tank is mapped to the secondary tank as well (see step15 on page 71), these variables will also appear in the *Configuration* window for the secondary tank.



17. Configure whether to use measurement values (Automatic) from the available instruments or manual values.

18. Specify parameter value range to be used in various windows for presentation of measurement data.

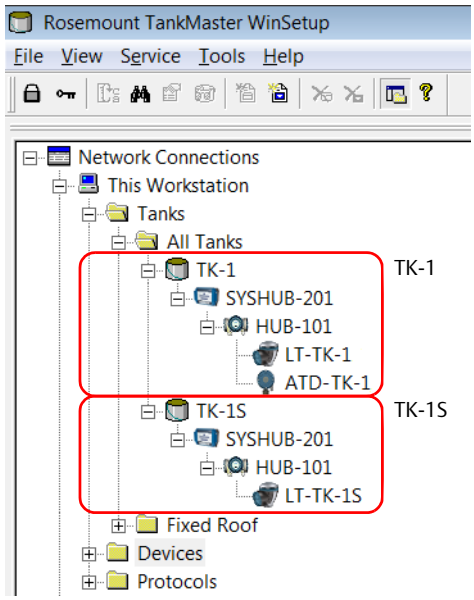


Note
Calculation of the Average Temperature (AVG Temp) requires a valid Level value. In case the Level value is not available, the Average Temperature (AVG Temp) will also be missing.

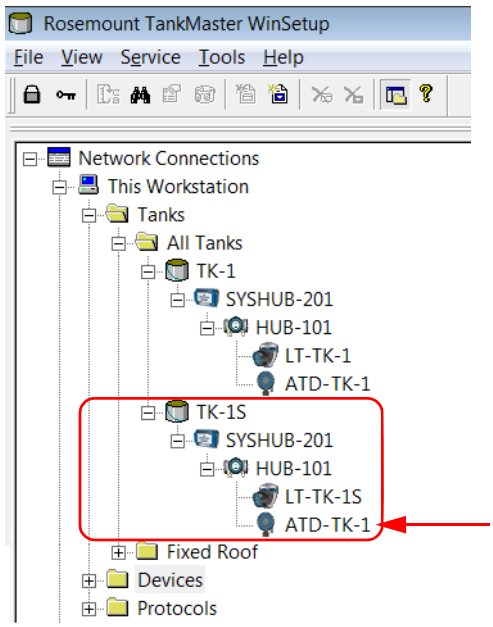
19. Verify installation.
In the TankMaster WinSetup workspace verify that the tanks and devices are properly installed. Check that the two Rosemount 5900S gauges and the ATD are associated with the right tanks. Two options are shown below:

- ATD (temperature transmitter, etc.) is associated with the primary tank only
- ATD on primary tank is mapped to both the primary and secondary tanks

Secondary tank has level device only



ATD-TK-1 on Primary tank mapped to secondary tank as well



2.9 Installing Auxiliary Tank Devices

Auxiliary Tank Devices (ATDs) such as the Rosemount 2240S Multi-input Temperature Transmitter and the Rosemount 2230 Graphical Field Display, are typically installed as part of the installation procedure of the Rosemount 2410 Tank Hub. The ATD devices appear in the TankMaster workspace and are configured via the *22XX ATD* window.

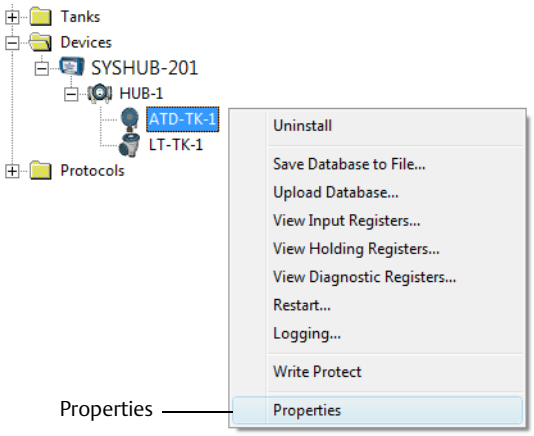
The *22XX ATD* window includes tabs for configuration of temperature sensors, graphical field displays, and water level sensors. It also includes configuration options for mapping outputs of measurement instruments to variables such as Free Water Level and Liquid Pressure.

Before starting the ATD installation, read the reference manuals for the various ATD devices, such as the Rosemount 2240S and the Rosemount 2230, to learn more about how to configure these devices.

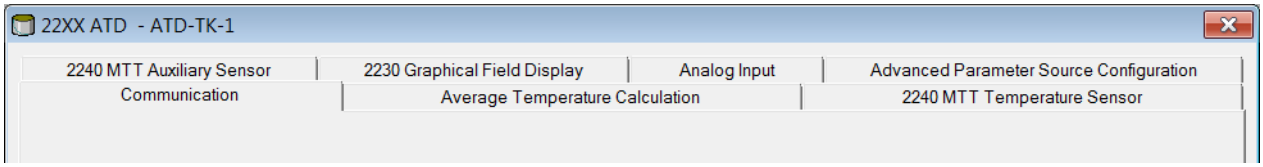
2.9.1 Opening the Properties window

To open the *22XX ATD* window and to configure the ATD devices do the following:

1. In the *WinSetup Workspace* window, open the **Devices** folder and select the ATD device icon.



2. Click the right mouse button and select **Properties**, or from the **Service** menu choose the **Devices/Properties** option to open the *22XX ATD* window.



3. The *22XX ATD* window has a number of configuration tabs for the Rosemount 2240S and the Rosemount 2230.

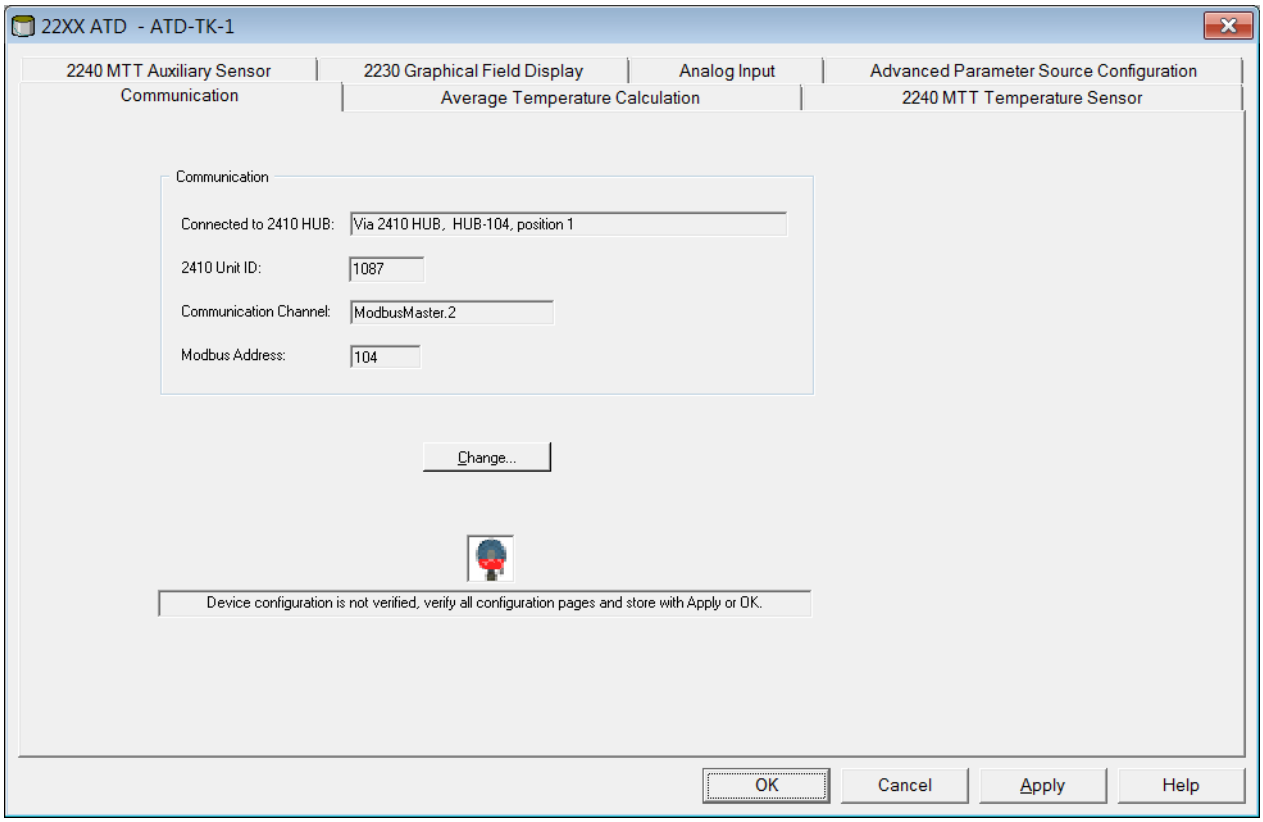
4. Use the appropriate tabs to configure the ATD devices as described in sections 2.9.2 to 2.9.8.

5. Finish the ATD configuration by clicking the Apply or OK button.

2.9.2 Communication parameter setup

The *Communication* tab lets you verify the device communication settings. A red icon means that the current ATD needs to be configured.

1. In the *22xx ATD* window select the *Communication* tab:



2. In the *Connected to HUB* field verify that the ATD device is connected to the correct Rosemount 2410 Tank Hub and mapped to the correct position in the tank hub's tank database.
For example, "position 1" means that the ATD device is mapped to tank database position 1 in the tank hub's database, "position 2" to tank database position 2 etc.
You can check the tank database of the current tank hub by opening the *2410 HUB Properties/Tank Database* window. See "Installing a Rosemount 2410 Tank Hub" on page 32 for more information.

3. The **Change** button lets you change the Modbus address of the current ATD device in case it is connected to a multiple tank version of the tank hub.
Note that the Modbus address can only be changed for ATD devices in tank database position 2 and higher. An ATD device mapped to position 1 in the tank hub's database uses the same Modbus address as the tank hub itself. See "Installing a Rosemount 2410 Tank Hub" on page 32 for more information.

4. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

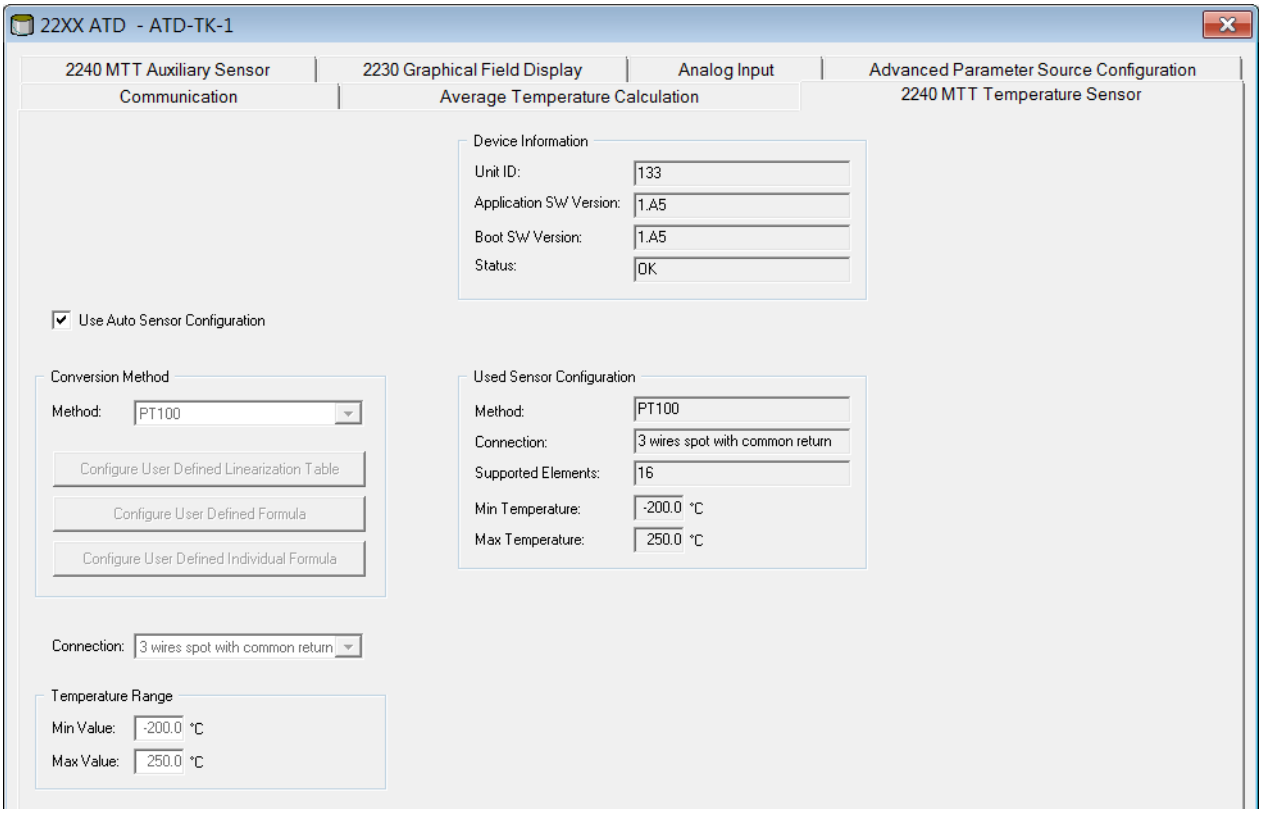
2.9.3 Temperature sensor configuration

The *2240S MTT Temperature Sensor* tab lets you configure a sensor connected to the Rosemount 2240S Multi-input Temperature Transmitter.

The *2240S MTT Temperature Sensor* tab input fields are disabled in case no Rosemount 2240S is connected to the Tankbus.

To configure the temperature sensors for a Rosemount 2240S, do the following:

1. In the *22xx ATD* window select the *2240S MTT Temperature Sensor* tab:



2. The Rosemount 2240S is equipped with a DIP switch for automatic configuration of temperature element and wiring. By selecting the **Use Auto Sensor Configuration** check box, the Rosemount 2240S transmitter is automatically configured according to the DIP switch settings. See the Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240) for more information.

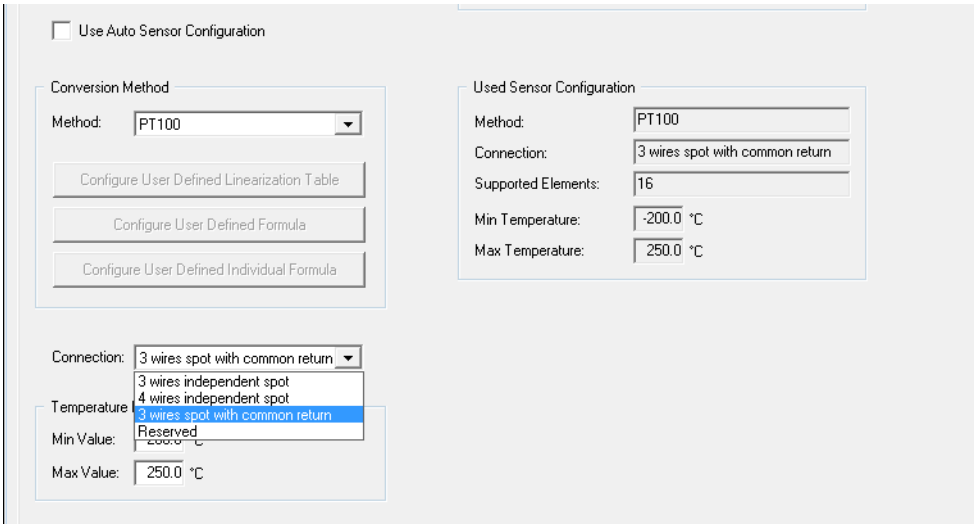
   In case a temperature element type is used that does not match the Auto Sensor Configuration, the Rosemount 2240S transmitter can be manually configured as described below.

Manual configuration

1. Ensure that the **Use Auto Sensor Configuration** check box is unchecked.
2. Select the desired user defined conversion method in the **Method** input field.

Note
For spot temperature elements, use the **Pt100** sensor option in order to obtain a correct average temperature calculation.

3. Choose the type of sensor connection that is used for the spot sensors in the **Connection** drop-down list.
4. Specify the measurement range of the current temperature element in the **Min Value** and **Max Value** input fields.



5. For user defined temperature conversion, such as *User defined table*, *User defined formula*, and *User defined individual formula*, click the configuration button that corresponds to the selected conversion method and configure the temperature sensors as described below in "User defined linearization table" on page 79, "User defined formula" on page 80, and "User defined individual formula" on page 81.
6. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

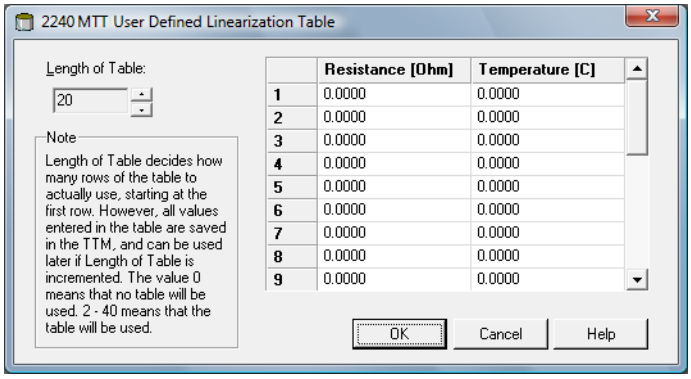
See the Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240) for more information on how to configure temperature sensors for the Rosemount 2240S.

User defined linearization table

When using a resistance temperature sensor, the electrical resistance values can be converted to temperature values by using a table of resistance and temperature values.

To create a conversion table:

1. In the *2240S MTT Temperature Sensor* window, select conversion method User Defined Linearization Table.
2. Click the **Configure User Defined Linearization Table** button:



3. Specify the number of conversion points in the **Length of Table** input field.
4. Type resistance and temperatures values into the **Resistance [Ohm]** and **Temperature [C]** columns.
5. Click the **OK** button to store the linearization table in the temperature transmitter's database registers.

User defined formula

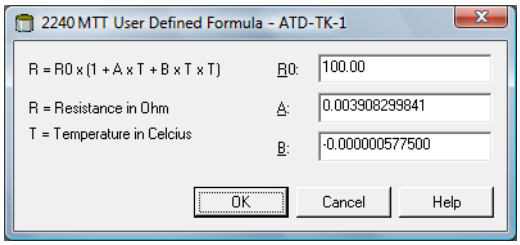
For a resistance temperature sensor, the relation between temperature and resistance can be specified by a mathematical formula:

$R=R_0{}^*(1+A^*T+B^*T^2)$

where **R** is the resistance at temperature **T**, $\mathbf{R_0}$ is the electrical resistance at zero degrees Celsius, and A and B are constants.

To create a conversion formula:

1. In the *2240S MTT Temperature Sensor* window, choose conversion method User Defined Formula.
2. Click the **Configure User Defined Formula** button:



3. Enter the parameters R_0, A and B in the corresponding input fields.
4. Click the **OK** button to store the R_0, A and B parameters in the temperature transmitter's database registers.

User defined individual formula

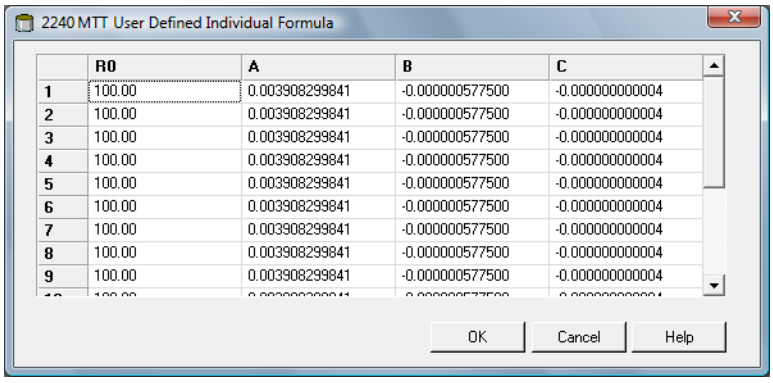
When using *User Defined Individual Formula,* a mathematical formula is used for each individual temperature element:

$R=R_0*(1+A_N*T+B_N*T^2+C_N*T^3)$

- R is the resistance at temperature T
- R_0 is the resistance at zero degrees Celsius
- A, B, and C are individual constants for each element
- N is the number of temperature sensors

To create an individual conversion formula:

1. In the *2240S MTT Temperature Sensor* window, choose conversion method User Defined Individual Formula.
2. Click the **Configure User Defined Individual Formula** button:



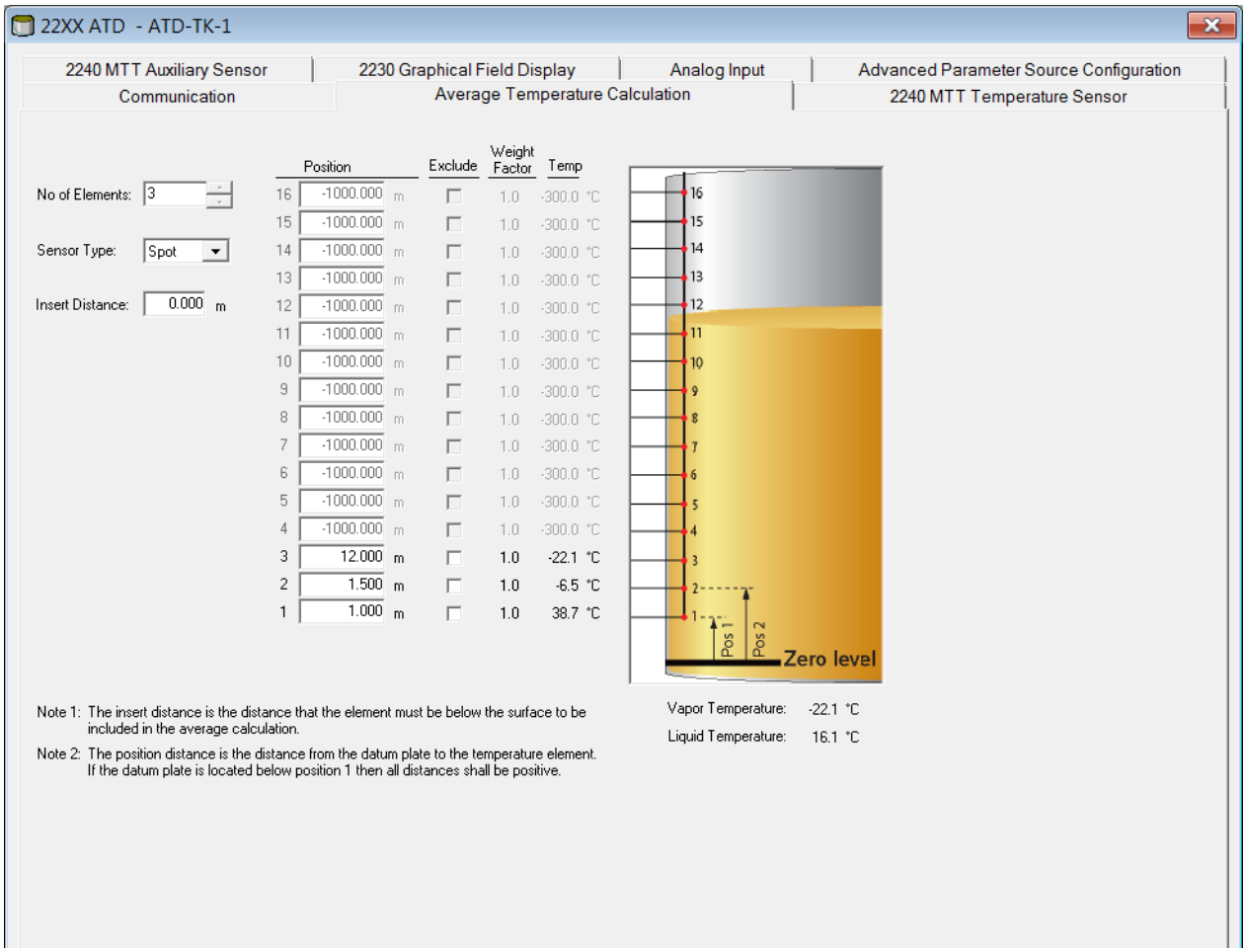
3. Enter parameters R_0, A, B, and C for each individual temperature element.
4. Click the **OK** button to store the formula in the temperature transmitter's database registers.

2.9.4 Average temperature calculation

This section gives a brief description of how to configure average temperature calculations for a temperature sensor connected to the Rosemount 2240S Multi-input Temperature Transmitter. See the Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240) for more information.

To configure a Rosemount 2240S for average temperature calculations, do the following:

1. In the *22xx ATD* window, select the *Average Temperature Calculation* tab:



2. **No of Elements**: select the number of temperature elements used. Verify that the input fields for element positions are enabled.

3. **Sensor Type**: select the type of sensor that is used; Spot or Average.

4. **Insert Distance**: specify the minimum distance between a temperature sensor and the product surface for temperature sensors included in average temperature calculation.

5. **Position**: this is the distance from Zero Level to the spot temperature element. If average temperature elements are used, enter the position where the average element ends.

6. You may exclude a temperature element from average temperature calculation by selecting the **Exclude** check box in the column next to the Position field. This option may be useful in case you would like to exclude a malfunctioning temperature element.

7. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

See the Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240) for more information on how to configure the Rosemount 2240S for average temperature calculations.

2.9.5 Auxiliary sensor configuration

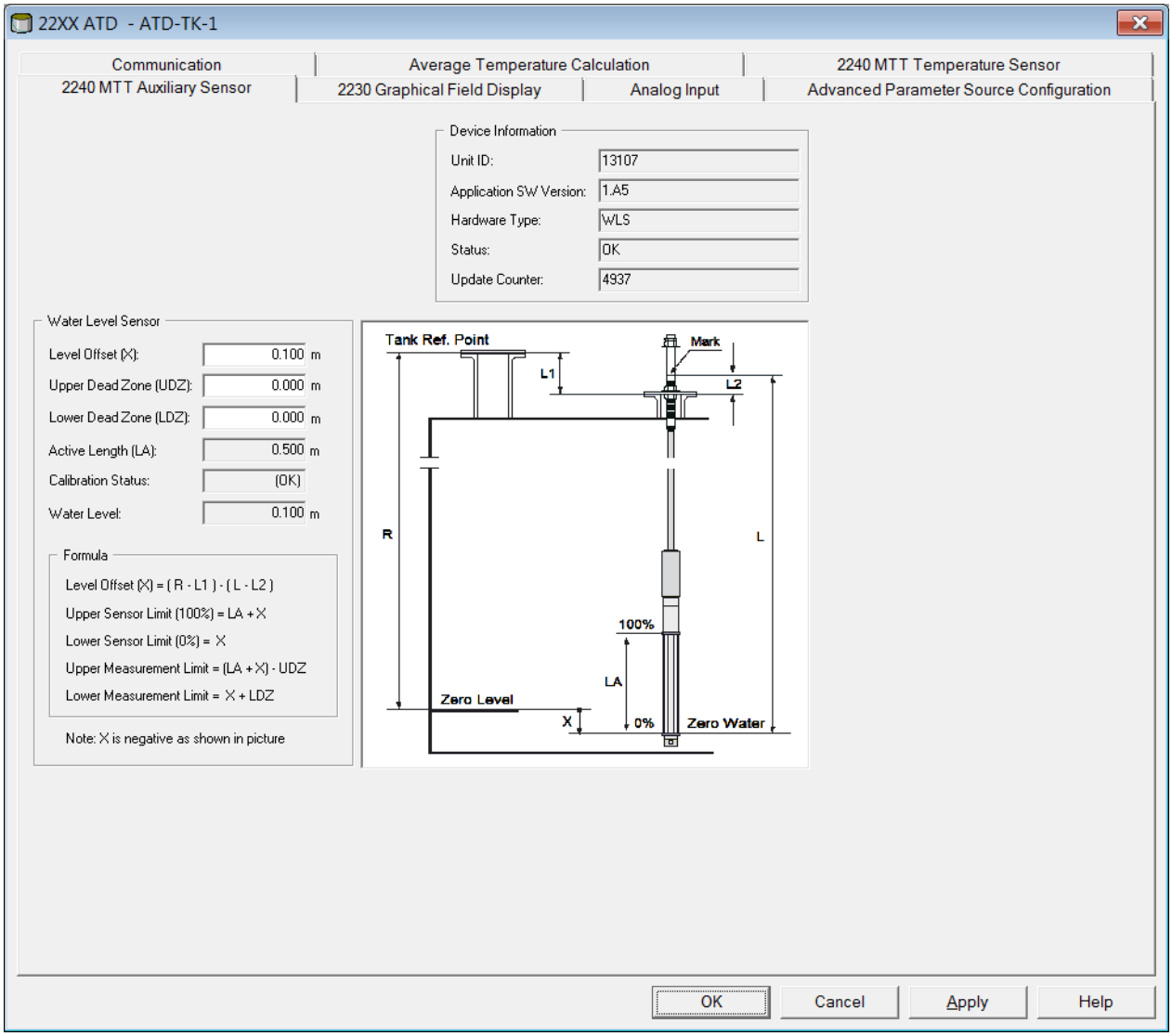
The *2240S MTT Auxiliary Sensor* tab lets you configure a water level sensor connected to a *Rosemount 2240S* Multi-input Temperature Transmitter.

Water Level Sensor

This section gives a brief description of how to configure a Rosemount 765 Water Level Sensor connected to a Rosemount 2240S Multi-input Temperature Transmitter. See the Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240) for further information.

To configure the water level sensor do the following:

1. In the *22xx ATD* window, select the *2240S MTT Auxiliary Sensor* tab:



2. Calculate the **Level Offset (X)** according to the formula *X=(R-L1)-(L-L2)*.
3. Enter the resulting level offset value in the **Level Offset (X)** input field.
4. Enter the **Upper Dead Zone (UDZ)** and the **Lower Dead Zone (LDZ)** if needed.
5. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

See the Rosemount 2240S Temperature Transmitter Reference Manual (00809-0100-2240) for more information on how to configure a water level sensor connected to a Rosemount 2240S Multi-input Temperature Transmitter.

2.9.6 Advanced parameter source configuration

The *Advanced Parameter Source Configuration* tab lets you map the output of various measurement instruments (source devices) to tank measurement variables such as Liquid Pressure and Vapor Pressure. This makes the measurement variables available for configuration in the *Tank Configuration* window as described in "Installing a tank" on page 115.

For tank measurement variables such as Level, Vapor Temperature, and Free Water Level, source devices are automatically mapped and do not need to be configured in the *Advanced Parameter Source Configuration* tab.

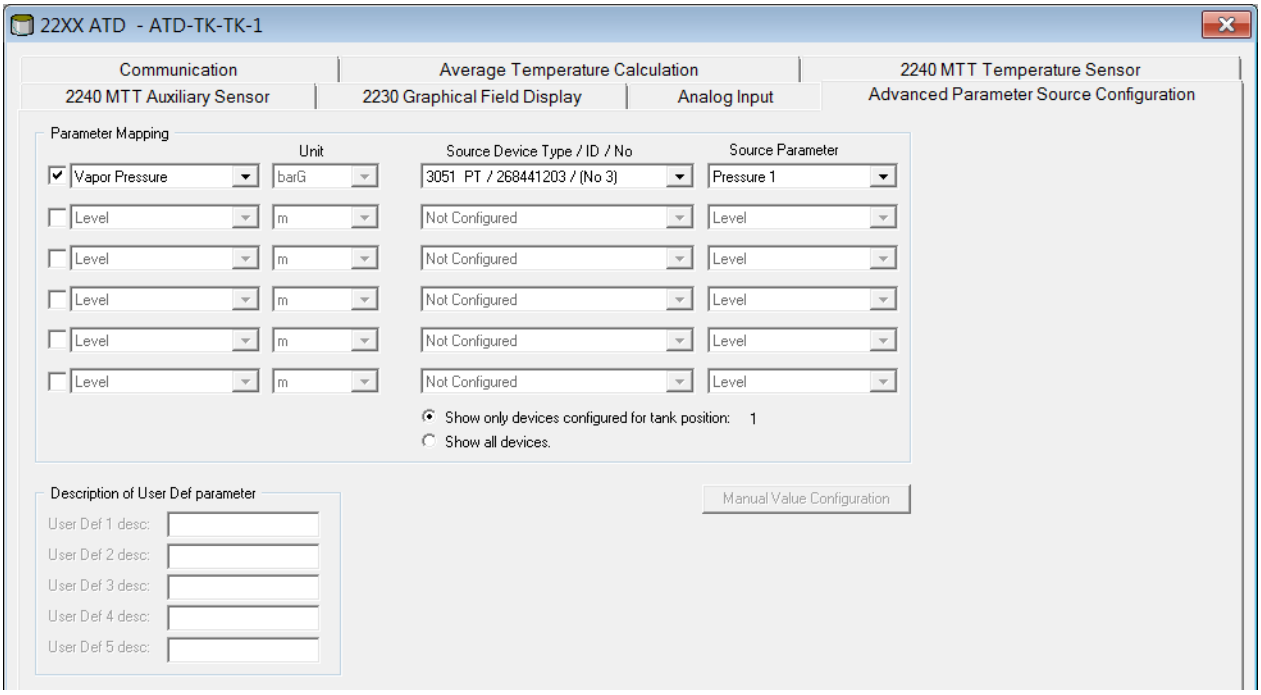
The Rosemount 2410 Tank Hub supports 60 source parameter mappings. Six mappings are reserved for each one of the ten tank database positions.

Note
A warning message will appear in case a certain parameter/source mapping is already used for another tank.

For a source device to be available in the *Advanced Parameter Source Configuration* tab, it must be mapped to the current tank in the tank hub's database (see "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).

To map parameters to source devices, follow these steps:

1. In the *22xx ATD* window, select the *Advanced Parameter Source Configuration* tab:



2. In the *Parameter Mapping* column select a tank measurement parameter.

3. In the *Source Device Type/ID/No* column, choose a measurement device such as a pressure transmitter or any other type of instrument.

   The default setting lists only devices mapped to the current tank position in the tank hub's database. By using this option you will avoid mapping to a device on the wrong tank by mistake. By selecting the appropriate radio button you can choose to show all available devices, or only the devices mapped to tank position 1 in the 2410 tank database.

4. In the Source Parameter column, select the transmitter variable to be mapped to the tank measurement variable in the first column.

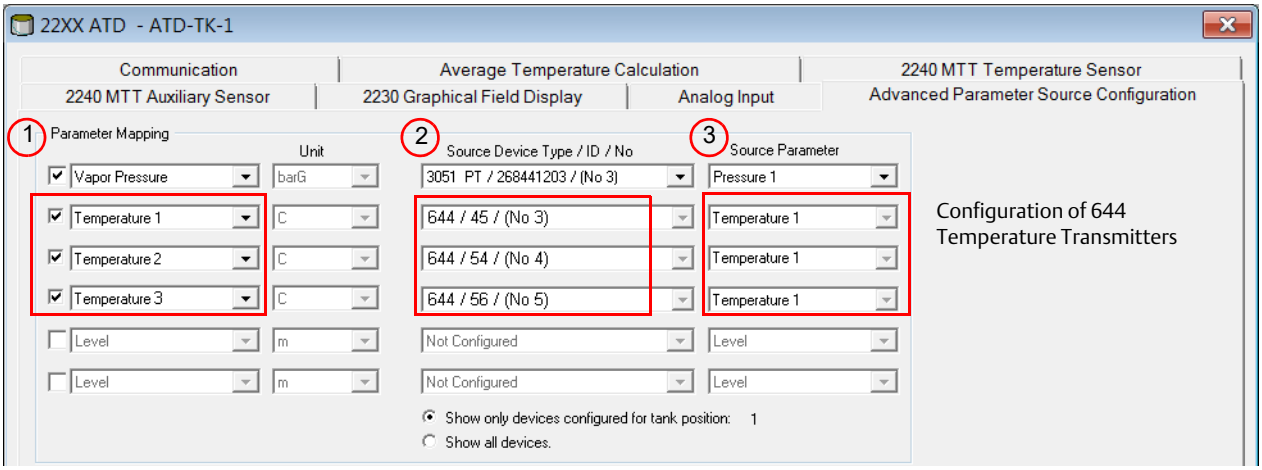
5. In case User Defined is selected, you may type a description in the Description of User Def parameter box.

6. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

Using a Rosemount 644 Temperature Transmitter

The Rosemount Tank Gauging system automatically handles source parameter mapping for Rosemount 2240S transmitters to provide correct input for calculation of tank measurement variables such as **Vapor Temperature** and **Average Temperature**.

For Rosemount 644 temperature transmitters, tank variables have to be mapped manually to the appropriate source devices. The output from each Rosemount 644 transmitter on the tank is mapped to a temperature tank variable as shown in the following example with three Rosemount 644 transmitters on the tank:



1. Select *Temperature 1* in the Parameter Mapping list for the first 644 temperature transmitter. This temperature parameter is mapped to the temperature element at position 1 in the tank.

   For the second and third 644 transmitters, select *Temperature 2* and *Temperature 3* in the Parameter Mapping list. These parameters are mapped to the temperature elements at position 2 and 3, respectively.

2. In the Source Device Type field, for each temperature parameter (*Temperature 1, 2, 3*) select the actual 644 transmitter to be used as source device.

3. In the Source Parameter list, select *Temperature 1*. This is the source parameter designation of the temperature output from a Rosemount 644 temperature transmitter.

Note that the Vapor Temperature and Average Temperature variables are not mapped to the source devices.

4. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

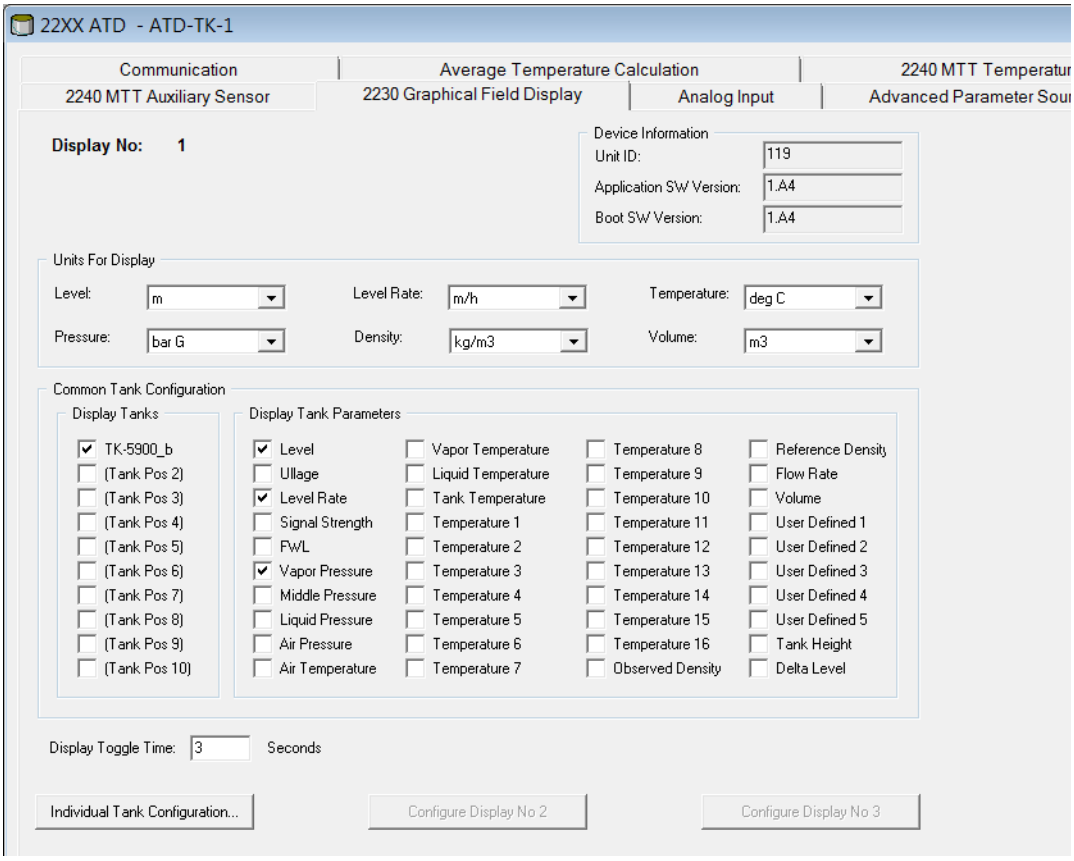
2.9.7 Rosemount 2230 Graphical Field Display

This section gives a brief description of how to configure a Rosemount 2230 Graphical Field Display.

All fields in the *2230 Graphical Field Display* tab are disabled if no graphical field display is connected to the Tankbus, or if the display is not mapped to the current tank database position of the Rosemount 2410 Tank Hub. The **Configure Tank Display 2** and **Configure Tank Display 3** buttons are disabled when only one *Rosemount 2230* is mapped to the current tank database position.

To configure the Rosemount 2230:

1. In the *22xx ATD* window, select the *2230 Graphical Field Display* tab:



2. From the drop-down lists in the *Units for Display* pane, select the desired measurement units to be displayed for the various tank measurement variables.

Note
The Rosemount 2230 converts the unit specified in the *Server Preferences* window (see "Measurement units" on page 20).

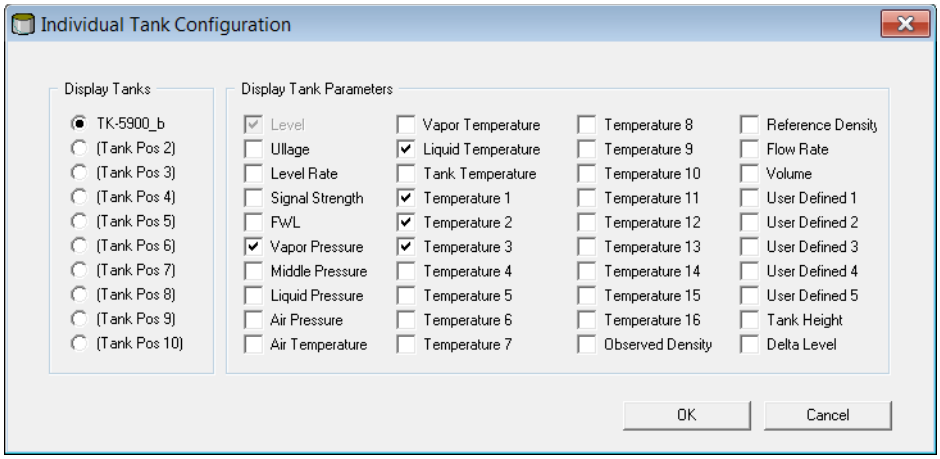
3. In the *Common Tank Configuration* pane, select tanks and tank parameters to be presented by the Rosemount 2230 display by selecting the appropriate check boxes.

4. In the **Display Toggle Time** input field, enter toggle time for the displayed tank parameters. The selected parameters will be displayed for one tank at a time starting with Tank 1.

5. If a second graphical field display is used, click the **Configure Tank Display No 2** button and repeat the configuration procedure.

6. If a third graphical field display is used, click the **Configure Tank Display No 3** button and repeat the configuration procedure.

7. The Rosemount 2230 can be configured to show different set of parameters for each tank on the Tank Bus. In the *2230 Graphical Field Display* tab click the **Individual Tank Configuration** button:



8. Select the desired tank and parameters to show on the Rosemount 2230 display. Repeat this procedure for each tank.

9. Click the OK button to store the configuration and return to the *22xx ATD* window.

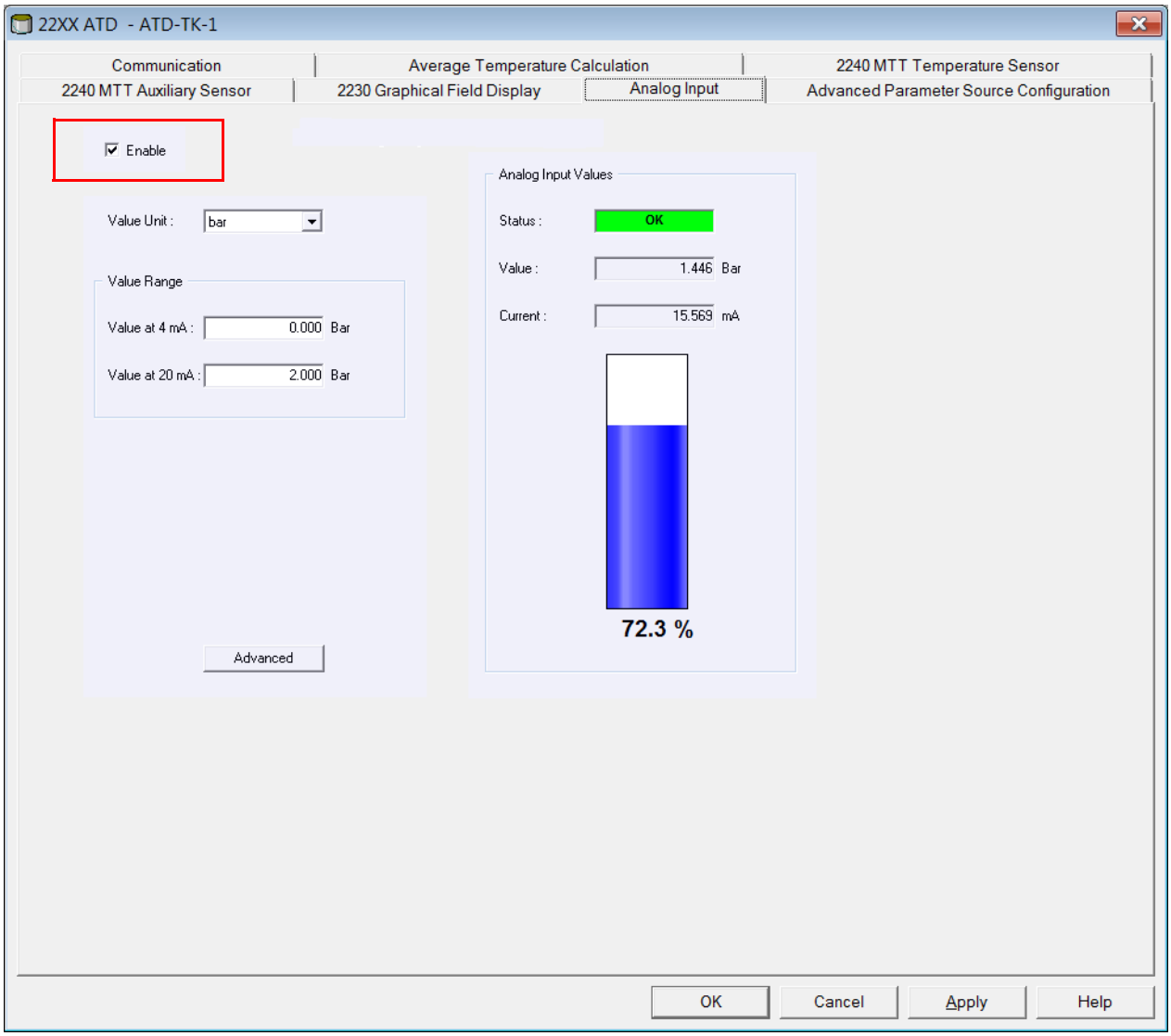
10. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

See the Rosemount 2230 Display Reference Manual (00809-0100-2230) for more information on how to configure a *Rosemount 2230* Graphical Field Display.

2.9.8 Analog input

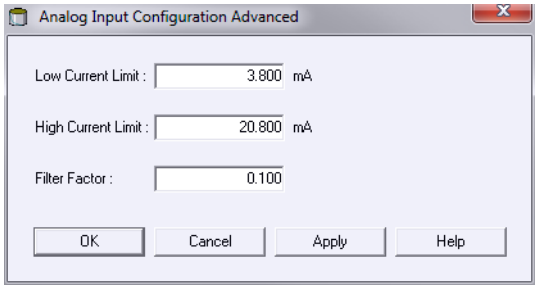
The Rosemount 2410 Tank Hub can be equipped with an analog input which lets you connect instruments for 4- 20 mA/HART communication.

1. In the *22xx ATD* window, select the *Analog Input* tab:



2. Ensure that the **Enable** check box is selected.
3. In the **Value Unit** field select a suitable unit to match the input source.
4. In the **Value Range** pane, enter the parameter values that correspond to the analog input values 4 mA and 20 mA, respectively. You may specify any value as long as the 20 mA value is higher the 4 mA value. For measurement values outside the range values, the analog input enters alarm mode.

5. Use the **Advanced** button in case you would like to configure **Filter Factor** and **Current Limits**.



Filter Factor lets you suppress spurious fluctuations in the analog input signal. A value between 0 and 1 can be used. The default value is 0.1. A higher value means less filtering.

Filtering means that the presented Analog Input value is calculated as the average value of the <n> latest measurements. A filter factor equal to 0.1 is the average of the 10 latest measurements, a filter factor equal to 0.5 is the average of the 2 latest measurements and so on.

Current Limits define the lower and upper limits of the input currents. Outside this range an error will be indicated. The current limits should correspond to the error limits of connected instruments. If for example an instrument sets the output current in alarm mode to 3.8 mA, you should set the lower error limit to 3.8 or higher.

6. In the **Analog Input Values** pane, verify that Status is OK and that the expected measurement results appear in the Value and Current fields.

Analog input and tank parameter setup

For a complete configuration of the Analog Input you need to perform the following steps:

a. Configure the tank hub's tank database; associate the Analog Input with the tank on which the device is installed.
b. In the Rosemount 2410 *Properties* window, select the *Device Tags* tab and install the analog input device in TankMaster. Verify that it is installed as an ATD device.
c. In the *ATD Properties|Analog Input* window, configure value range and units.
d. In the *ATD Properties|Advanced Parameter Source Configuration* window, ensure that the analog input device is mapped to the desired tank parameter, source device, and source parameter.
e. Install a tank in TankMaster WinSetup and make sure that the ATD device that includes the analog input device is mapped as source device for the tank.

See the Rosemount 2410 Tank Hub Reference Manual (00809-0100-2410); Appendix C, section C.10) for a complete description of how to setup the analog input for a Rosemount 2410 Tank Hub. The manual also includes a description on how to configure HART slaves for the Rosemount 2410.

2.10 Installing a Rosemount 5408

The Rosemount 5408 Radar Level Transmitter is most conveniently installed in TankMaster WinSetup by utilizing the integrated option included as part of the Rosemount 2410 Tank Hub installation procedure. In a following step, the Rosemount 5408 is configured via the *5408 RLT* window, see "Configuration via 5408 properties" on page 93. The *5408 RLT* window includes tabs for basic and advanced configuration of a Rosemount 5408 transmitter.

When connecting a Rosemount 5408 to a Rosemount 2410 Tank Hub in an existing Rosemount Tank Gauging system, the Rosemount 5408 has to be mapped to the appropriate tank in the Rosemount 2410 tank database. Configuration is performed via the *5408 RLT* window. See "Adding a tank" on page 128 for further information.

A Rosemount 5408 can also be installed and configured by using the WinSetup installation Wizard (see "Installing a Rosemount 5408 using the installation wizard" on page 100). This method should only be used when, for example, the 5408 is connected to the Tankbus at a later stage and not available when installing the Rosemount 2410 Tank Hub.

The following configuration steps are included in the Rosemount 5408 radar level transmitter basic configuration:

- communication parameters
- antenna type
- tank geometry

Due to properties of the product, tank shape, or other circumstances, further configuration may be needed in addition to the basic configuration. Disturbing objects and turbulent conditions in the tank may also require advanced measures to be taken. The TankMaster WinSetup configuration tool includes advanced options for the 5408 such as:

- tank environmental conditions
- tank shape

See "Advanced configuration" on page 98 for further information on advanced configuration options.

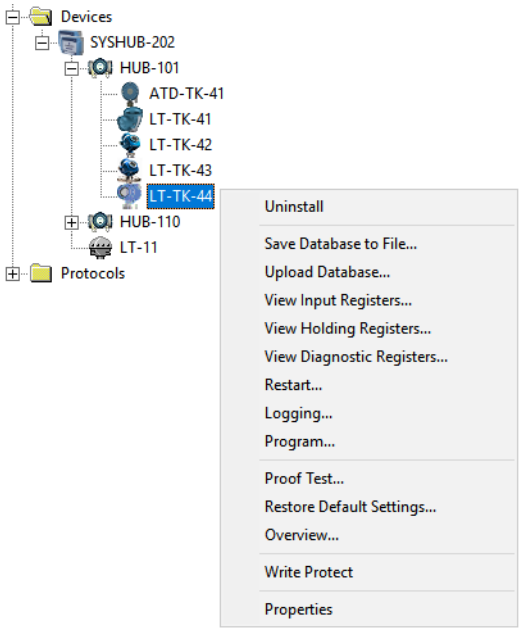
For further information on how to install and configure a Rosemount 5408 Radar Level Transmitter see the Rosemount 5408 Series Reference Manual (00809-0300-4408).

2.10.1 Configuration via 5408 properties

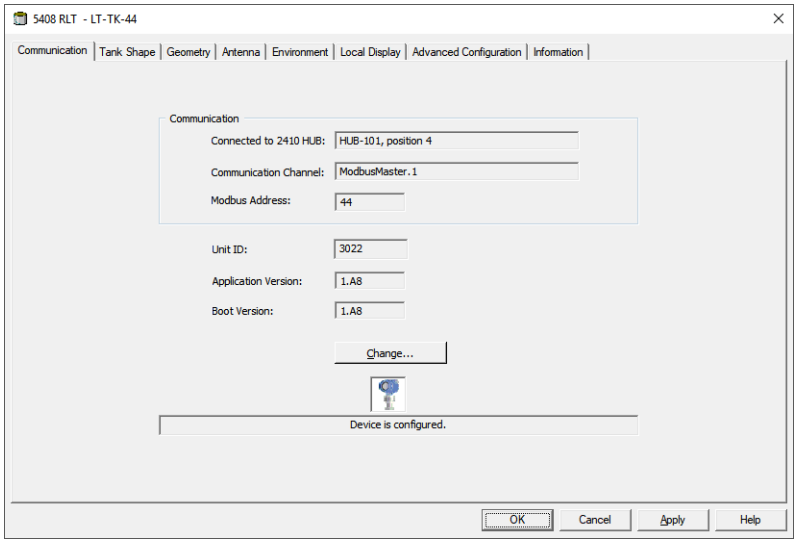
This section describes the basic configuration procedure for a Rosemount 5408 series radar transmitter by using the *5408 RLT* window.

To configure the Rosemount 5408 Radar Level Transmitter perform the following steps:

1. In the *WinSetup Workspace* window, open the **Devices** folder and select the desired Rosemount 5408 transmitter.



2. Click the right mouse button and select **Properties**, or from the **Service** menu choose the **Devices/Properties** option. The *5408 RLT* window appears:

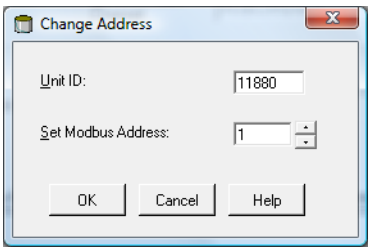


3. Select the *Communication* tab.

4. Verify the tank position. The *Connected to HUB* field shows the name of the Rosemount 2410 Tank Hub and the tank position that the Rosemount 5408 is mapped to in the tank hub's database. The tank position indicates which tank the Rosemount 5408 is associated with.

   In case the transmitter is connected to a multiple tank version of the Rosemount 2410, it may be mapped to another tank position via the *2410 Tank Hub Properties/Tank Database* window if needed (in the WinSetup workspace, click the right mouse button on the Rosemount 2410 icon and select the Properties option).
   See "Tank Database setup" on page 36 for more information on how to configure the Rosemount 2410 tank database.

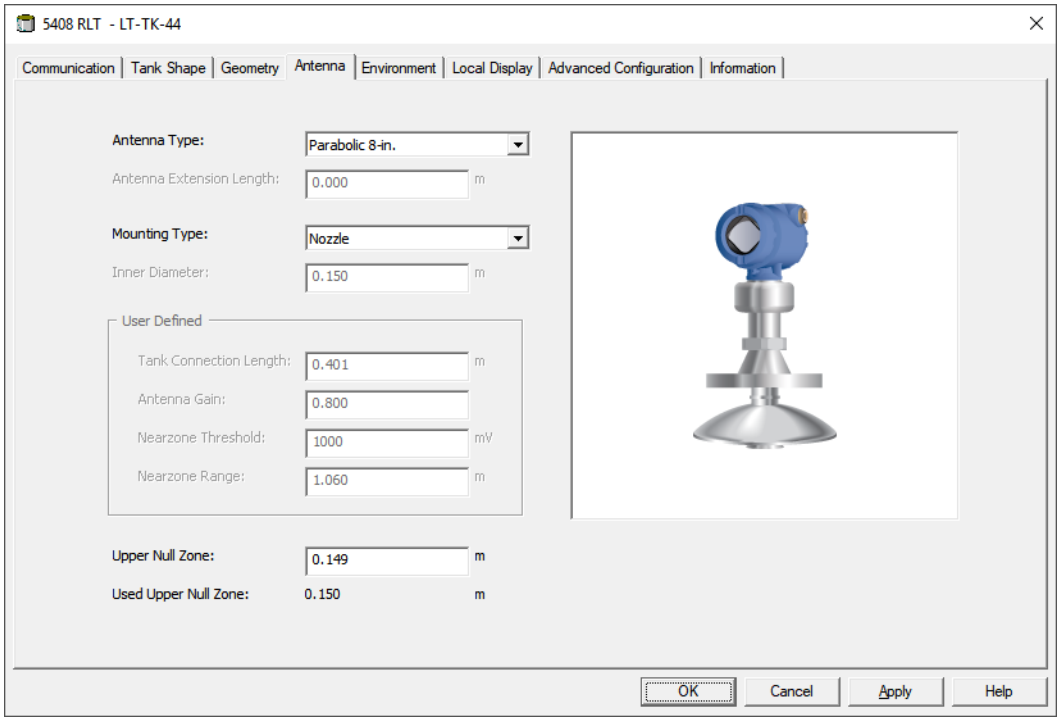
5. Verify the Modbus address. To change the Modbus address click the **Change** button:



   a. Enter the Unit ID in the **Unit ID** input field.
      When changing the device address, the Unit Id is used as a unique identifier of the device. The Unit Id can be found on a label mounted on the device.
   b. Type the desired address in the **Set Modbus Address** input field.
   c. Click the **OK** button to confirm and to close the *Change Address* window.

6. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

7. Select the *Antenna* tab.



8. Select **Antenna Type** and mounting type if applicable. You may choose between predefined antenna types or User Defined for non-standard antennas. For predefined antennas a number of transmitter parameters are automatically specified in order to optimize measurement performance. For User Defined antenna the database settings must be entered manually.

   Enter **Antenna Extension** Length in case the antenna is equipped with an extension.

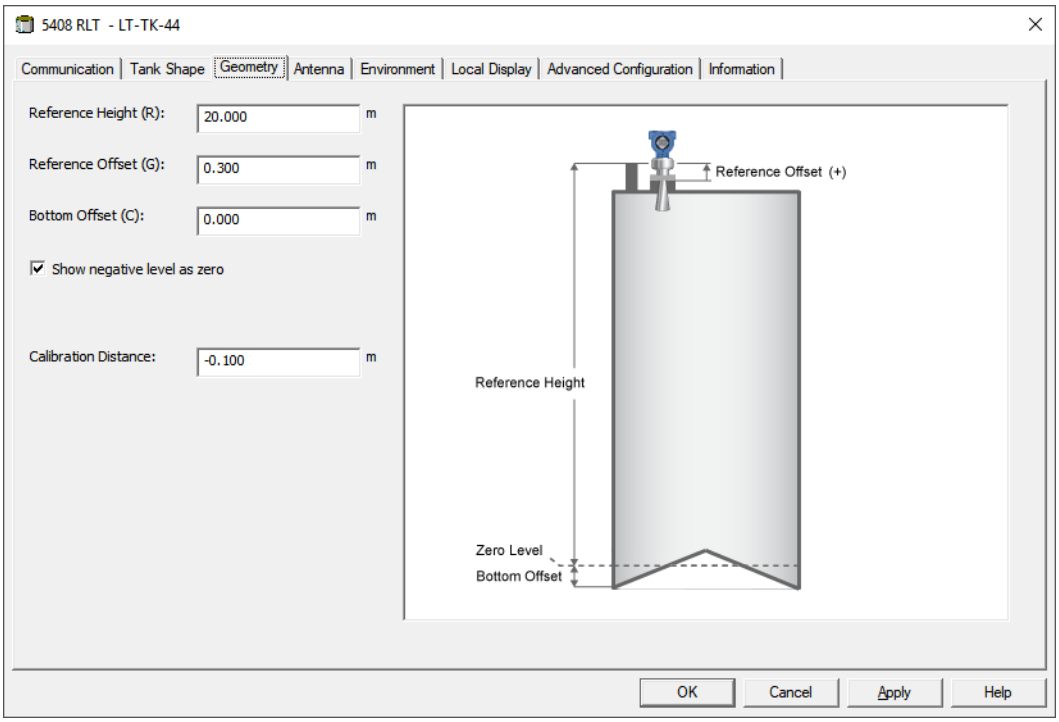
9. In case there are disturbances close to the nozzle you may adjust the **Upper Null Zone**. By increasing the Upper Null Zone, the measurement range is reduced in the upper part of the tank.

10. For still pipe applications enter the **Inner Diameter**.

See the Rosemount 5408 Series Reference Manual (00809-0300-4408) for more information on Upper Null Zone and other transmitter parameters.

11. Click the **Apply** button to store the configuration.

12. Select the *Geometry* tab.



13. Enter tank distance parameters.

    a. **Tank Reference Height (R)** is defined as the distance from the Tank Reference Point to the Zero Level.

    b. **Reference Offset (G)** is the distance between the Tank Reference Point and the Gauge Reference Point, which is located at the surface of the nozzle flange on which the gauge is mounted.

    c. **Bottom Offset (C)** is defined as the distance between the Zero Level (Dipping Datum Point) and the minimum level for the product surface (tank bottom). By specifying a C-distance, the measuring range can be extended to the bottom of the tank.

       C>0: the transmitter presents negative level values when the product surface is below the Zero Level.
       You can use the **Show negative level values as zero** check box to present product levels below the Zero Level (Datum plate) as equal to zero.

       C=0: measurements below the Zero Level will not be approved, i.e. the transmitter will report “invalid level” if the product level is below the Datum Plate.

14. Enter **Calibration Distance** if needed. This variable lets you adjust the tank height so that measured product levels correspond to hand dipped levels. Normally a minor adjustment is necessary when the transmitter is installed. For example, a minor deviation between the actual tank height and the value stored in the transmitter database may occur if tank dimensions according to drawings are not quite up to date with actual dimensions.

15. Select the **Show negative level as zero** check box in case you don't want the transmitter to show negative level values.

16. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

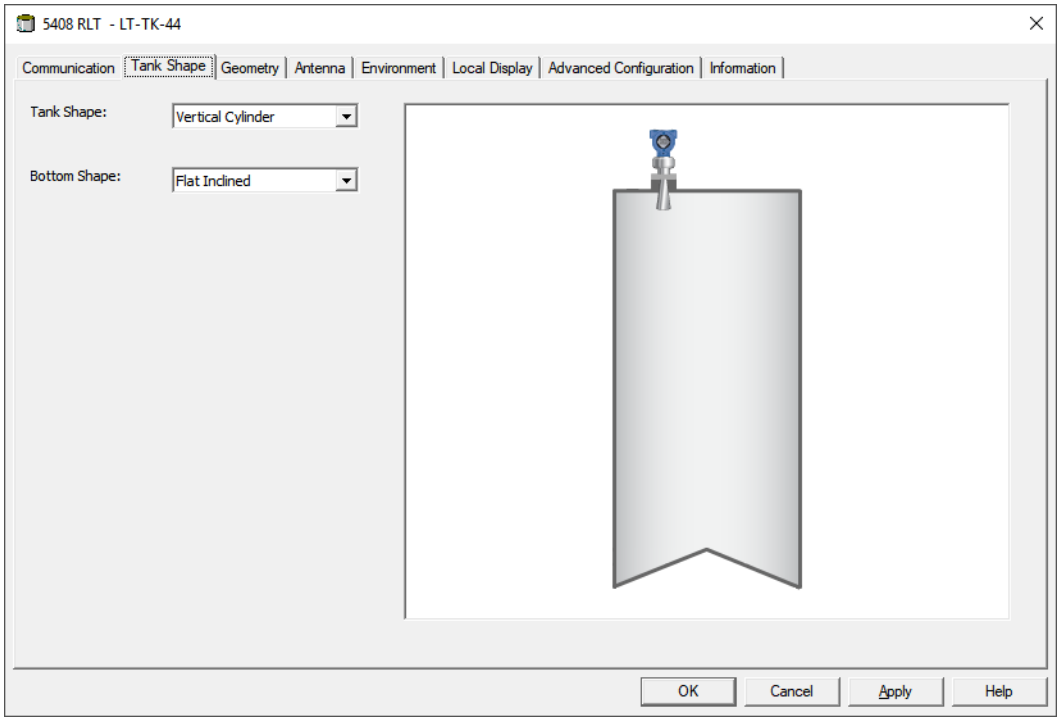
See the Rosemount 5408 Series Reference Manual (00809-0300-4408*)* for more information on the different tank geometry parameters.

2.10.2 Advanced configuration

In addition to the basic configuration there are advanced configuration options available for the Rosemount 5408 transmitter. This section provides a brief description of a couple of these options. For more information on advanced configuration see the Rosemount 5408 Series Reference Manual (00809-0300-4408).

Tank shape

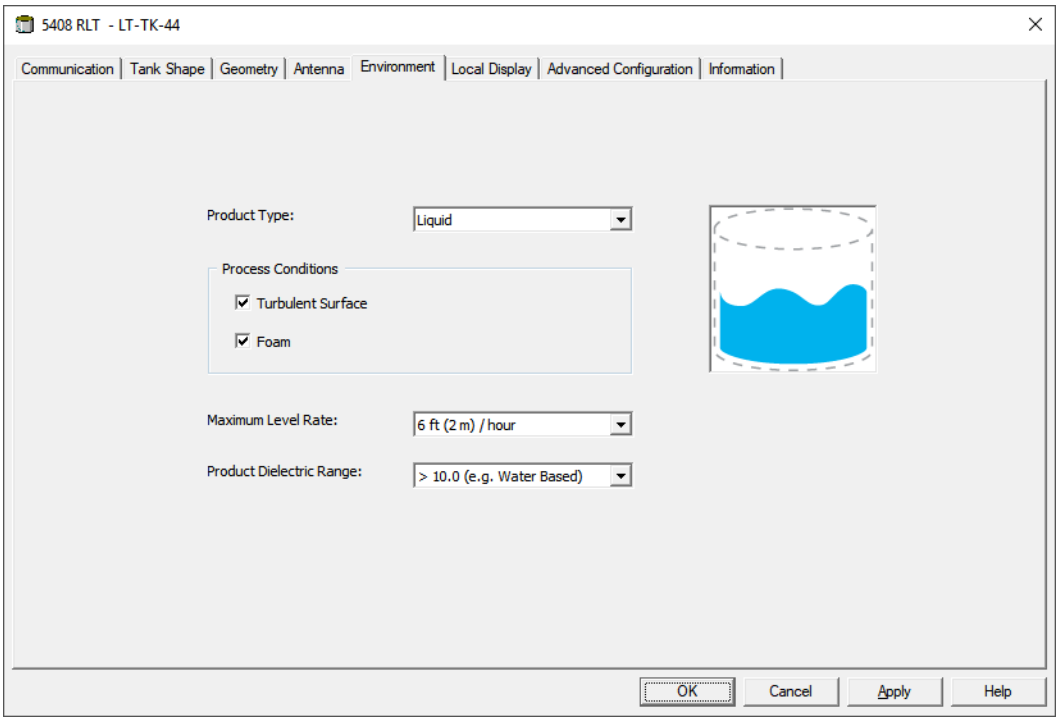
The **Tank Shape** and **Bottom Shape** parameters optimize the Rosemount 5408 for various tank geometries and for measurements close to the tank bottom. These parameters are configured in the *Tank Shape* window:



Tank environment

Certain product conditions in the tank may require special configuration options to be used in order to optimize measurement performance of the 5408 Radar Level Transmitter. By configuring the environmental conditions in the tank, the transmitter can compensate for conditions such as rapid level change, weak echo signals, varying surface echo amplitudes, or other similar sources of inaccurate measurement.

The *Environment* window is used to optimize the transmitter for special tank conditions:



For Process Conditions it is recommended to select as few options as possible.

See the Rosemount 5408 Series Reference Manual (00809-0300-4408) for more information on tank environment settings.

2.10.3 Installing a Rosemount 5408 using the installation wizard

The installation wizard in TankMaster WinSetup is a tool that may be used to install and configure a Rosemount 5408 Radar Level Transmitter and other devices.

Normally a Rosemount 5408 Radar Level Transmitter is installed as part of the installation procedure for a Rosemount 2410 Tank Hub. However, the installation wizard lets you install a Rosemount 5408 in TankMaster separately from the tank hub installation:

1. Ensure that the tank databases of the **Rosemount 2460 System Hub** and the **Rosemount 2410 Tank Hub** are properly configured and include the new 5408 Radar Level Transmitter. Ensure that the correct level gauge Modbus address is used (see "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).
2. Install and configure the Rosemount 5408 as described in "Using the installation wizard" on page 101.
3. Verify that the Rosemount 5408 communicates with the Rosemount 2410 Tank Hub. Use for example the tank hub's Device Live List function to see all devices connected to the tank hub. The live list is available by right clicking the tank hub's device icon.

In most cases the following procedure is recommended when installing a new Rosemount 5408 Radar Level Transmitter:

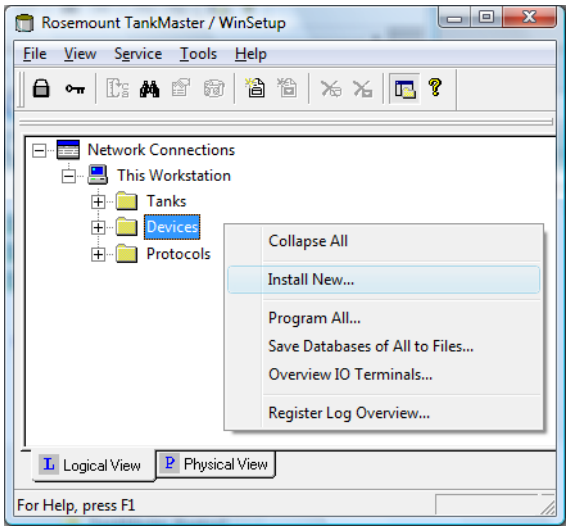
1. Install and configure the Rosemount 2460 System Hub and the Rosemount 2410 Tank Hub. Ensure that the correct level gauge Modbus address is configured for the new Rosemount 5408 (see "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).
2. In the *2410 Tank Hub Summary* window select the **Install Level and AUX devices** check box to automatically install the Rosemount 5408 in the TankMaster workspace.
3. Configure the Rosemount 5408 (see "Configuration via 5408 properties" on page 93).

See also "Adding a tank" on page 128 for further information on adding tanks and devices to a Rosemount Tank Gauging system.

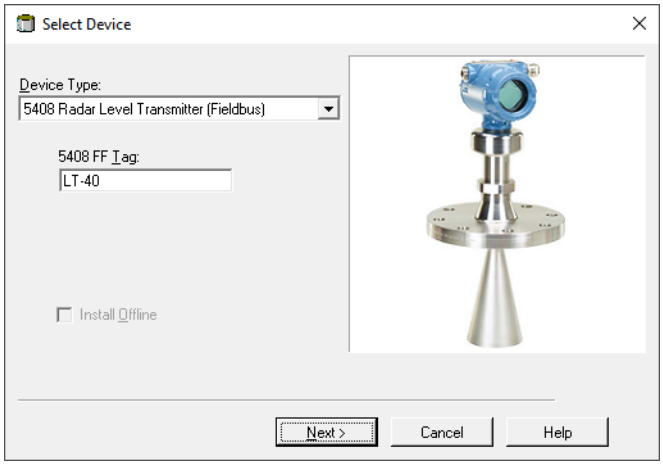
Using the installation wizard

To configure a Rosemount 5408 by using the WinSetup installation wizard perform the following steps:

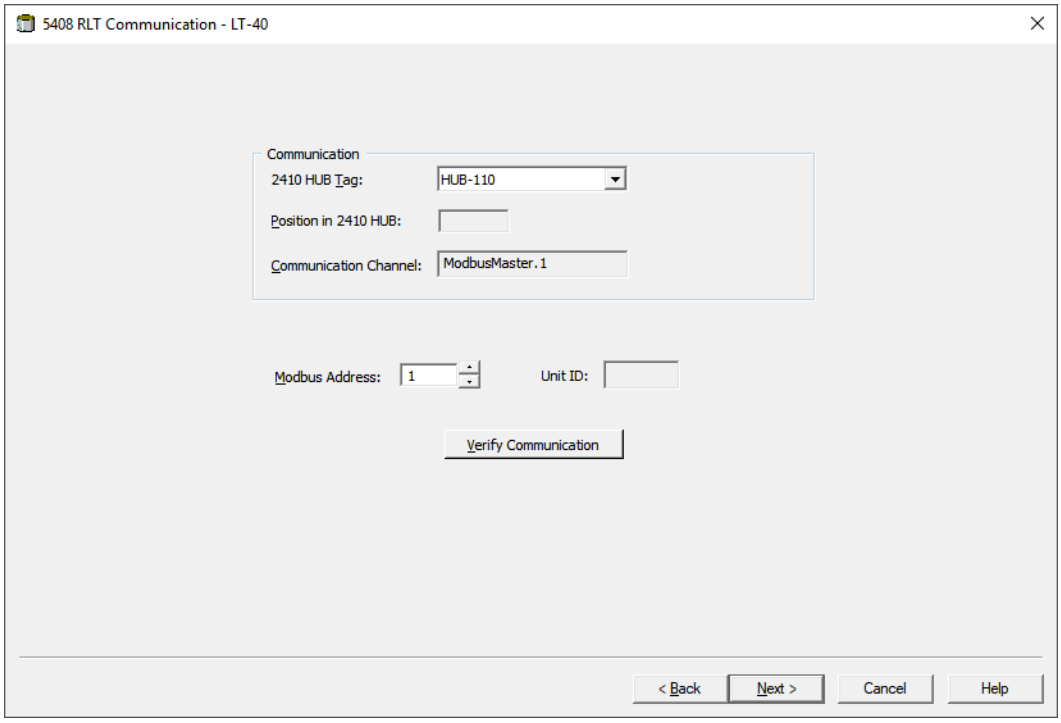
1. In the *Workspace* window select the **Devices** folder.



2. Click the right mouse button and select **Install New**, or from the **Service** menu choose **Devices/Install New**.
The *Select Device* window appears:



3. Choose **Device Type** *5408 Radar Level Transmitter* from the drop-down list.
4. Enter the level tag used for the radar level gauge.
5. Click the **Next** button to open the *5408 RLT Communication* window.



6. In the *2410 HUB Tag* drop-down list choose the Rosemount 2410 Tank Hub that the 5408 Radar Level Transmitter is connected to.

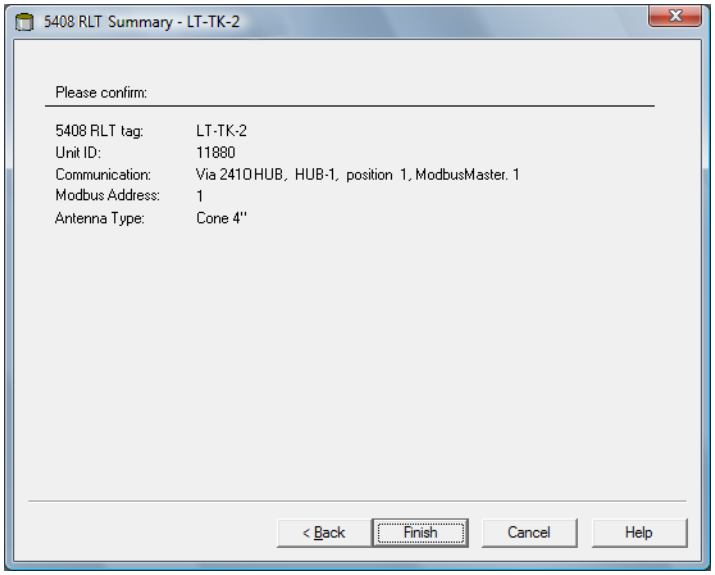
7. Enter the **Modbus address** that is used for the 5408 level transmitter. Note that this address must be stored in the tank databases of the Rosemount 2460 System Hub as well as the Rosemount 2410 Tank Hub.

8. Click the **Verify Communication** button to verify that the TankMaster PC communicates with the 5408 transmitter. The Unit ID will appear when contact is established.

9. Verify the tank position. The *Position in 2410 HUB* field shows the tank position that the 5408 is mapped to in the 2410 tank database. The tank position indicates which tank the 5408 is associated with. In case the 5408 transmitter is connected to a multiple tank version of the Rosemount 2410, the 5408 can be mapped to another tank position via the *2410 Tank Hub Properties/Tank Database* window if necessary(in the WinSetup workspace, click the right mouse button on the 2410 icon and choose the Properties option).
See "Tank Database setup" on page 36 for more information on how to configure the 2410 Tank Database.

10. Click the **Next** button to proceed with the 5408 configuration.

11. For further information on Rosemount 5408 configuration, refer to "Configuration via 5408 properties" on page 93 and "Advanced configuration" on page 98.



12. In the *5408 RLT Summary* window, click the **Finish** button to finish the installation wizard. If the configuration needs to be changed click the **Back** button until the desired window appears.

2.11 Installing a Rosemount 5300

The Rosemount 5300 Guided Wave Radar is most conveniently installed in TankMaster WinSetup by utilizing the integrated option included as part of the Rosemount 2410 Tank Hub installation procedure. In a following step, the 5300 is configured via the *5300 GWR* window, see "Configuration via 5300 Properties" on page 105. The *5300 GWR* window includes tabs for basic and advanced configuration of a Rosemount 5300.

When adding a Rosemount 5300 to a Rosemount 2410 in an existing Rosemount Tank Gauging system, the 5300 needs to be mapped to the appropriate tank in the 2410 tank database. Configuration is performed via the *5300 GWR* window. See "Adding a tank" on page 128 for further information.

A Rosemount 5300 is most conveniently installed by utilizing the integrated option included as part of the Rosemount 2410 Tank Hub installation procedure.

The 5300 can also be installed and configured by using the WinSetup installation Wizard (see "Installing a Rosemount 5300 using the installation wizard" on page 111). This method should only be used in exceptional cases when, for example, the 5300 is connected to the Tankbus at a later stage and not available when installing the Rosemount 2410 Tank Hub.

The following configuration steps are included in the basic configuration of a Rosemount 5300 Guided Wave Radar:

- communication parameters
- probe type
- tank geometry

Due to the properties of the product, the shape of the tank, or other circumstances, further configuration may be needed in addition to the basic configuration. Disturbing objects and turbulent conditions in the tank may also require advanced measures to be taken. The TankMaster WinSetup configuration tool includes advanced options for the 5300 such as:

- tank environmental conditions

See "Installing a tank" on page 115 for further information on advanced configuration options.

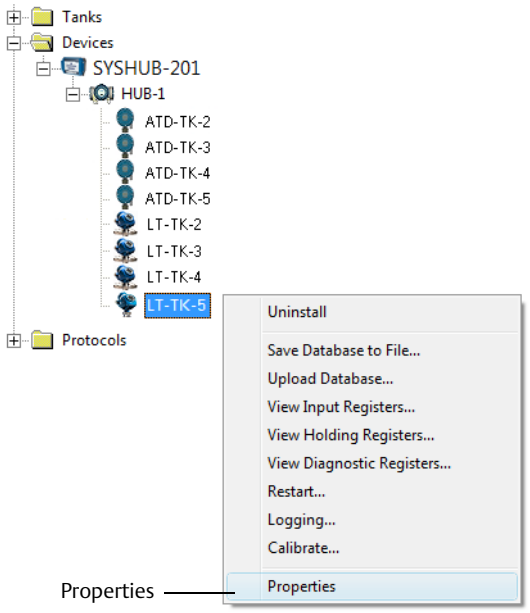
For further information on installation and configuration of a Rosemount 5300 Guided Wave Radar see the Rosemount 5300 Series Reference Manual (00809-0100-4530).

2.11.1 Configuration via 5300 Properties

This section describes the basic configuration procedure for a Rosemount 5300 Guided Wave Radar by using the *5300 GWR window*.

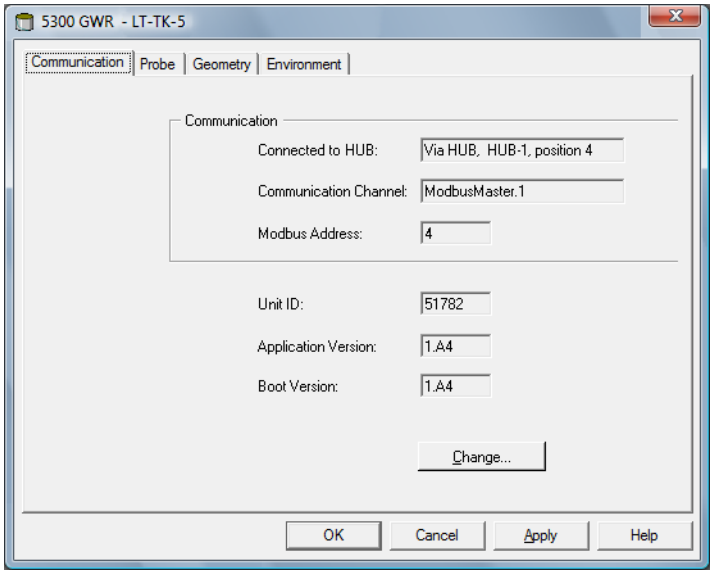
To configure the Rosemount 5300 Guided Wave Radar perform the following steps:

1. In the *WinSetup Workspace* window, open the **Devices** folder and select the desired Rosemount 5300.



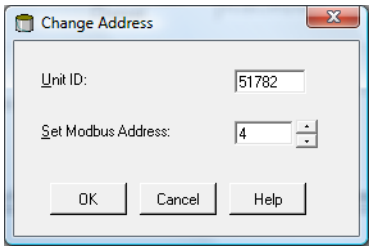
2. Click the right mouse button and select **Properties**, or from the **Service** menu select the **Devices/Properties** option.
The *5300 GWR window* appears.

3. Select the *Communication* tab.



4. Verify the position in the tank database. The *Connected to HUB* field shows the name of the Rosemount 2410 Tank Hub and the tank position that the 5300 is mapped to in the tank hub's database. The tank position indicates which tank the 5300 is associated with.
In case the transmitter is connected to a multiple tank version of the Rosemount 2410, it may be mapped to another tank position via the *2410 Tank Hub Properties/Tank Database* window if needed (in the WinSetup workspace, click the right mouse button on the Rosemount 2410 icon and select the Properties option).
See "Tank Database setup" on page 36 for more information on how to configure the Rosemount 2410 tank database.

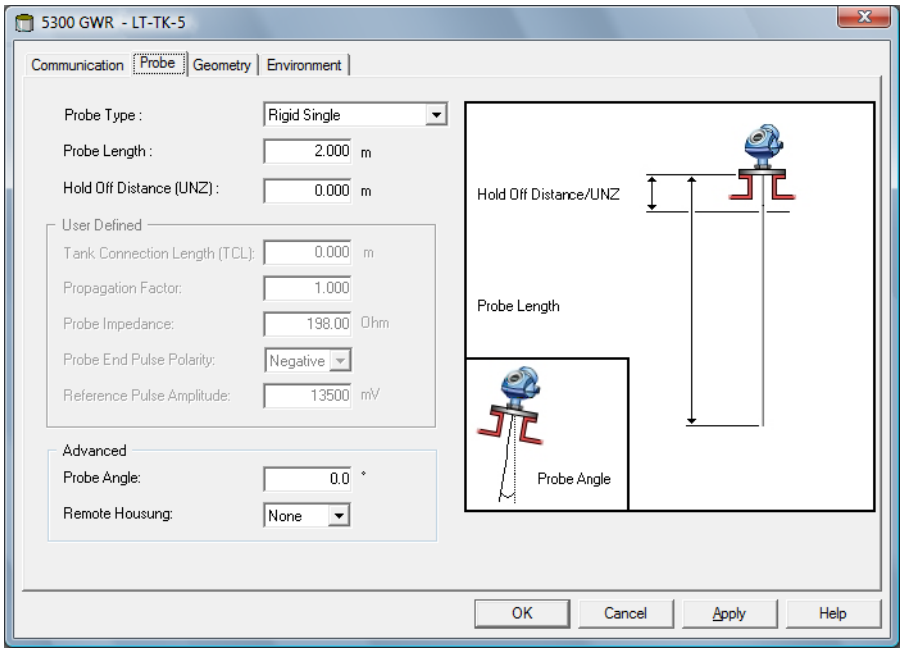
5. Verify the Modbus address. To change the Modbus address click the **Change** button:



   a. Enter the Unit ID in the **Unit ID** input field.
   When changing the device address, the Unit Id is used as a unique identifier of the device. The Unit Id can be found on a label mounted on the device.
   b. Type the desired address in the **Set Modbus Address** input field.
   c. Click the **OK** button to confirm and to close the *Change Address* window.

6. Click the **Apply** button to store the configuration.

7. Select the *Probe* tab.



8. Select a **Probe Type** that corresponds to the actual probe that is used on the transmitter. You may select a predefined (standard) probe, or User Defined for non-standard probes. For predefined probe types, measurement performance is optimized by automatically specifying various device parameters. For a User Defined probe the database settings must be configured manually.

   The following predefined (standard) **Probe Types** are available:

   - Flexible Twin
   - Flexible Single
   - Coaxial

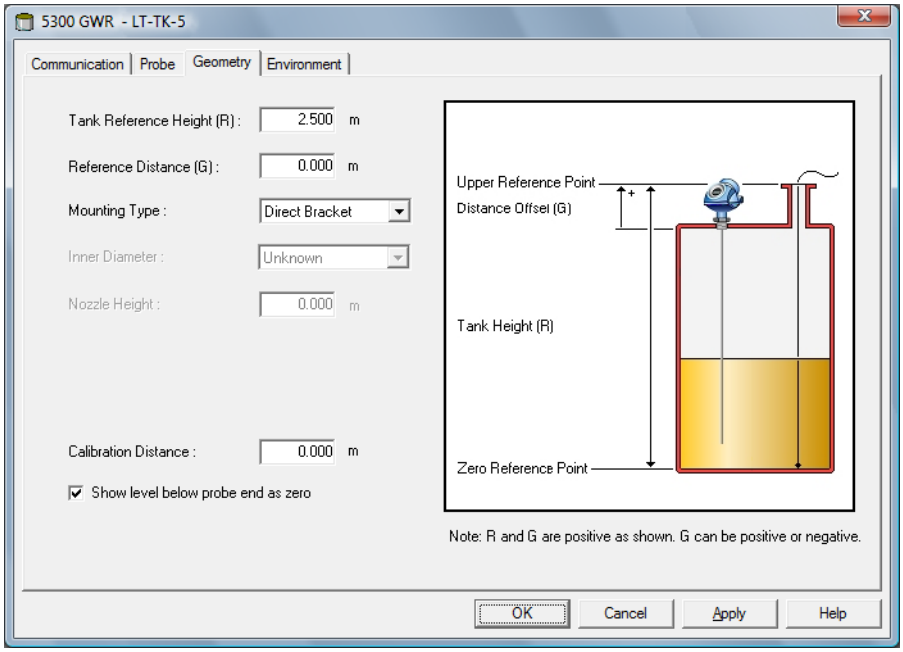
9. **Probe Length** is measured from the Upper Reference Point to the end of the probe. If a weight is used at the end of the probe it shall not be included.

10. Adjust the **Hold Off Distance (UNZ)** if there are disturbances in the upper part of the tank. Such problems may occur if there are disturbing objects, such as a narrow nozzle with rough walls, close to the probe. By increasing the Hold Off distance, the measuring range is reduced.

11. Click the **Apply** button to store the configuration.

See the Rosemount 5300 Series Reference Manual (00809-0100-4530) for more information on Hold Off Distance and other configuration parameters.

12. Select the *Geometry* tab.



13. **Tank Reference Height (R)** is defined as the distance from the Upper Reference Point to the Zero Reference Point

14. **Reference Distance (G)** is the distance between the Upper Reference Point and the flange.

15. Use the **Calibration Distance** parameter to adjust the tank height so that measured product levels match the hand dipped level values. Typically a minor adjustment is necessary when the device is installed. For example, a minor deviation between the actual tank height and the value stored in the device database may occur if tank dimensions according to drawings are not quite up to date with actual dimensions.

16. Select the appropriate **Mounting Type**; *Pipe Chamber*, *Direct Bracket*, or *Nozzle*. Select *Unknown* if none of these is appropriate. Depending on the mounting type you may also need to specify other parameters such as Inner Diameter and Nozzle Height.

17. Select the **Show level below probe end as zero** check box if you want the transmitter to present zero instead of negative product levels.

18. Click the **Apply** button to store the configuration, or click the **OK** button to store the configuration and close the window.

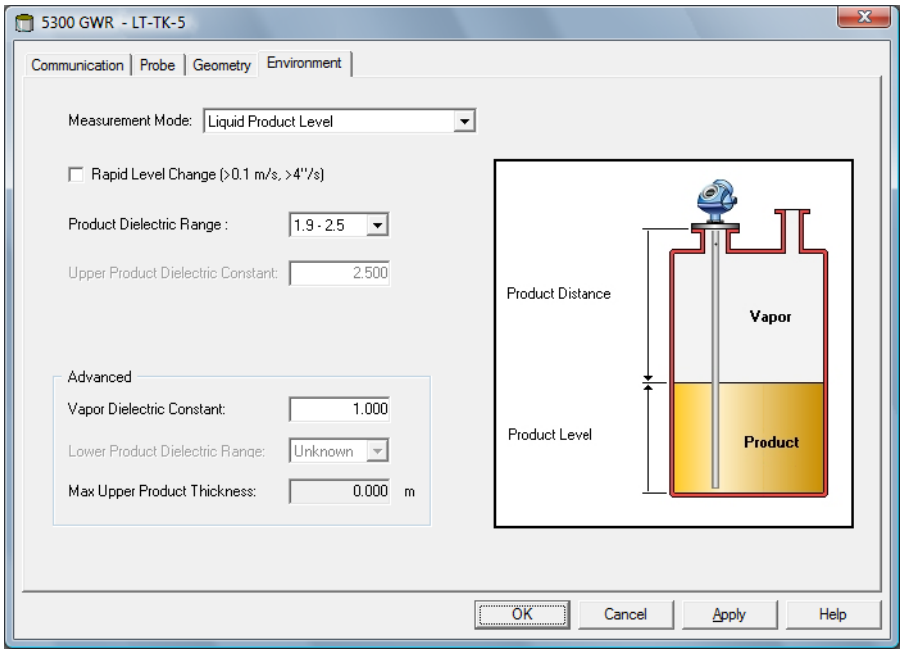
See the *Rosemount 5300 Reference Manual (Document No.00809-0100-4530)* for more information on various tank geometry parameters.

2.11.2 Advanced configuration

In addition to the basic configuration there are advanced configuration options available for the Rosemount 5300 Guided Wave Radar. Environment conditions such as rapid level changes and dielectric constants of products as well as vapor dielectric constant can be configured.

The *5300 GWR/Environment* window can be used to optimize the 5300 Guided Wave Radar for special tank conditions as illustrated below. To configure Environment parameters for the Rosemount 5300:

1. In the *Workspace* window, select the Rosemount 5300 icon.
2. Click the right mouse button and choose the **Properties** option. The *5300 GWR* window appears.
3. Select the *Environment* tab.



Measurement mode

The Rosemount 5300 is preconfigured according to the specified model and normally the measurement mode does not need to be changed.

Rapid level change

Select the **Rapid Level Change** check box if the surface is moving quickly up or down at rates over 0.1 m/s (4 inch/s).

Dielectric constant/dielectric range

The Product Dielectric Range is used for setting the appropriate signal amplitude thresholds in order to filter out noise from the measurement signal.

In interface level measurements, dielectric constants can be configured for both the upper and the lower products. For the Product Dielectric Range choose option *Unknown* if the correct value range is not known or if the contents of the tank is changing on a regular basis.

For Measurement Mode *Liquid Product Level* enter the **Product Dielectric Range**. In some applications there is heavy vapor above the product surface having a significant influence on the level measurement. This may for example be the case of saturated water vapor under high pressure. In such cases the **Vapor Dielectric Constant** can be changed to compensate for this effect. Normally this value does not have to be changed since the effect on measurement performance is very small for most vapors. The default value is equal to 1 which corresponds to the dielectric constant of vacuum.

For Measurement Mode *Product Level and Interface Level* enter the **Upper Product Dielectric Constant**. If the dielectric constant of the lower product is significantly smaller than the dielectric constant of water you may need to adjust the **Lower Product Dielectric Range** as well.

See the Rosemount 5300 Series Reference Manual (00809-0100-4530*)* for more information on tank environment settings.

2.11.3 Installing a Rosemount 5300 using the installation wizard

The installation wizard in TankMaster WinSetup is a tool that may be used to install and configure a Rosemount 5300 Guided Wave Radar and other devices.

Normally a Rosemount 5300 is installed as part of the installation procedure for a Rosemount 2410 Tank Hub. However, the installation wizard lets you install a Rosemount 5300 in TankMaster separately from the tank hub installation:

1. Ensure that the tank databases of the **Rosemount 2460 System Hub** and the **Rosemount 2410 Tank Hub** are properly configured and include the new Rosemount 5300 transmitter. Ensure that the correct level gauge Modbus address is used (see "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).
2. Install and configure the Rosemount 5300 as described in "Using the installation wizard" on page 112.
3. Verify that the Rosemount 5300 communicates with the Rosemount 2410 Tank Hub. Use for example the tank hub's Device Live List function to see all devices connected to the tank hub. The live list is available by right clicking the tank hub's device icon.

In most cases the following procedure is recommended when installing a new Rosemount 5300 transmitter:

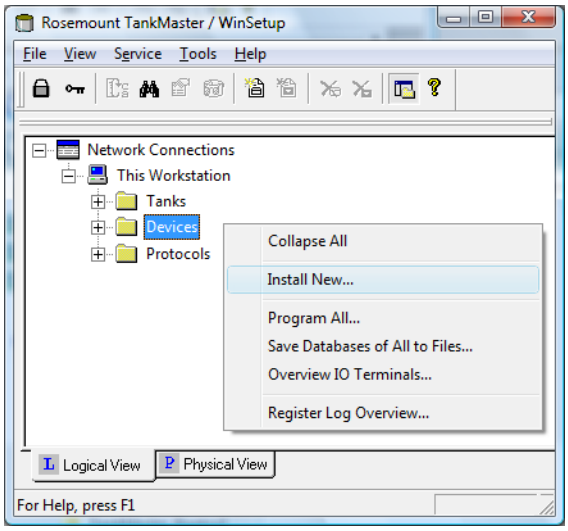
1. Install and configure the Rosemount 2460 System Hub and the Rosemount 2410 Tank Hub. Ensure that the correct level gauge Modbus address is configured for the new Rosemount 5300 (see "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for more information).
2. In the *2410 Tank Hub Summary* window select the **Install Level and AUX devices** check box to automatically install the Rosemount 5300 in the TankMaster workspace.
3. Configure the Rosemount 5300 (see "Configuration via 5300 Properties" on page 105).

See also "Adding a tank" on page 128 for further information on adding tanks and devices to a Rosemount Tank Gauging system.

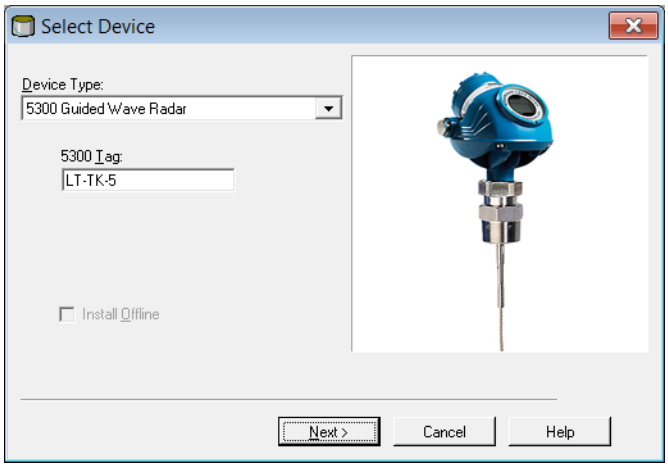
Using the installation wizard

To configure a Rosemount 5300 by using the WinSetup installation wizard perform the following steps:

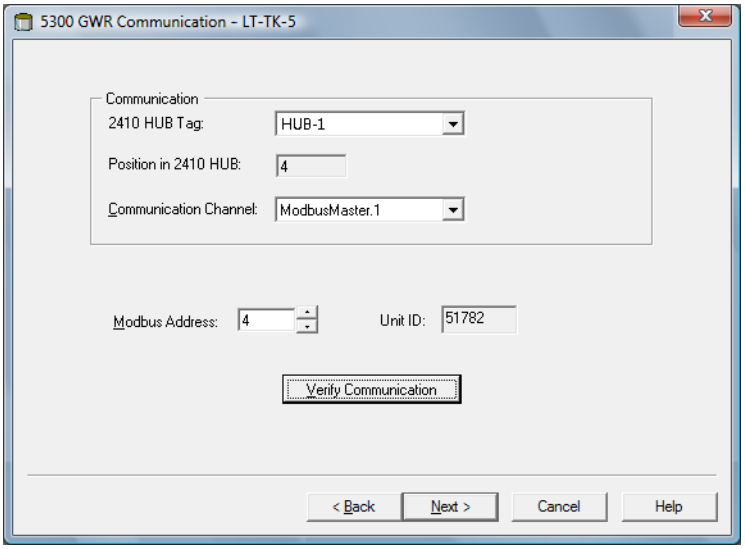
1. In the *Workspace* window select the **Devices** folder.



2. Click the right mouse button and select **Install New**, or from the **Service** menu choose **Devices/Install New**.
The *Select Device* window appears:



3. Choose **Device Type** *5300 Guide Wave Radar* from the drop-down list.
4. Enter the desired level tag for the transmitter.
5. Click the **Next** button to open the *5300 GWR Communication* window.



6. In the 2410 Tag drop-down list select the tank hub that the radar transmitter is connected to.

7. Check that the **Modbus address** is the same one that is used for the transmitter in the tank databases of the Rosemount 2460 System Hub and the Rosemount 2410 Tank Hub.

8. Click the **Verify Communication** button to verify that the TankMaster PC communicates with the Rosemount 5300. The Unit ID appears when contact is established.

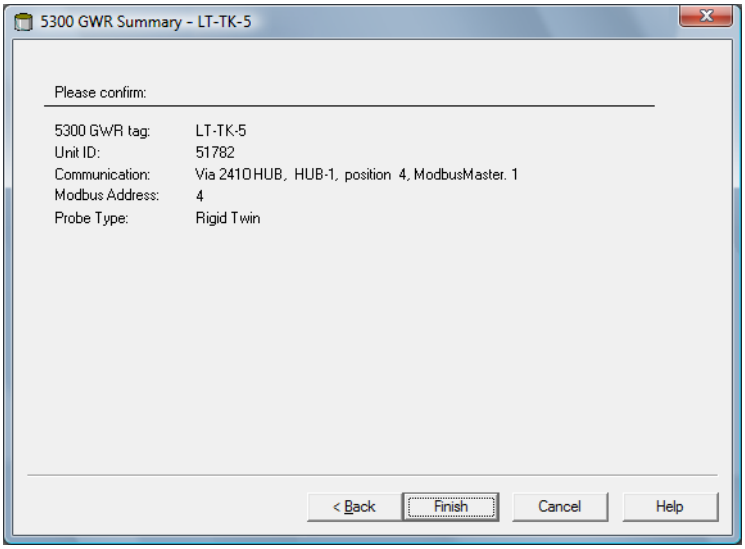
9. Verify that the **Position in 2410 HUB** is the tank position that the transmitter is mapped to in the tank hub's database. The tank position indicates which tank the transmitter is associated with.

   In case the Rosemount 5300 is connected to a multiple tank version of the Rosemount 2410, the tank position can be changed via the *2410 Tank Hub Properties/Tank Database* window if necessary (in the WinSetup workspace, click the right mouse button on the 2410 icon and select the Properties option). See "Tank Database setup" on page 36 for more information on how to configure the Rosemount 2410 tank database.

10. Click the **Next** button to proceed with the configuration.

11. For configuration of the *5300 GWR Probe* window refer to the appropriate parts in "Configuration via 5300 Properties" on page 105.

12. For configuration of the *5300 GWR Environment* window refer to the appropriate parts in "Installing a tank" on page 115.



13. In the *5300 GWR Summary* window click the **Finish** button to finish the installation wizard. If the configuration needs to be changed click the **Back** button until the desired window appears.

Further configuration options are available in the *5300 GWR* window, see "Installing a tank" on page 115.

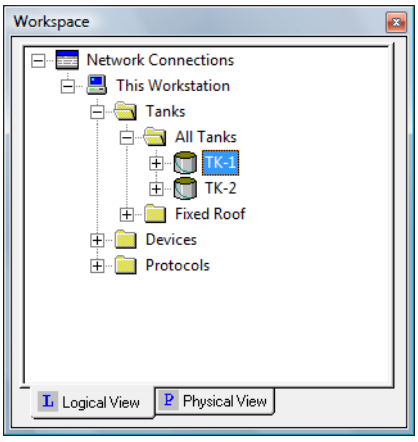
Section 3 Tank Installation

This section describes how to install and configure tanks in a Rosemount Tank Gauging system by using the Rosemount TankMaster WinSetup configuration program.

3.1 Installing a tank

3.1.1 Overview

Basically the purpose of the tank installation procedure is to associate various devices to the right tanks. It also includes mapping variables such as Free Water Level and Vapor Pressure to specific instrument outputs.



Installing a new tank is a simple and straightforward procedure when using the tank installation wizard.

Note
Make sure that measurement units are specified before installing a new tank. See also "Measurement units" on page 20.

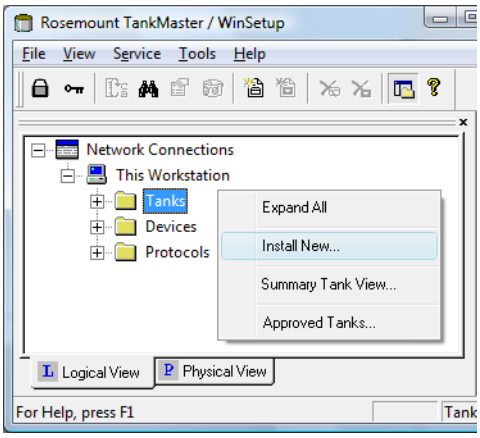
The specified measurement units only affect installation of new tanks. Changing measurement units has no effect on tanks which are already installed in WinSetup. This means that if you want to change measurement units for an installed tank, it has to be uninstalled first, and then installed again after changing the measurement units in the *Server Preferences/Units* window. See also "Measurement units" on page 20.

A tank installation includes the following steps:

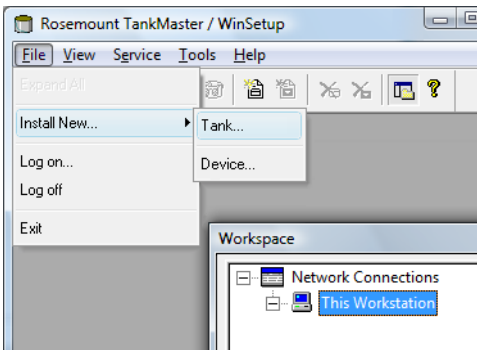
1. Specify tank type: Fixed Roof, Floating Roof, Sphere, Horizontal etc.
2. Select which devices to associate with the tank.
3. Configure the tank. For inventory calculations you will need to specify source signals for Free Water Level (FWL), Vapor Temperature, Vapor Pressure and Liquid Pressure, see "Advanced parameter source configuration" on page 85.
4. Specify input for the different tank variables: automatic (measured by a field device) or manual values.

3.1.2 Starting the tank installation wizard

To start the tank installation wizard do the following:



In the *Logical View* select the **Tanks** folder.
Click the right mouse button and select **Install New** from the popup menu, or from the **File** menu select **Install New>Tank**.



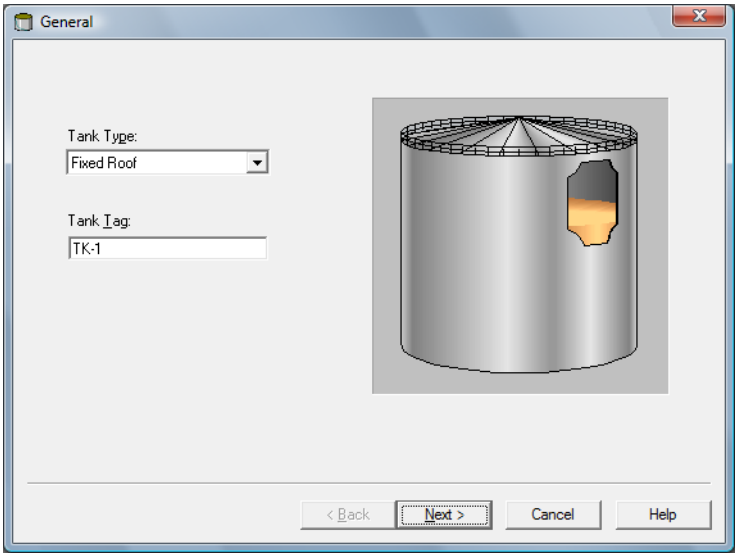
As an alternative you can use the following method:
In the *Logical View* or the *Physical View* select the server where the system is installed.
From the **File** menu select **Install New>Tank**.

See "Installing a new tank" on page 117 for further instructions.

3.1.3 Installing a new tank

To install and configure a tank by using the WinSetup installation wizard do the following:

1. Start the **TankMaster WinSetup** program.
2. Start the tank installation wizard (see "Starting the tank installation wizard" on page 116 for more information).



3. Select the appropriate tank type. For a Rosemount Tank Gauging system the following options are available:

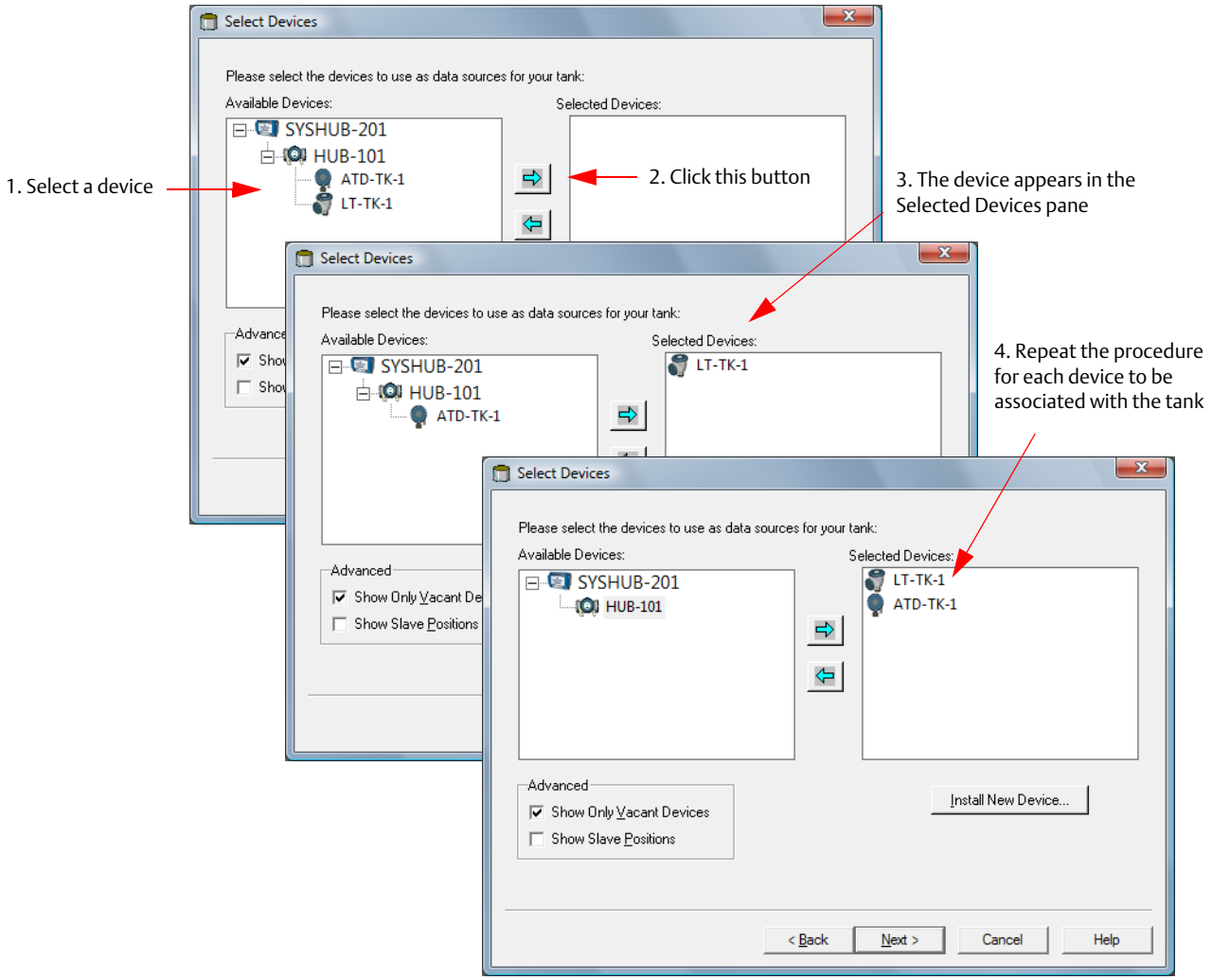
- Fixed Roof
- Floating Roof
- Sphere
- Horizontal
- LPG Sphere, LPG Horizontal
- Servo Tank:
  Fixed Roof, Floating Roof, Sphere LPG, Horizontal LPG, Servo Tank Sphere, Horizontal
- HTG Fixed Roof, HTG Floating Roof, HTG Floating Roof Blanket

4. Enter a name in the **Tank Tag** input field. A prefix appears automatically if you have defined one in the *Tag Prefixes* window (see "Setting the name tag prefixes" on page 24). It is recommended that the same name is used as in the tank database of the 2410 Tank Hub, see "Installing a Rosemount 2410 Tank Hub" on page 32.

Note
Tank Tag must begin with a letter.

5. Click the **Next** button to proceed with the tank installation.

6. Assign field devices to the current tank:
   a. From the **Available Devices** pane, select a device that is installed on the current tank and click the arrow button to move it to the **Selected Devices** pane.
   b. Repeat this procedure for each device that is associated with the tank.



Note
It is recommended that devices are installed prior to installing tanks. In a Rosemount Tank Gauging system, field devices should be installed as described in "Installation procedure" on page 5.

Show slave positions (advanced)

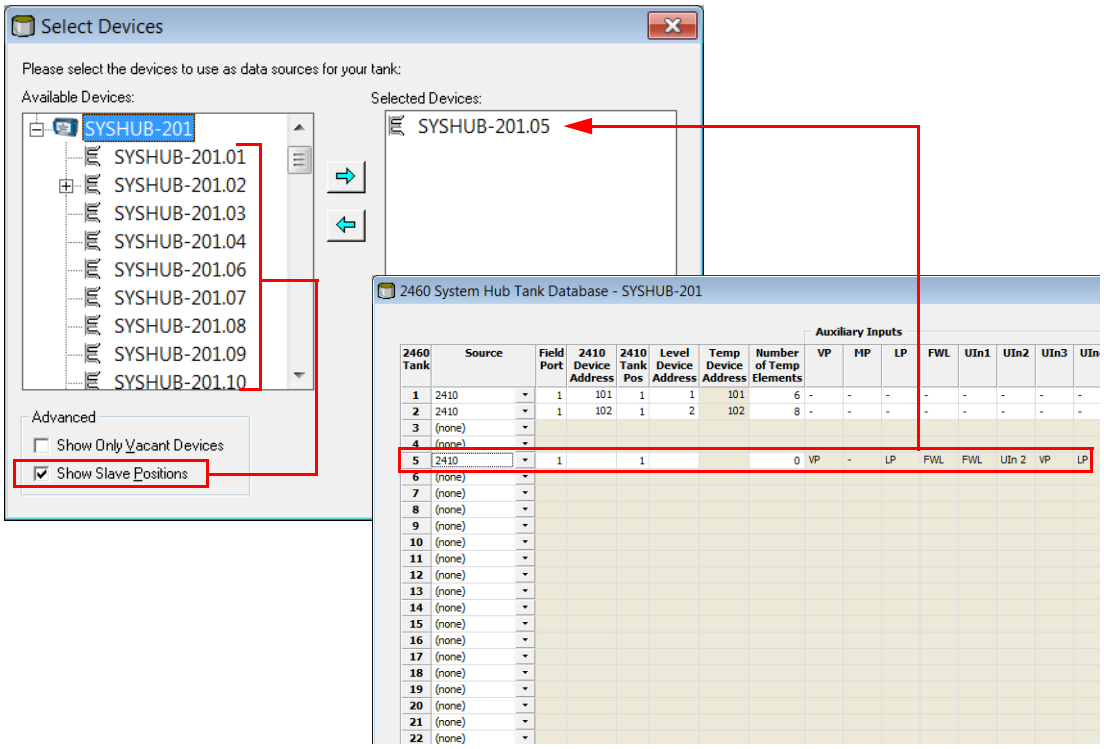
The Show Slave Positions check box should only be used for advanced tank configuration of devices which are not supported by the Rosemount Tank Gauging system.

A device which is connected to the Tankbus and configured in the Rosemount 2460 System Hub's tank database, will appear in the *Available Devices* pane at the left-hand side of the *Select Devices* window.

In case a device which can not be identified by the Rosemount Tank Gauging system is connected to the Tankbus, you will have to select the Show Slave Positions check box in order to map this device to a tank.

To associate an "unknown" device to a tank do the following:

a. In the *Select Devices* window, select the *Show Slave Positions* check box to display the tank database positions.



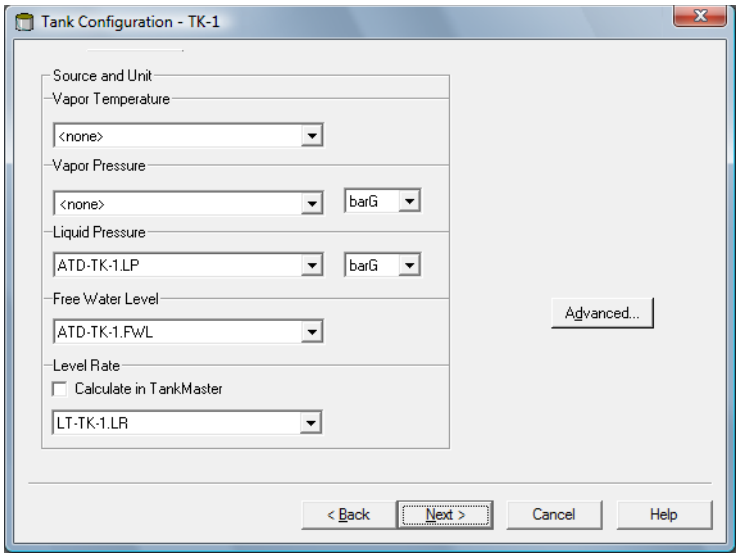
b. In the *Select Devices* window select the Slave Database position that corresponds to the tank where the device is installed.
In the example above the devices are mapped to position 5 which is identified as SYSHUB-201.05 in the tank database.

c. Move the selected item to the **Selected Devices** pane by clicking the button.

7. Click the **Next** button to proceed with the tank installation.

8. Configure the tank.

The *Tank Configuration* window lets you enable tank measurement variables such as **Vapor Temperature**, **Vapor Pressure**, **Liquid Pressure**, and **Free Water Level** (FWL) for calculating **Observed Density** and other inventory parameters. See the *TankMaster WinOpi Reference Manual* for more information on inventory parameters.



The *Calculate in TankMaster* check box may be used for devices without internal calculation of **Level Rate**. By selecting this check box the Level Rate is calculated by the TankMaster program.

Liquid Pressure and **Vapor Pressure** are not automatically mapped to measurement instruments. These tank measurement variables have to be mapped to an instrument in the *22XX ATD/Advanced Parameter Source Configuration* window in order to make them available in the *Tank Configuration* window. See Figure 3-1 on page 121 for an example of how to map the Liquid Pressure variable to the output of a Rosemount 3051S pressure transmitter.

See also "Advanced parameter source configuration" on page 85 for further information on mapping tank measurement variables to source devices.

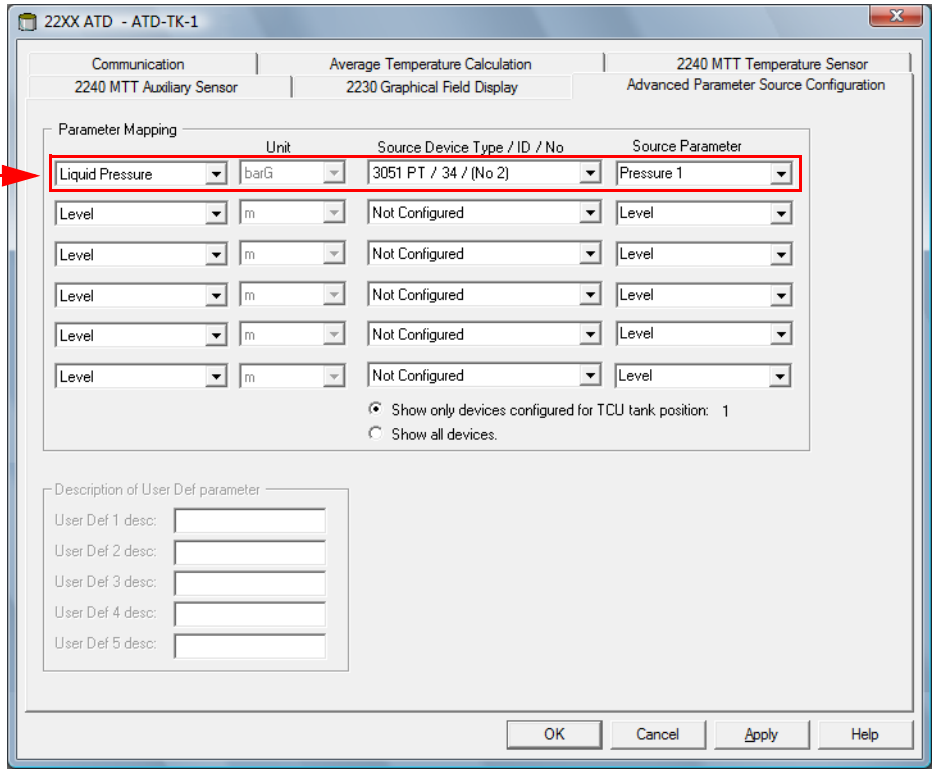
To open the *22XX ATD/Advanced Parameter Source Configuration* window:

a. In the TankMaster WinSetup workspace, click the right mouse button on the ATD device icon and select the Properties option.
b. Select the *Advanced Parameter Source Configuration* tab.
c. Map the appropriate tank measurement variable to the output of a transmitter on the Tankbus. See an example in Figure 3-1 on page 121.

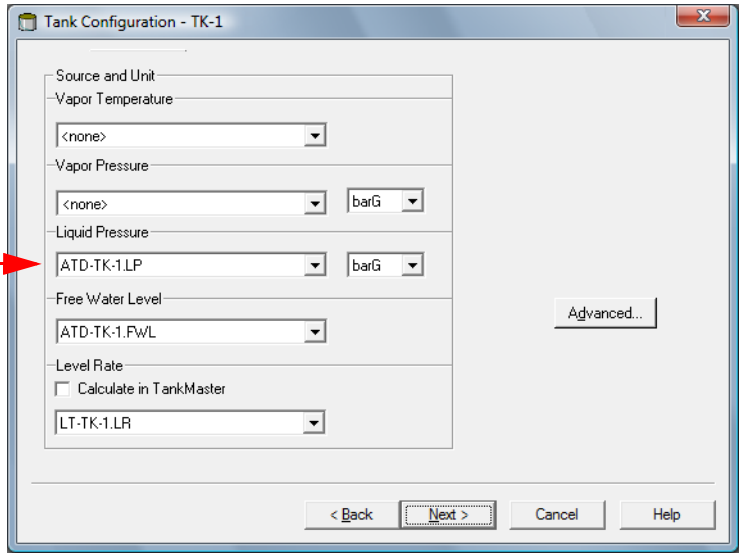
A measurement instrument which is mapped in the *22XX ATD/Advanced Parameter Source Configuration* window can be selected in the *Tank Configuration* window.

Figure 3-1. Advanced Parameter Source Configuration

22XX ATD / ADVANCED PARAMETER SOURCE CONFIGURATION



TANK CONFIGURATION



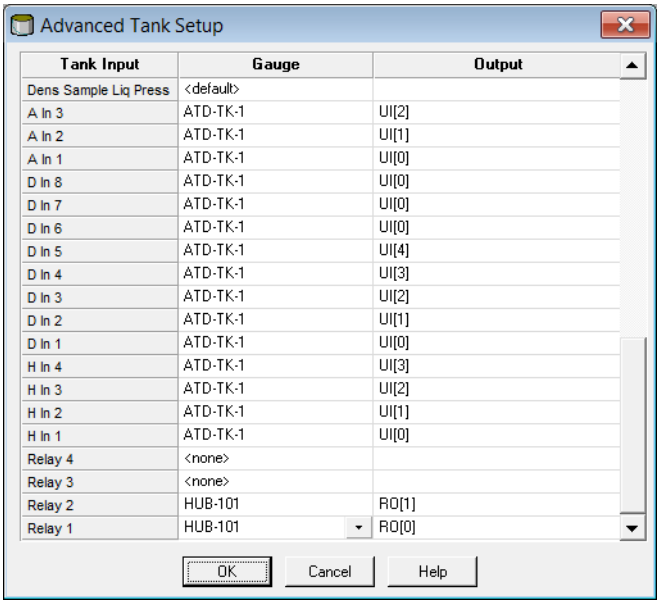
Advanced Configuration

The *Advanced Tank Setup* window allows you to change mapping of tank measurement variables to gauge output. This option can be used, for example, to map the relay outputs of a Rosemount 2410 Tank Hub to relay status presentation in the *TankMaster WinOpi* program.

Note
Advanced configuration should only be used when there is no appropriate option available in the standard *Tank Configuration* window.

To change tank parameter mapping do the following:

a. Click the **Advanced** button in the *Tank Configuration* window.

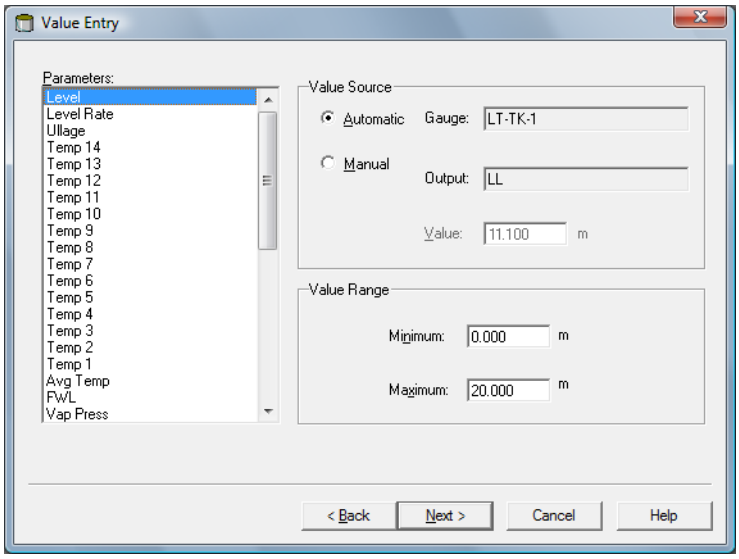


b. For each tank input variable you can change output as well as gauge. Simply put the mouse pointer in the Gauge or Output field of the desired Tank Input variable (Level, Level rate, etc.) and select the desired option from the drop-down list.

c. Click the **OK** button to close the *Advanced Tank Setup* window.

9. In the *Tank Configuration* window, click the Next button to proceed to the next step of the tank installation procedure.

10. The *Value Entry* window lets you:
    - Choose whether to use measurement values (Automatic) from available instruments, or manual values.
    - For Level and Free Water Level, specify parameter Value Range to be used in various windows for presentation of measurement data.



The **Free Water Level**, **Liquid Pressure**, and **Vapor Pressure** parameters are set to Value Source=Manual by default. Therefore, for these type of instruments, you need to configure the tank for automatic measurements.

The *Value Entry* window allows you to disable automatic measurements for selected parameters in case you need to remove an instrument for service purposes.

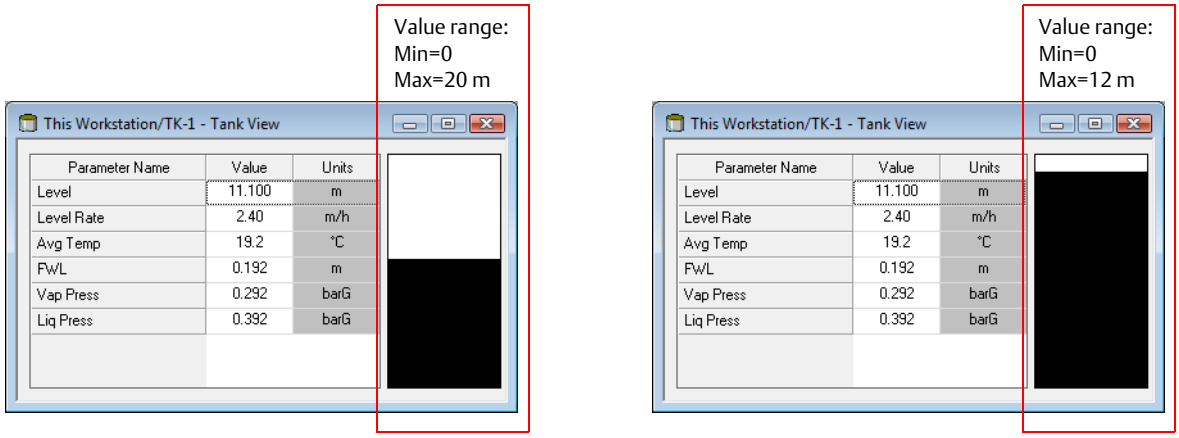
To use manual values do the following:

1. Select a measurement variable in the Parameters list on the left-hand side of the *Value Entry* window.
2. Set Value Source to **Manual**.
3. Type the desired value in the **Value** entry field.

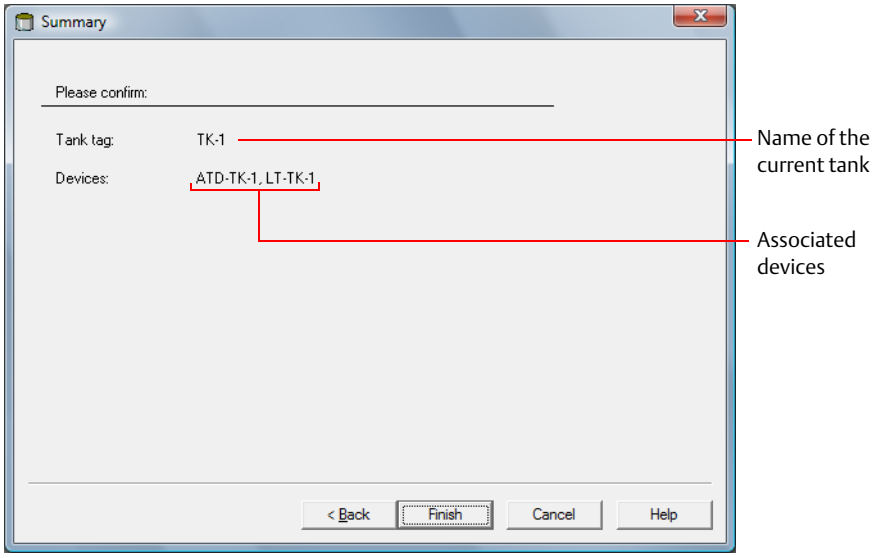
Manual values are marked yellow in order to distinguish them from automatic values.

The **Value Range** parameters (Minimum and Maximum) lets you scale bar graphs in the *Tank View* window and other windows (in Winsetup as well as WinOpi) where bar graphs are used to display product levels.

For example, the **Value Range** maximum value for Level is normally set equal to the Tank Reference Height (R), or the maximum level in the strapping table, to obtain correct scaling of the level bargraphs as illustrated below:

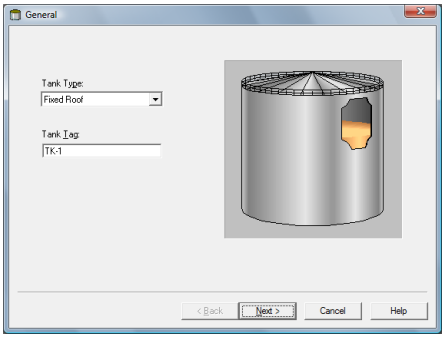


4. Summary.

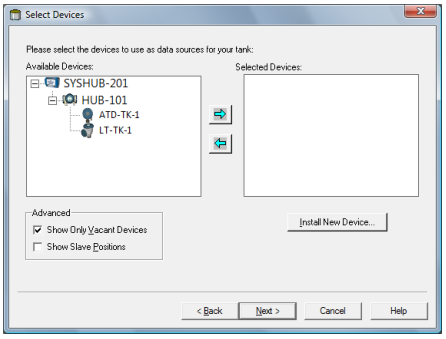


The *Summary* window presents information about the current tank installation. When you click the **Finish** button, the tank installation will be completed and the tank appears in the *WinSetup Workspace*. You can choose not to finish the installation by clicking the **Cancel** button. Note that if a device was installed as part of the tank installation process, the device remains installed and appears in the *Workspace* although the tank installation was not completed.

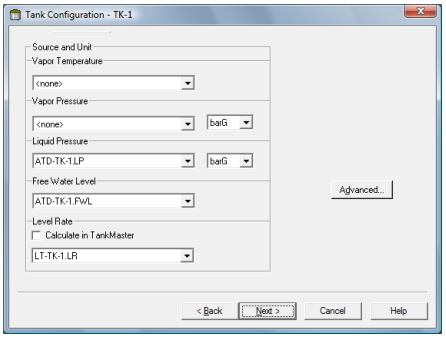
3.1.4 Summary of Tank Installation and Configuration



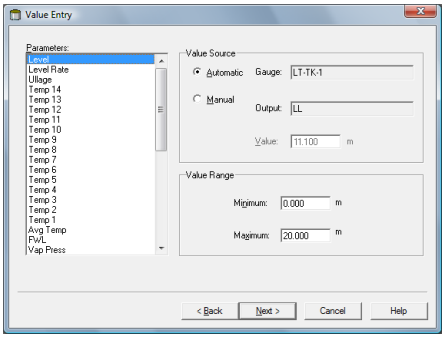
Tank Type
Select the tank type option that corresponds to the actual tank.



Select Devices
Associate devices with the tank.



Tank Configuration
Specify the source input for Vapor Temperature, Vapor Pressure, Liquid Pressure, and Free Water Level (FWL).

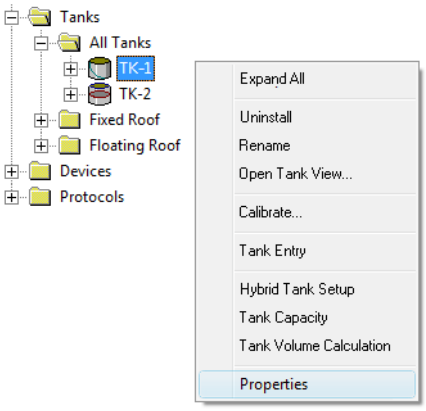


Value Entry
Configure for automatic measurements. If needed, set manual values by disconnecting the automatic measurement. Set the value range for scaling of measurement variables in bar graphs.

3.1.5 To change tank configuration

When a tank is installed and configured the current settings can be modified at any time by opening the corresponding **Properties** dialog. To open the **Properties** dialog for a tank do the following:

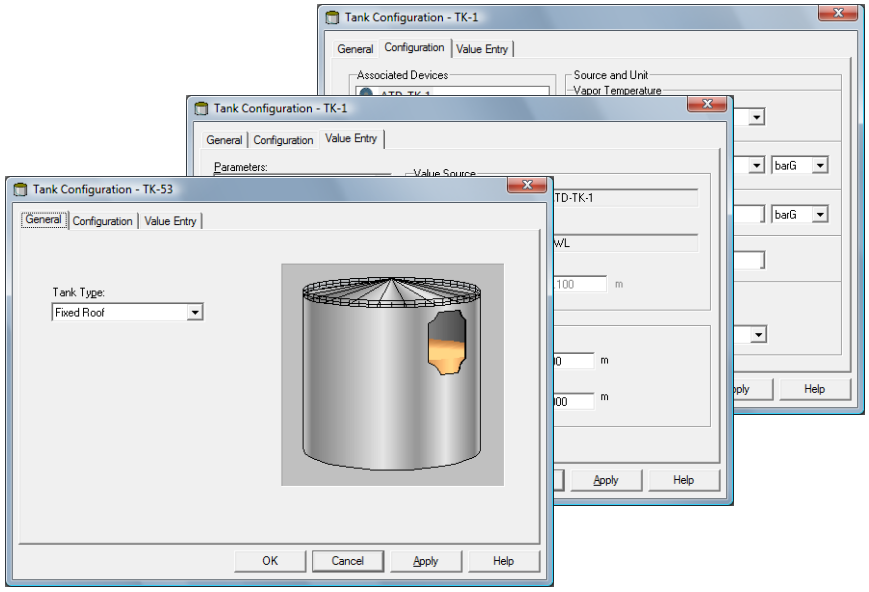
1. In the *Workspace* window select the desired tank.



2. Click the right mouse button and select the **Properties** option from the popup menu.

3. In the *Properties* window, select the appropriate tab, and change the current tank settings.

4. Click the **Apply** button to store the configuration before advancing to the next tab.

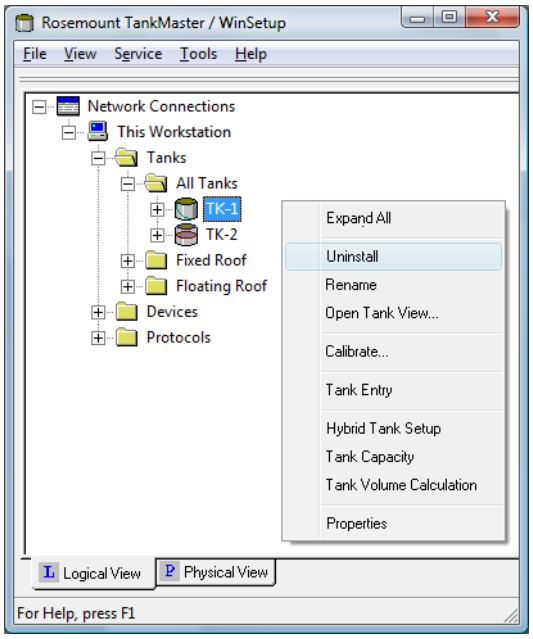


Basically the tabs correspond to the steps in the installation wizard. See “Installing a tank” on page 115 for a description on how to configure a tank.

3.1.6 To uninstall a tank

To remove a tank from the *WinSetup* workspace do the following:

1. In the *Workspace* window select the tank you want to remove.



2. Click the right mouse button and select the **Uninstall** option from the popup menu.

3.2 Adding a tank

New tanks can easily be added to a Rosemount Tank Gauging system. The procedure will be slightly different depending on the specific system configuration. It can be summarized as described below in sections "Adding a new tank and a new Rosemount 2410 Tank Hub" on page 128, and "Adding a new tank to an existing Rosemount 2410" on page 131.

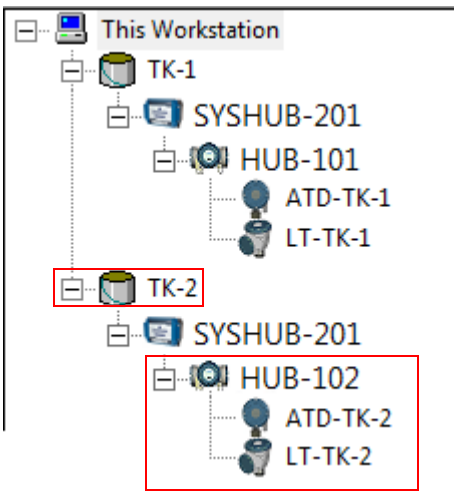
3.2.1 Adding a new tank and a new Rosemount 2410 Tank Hub

Summary

To install a new Rosemount 2410 Tank Hub and a new tank in a Rosemount Tank Gauging system that includes a Rosemount 2460 System Hub and various field devices:

1. Configure the communication settings of the system hub.
2. Update the system hub's tank database by adding field devices to associate with the new tank.
3. Install the new Rosemount 2410 Tank Hub and configure the Tank Database by mapping field devices to the new tank.
4. Configure the field devices added to the tank hub's database (Rosemount 5900S, Rosemount 2240S, Rosemount 3051S etc.).
5. Configure the new tank.

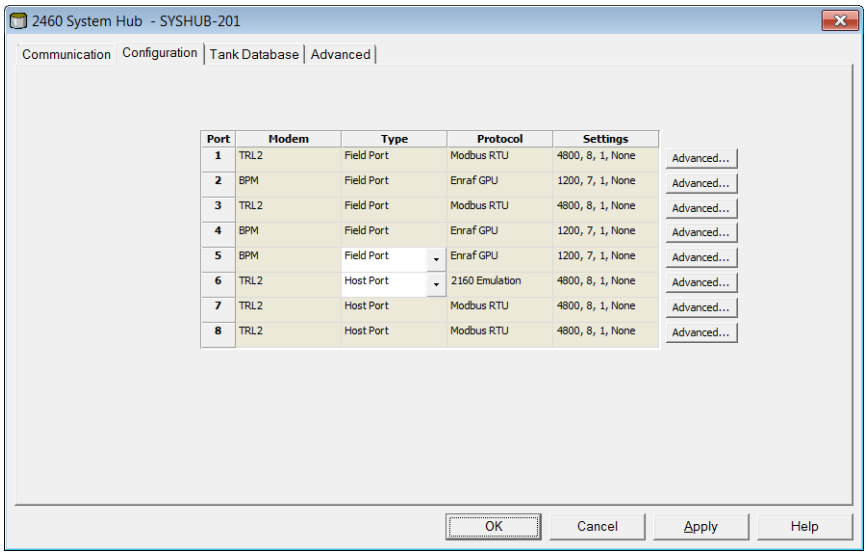
Figure 3-2. New Tank and Tank Hub Added to the System



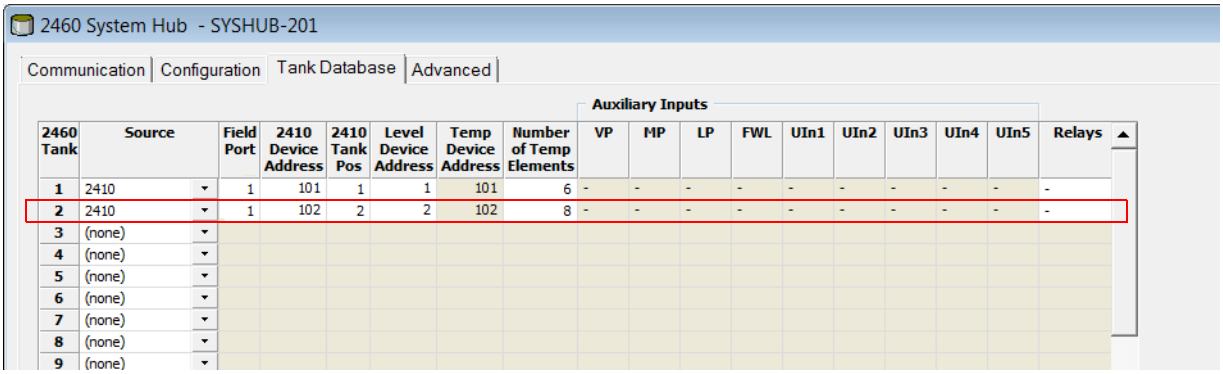
Installation procedure

To add a new tank and new field devices to a Rosemount Tank Gauging system do the following:

1. Start the TankMaster WinSetup program.
2. In the WinSetup workspace, right-click the icon of the Rosemount 2460 System Hub to open the *2460 System Hub* window.
3. Select the *Configuration* tab:



4. In case the tank hub is connected to a field bus port on the system hub which has not been used prior to adding the new tank hub, ensure that the *2460 System Hub Configuration* window is properly configured for the tank hub's Primary Bus.
For example, you may have to change the Baud Rate depending on the type of communication bus that is used; RS -485 or TRL2.
See "Installing a Rosemount 2460 System Hub" on page 31 for further instructions and information.
5. Click the **Apply** button to save the configuration.
6. Select the *Tank Database* tab.



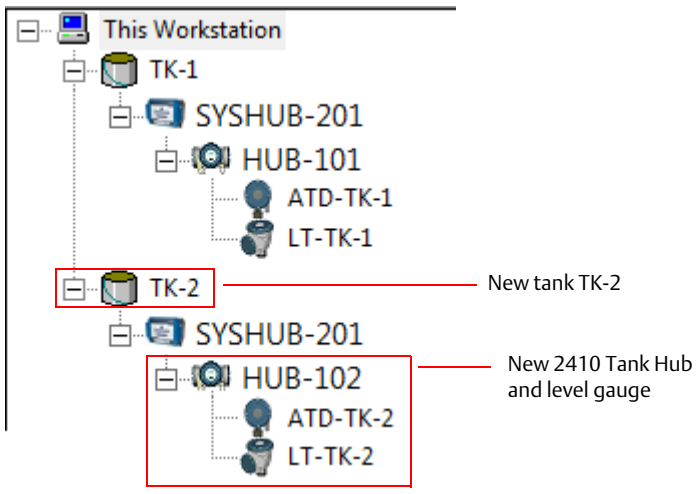
7. Configure the system hub's tank database with Modbus addresses for the new Rosemount 2410 Tank Hub, level gauge, and temperature device (ATD[(1)]). See "Installing a Rosemount 2460 System Hub" on page 31 for more information.

8. Install and configure a Rosemount 2410 Tank Hub and the field devices connected to the Tankbus as described in "Installing a Rosemount 2410 Tank Hub" on page 32.

9. Install a tank and associate the new tank hub to the tank as described in "Installing a tank" on page 115.

Now the new tank and field devices are installed and configured and will appear in the TankMaster workspace.

Figure 3-3. New Tank and Tank Hub



(1) *Auxiliary Tank Device (ATD) is used to designate various devices such as temperature and pressure transmitters, displays and other non-level devices.*

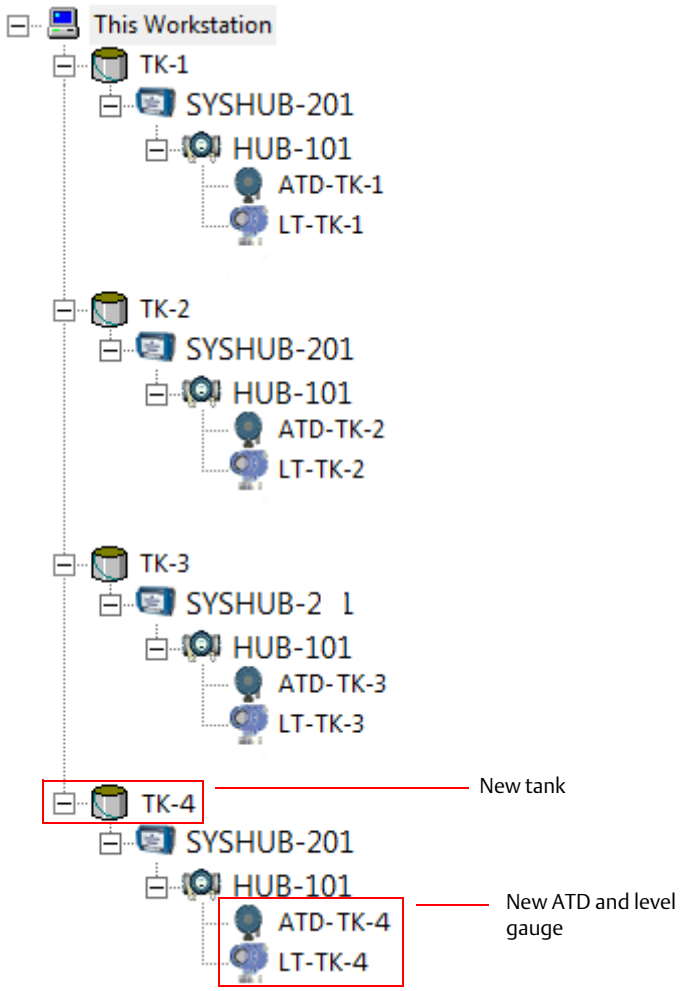
3.2.2 Adding a new tank to an existing Rosemount 2410

Summary

To add a new tank to an **existing** Rosemount 2410 Tank Hub in a Rosemount Tank Gauging system that includes a Rosemount 2460 System Hub and various field devices:

1. Update the Tank Database of the Rosemount 2460 System Hub by adding the field devices installed on the new tank.
2. Update the tank database of the existing Rosemount 2410 Tank Hub by mapping the new field devices to the new tank.
3. Configure the new field devices added to the tank hub's database.
4. Configure the new tank.

Figure 3-4. A New Tank is Added to an Existing 2410 Tank Hub

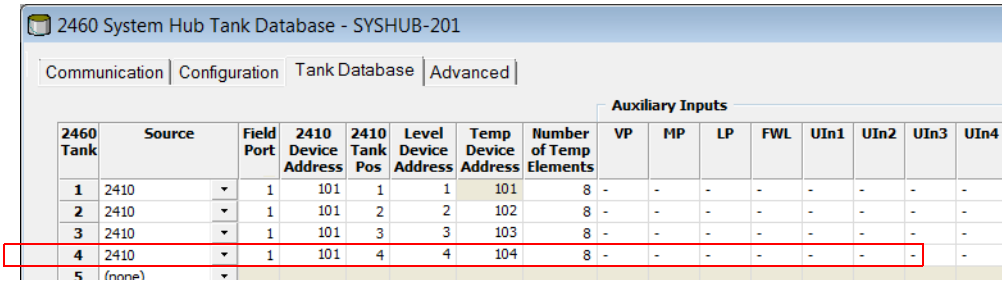


Installation procedure

In case new devices are connected to an existing 2410 Tank Hub, you will have to update the tank databases of the Rosemount 2460 System Hub **and** the Rosemount 2410 Tank Hub, as well as install and configure the new devices in TankMaster WinSetup.

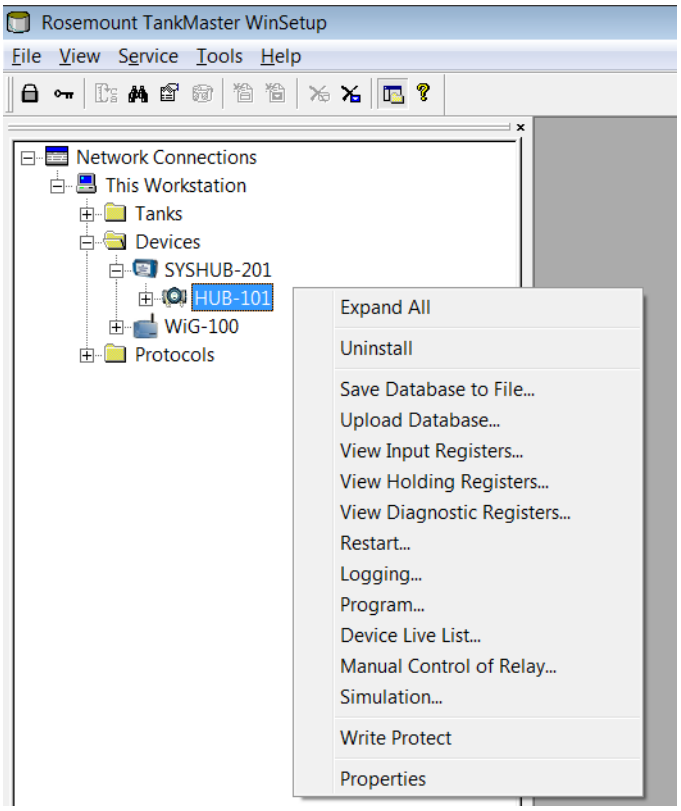
1. Start the TankMaster WinSetup program.
2. Open the *Rosemount 2460 System Hub* window.
3. Select the *Tank Database* tab.

New devices



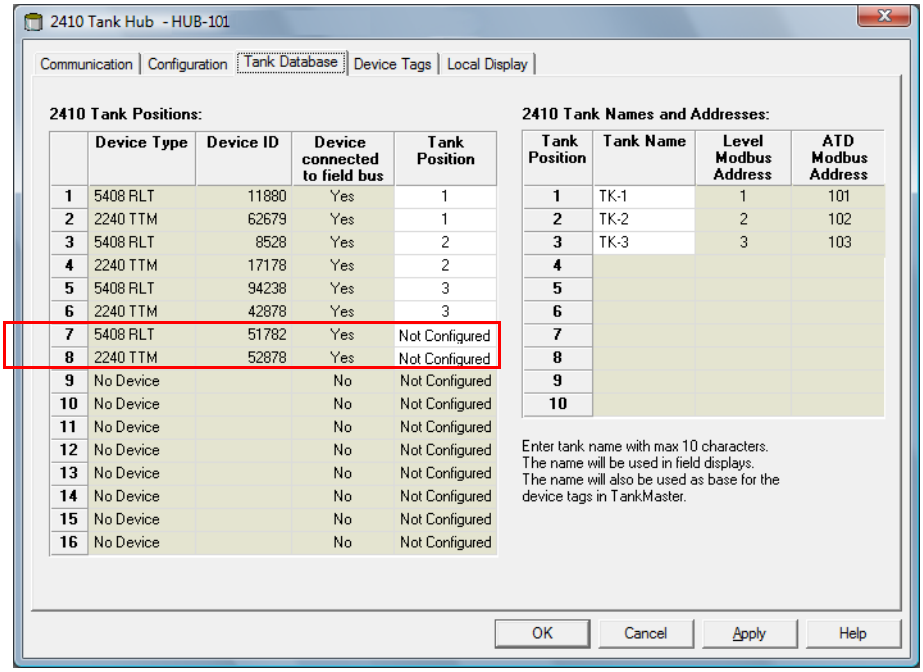
2460 Tank	Source	Field Port	2410 Device Address	2410 Tank Pos	Level Device Address	Temp Device Address	Number of Temp Elements	VP	MP	LP	FWL	UIn1	UIn2	UIn3	UIn4
1	2410	1	101	1	1	101	8	-	-	-	-	-	-	-	-
2	2410	1	101	2	2	102	8	-	-	-	-	-	-	-	-
3	2410	1	101	3	3	103	8	-	-	-	-	-	-	-	-
4	2410	1	101	4	4	104	8	-	-	-	-	-	-	-	-
5	(none)														

4. Configure the Tank Database with Modbus addresses of the new level gauge and ATD devices, see also "Installing a Rosemount 2460 System Hub" on page 31.
5. In the WinSetup *Workspace,* select the Rosemount 2410 Tank Hub icon:



6. Click the right mouse button on the **Properties** option, or from the **Service** menu select **Devices>Properties**.

7. Select the *Tank Database* tab:



	Device Type	Device ID	Device connected to field bus	Tank Position
1	5408 RLT	11880	Yes	1
2	2240 TTM	62679	Yes	1
3	5408 RLT	8528	Yes	2
4	2240 TTM	17178	Yes	2
5	5408 RLT	94238	Yes	3
6	2240 TTM	42878	Yes	3
7	5408 RLT	51782	Yes	Not Configured
8	2240 TTM	52878	Yes	Not Configured
9	No Device		No	Not Configured
10	No Device		No	Not Configured
11	No Device		No	Not Configured
12	No Device		No	Not Configured
13	No Device		No	Not Configured
14	No Device		No	Not Configured
15	No Device		No	Not Configured
16	No Device		No	Not Configured

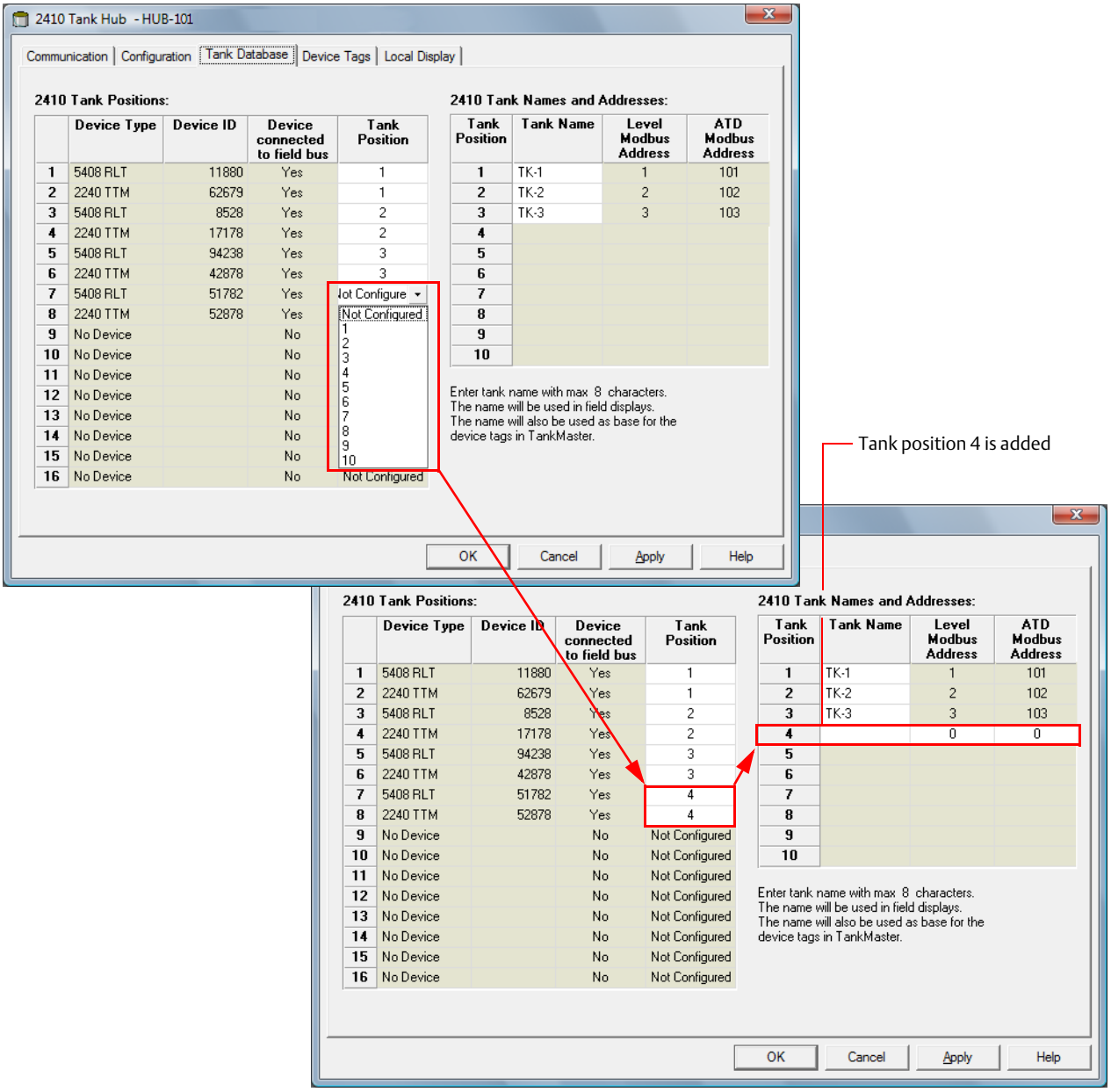
Tank Position	Tank Name	Level Modbus Address	ATD Modbus Address
1	TK-1	1	101
2	TK-2	2	102
3	TK-3	3	103
4			
5			
6			
7			
8			
9			
10			

Enter tank name with max 10 characters.
The name will be used in field displays.
The name will also be used as base for the device tags in TankMaster.

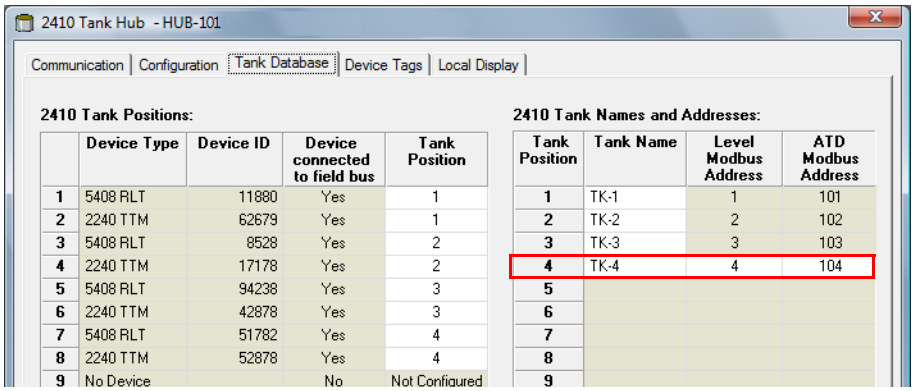
8. Verify that the new devices connected to the Tankbus appear in the **Device Type** column. Devices that appear in the list are properly communicating on the Tankbus. Devices supported by the Rosemount Tank Gauging system will automatically be identified by the Rosemount 2410.

9. Verify that the new devices are marked Not Configured in the **Tank Position** column.

10. In the Tank Position column map the new devices to a tank by selecting the appropriate number in the drop-down list.



11. Verify that a new tank position appears in the right-hand pane of the *Tank Database* window. In the example above, the new devices are mapped to tank position 4, and a tank position was added to the list of tanks in order to allow configuration of tank name and Modbus addresses for the new devices.



	Device Type	Device ID	Device connected to field bus	Tank Position
1	5408 RLT	11880	Yes	1
2	2240 TTM	62679	Yes	1
3	5408 RLT	8528	Yes	2
4	2240 TTM	17178	Yes	2
5	5408 RLT	94238	Yes	3
6	2240 TTM	42878	Yes	3
7	5408 RLT	51782	Yes	4
8	2240 TTM	52878	Yes	4
9	No Device		No	Not Configured

Tank Position	Tank Name	Level Modbus Address	ATD Modbus Address
1	TK-1	1	101
2	TK-2	2	102
3	TK-3	3	103
4	TK-4	4	104
5			
6			
7			
8			
9			

12. Type a name in the **Tank Name** field. This tank name should also be used at a later stage when installing the tank to be associated with the current tank hub, see "Installing a tank" on page 115.

13. The **Level Modbus Address** field is enabled for the new level gauge. Specify a Modbus address of your own choice. Note that it must be the same Modbus address as configured in the system hub's tank database for this level gauge.

14. In case an Auxiliary Tank Device (ATD) such as a Rosemount 2240S Multi-input Temperature Transmitter is installed, the **ATD Modbus Address** field is enabled as well.

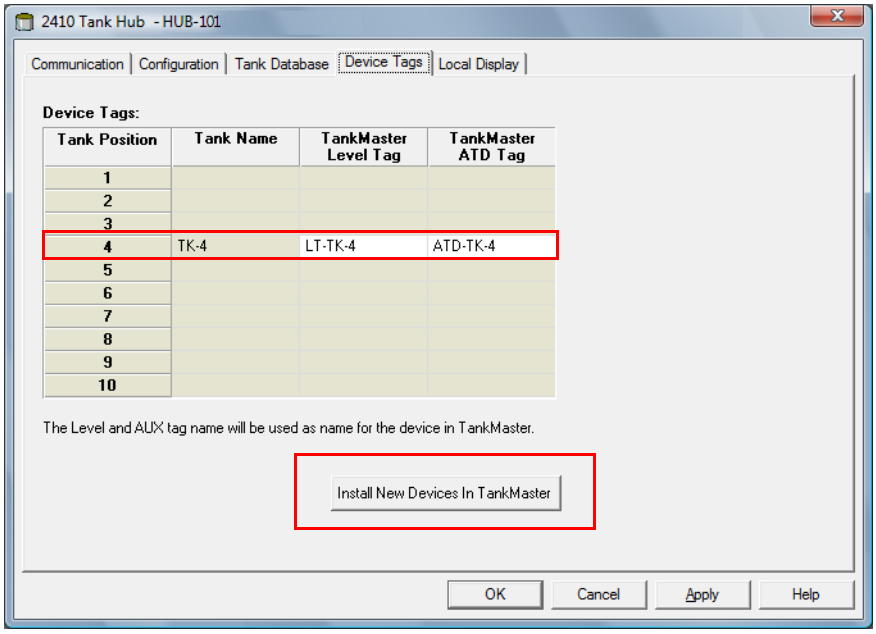
    Specify a Modbus address of your own choice. Note that it must be the same Modbus address as configured in the system hub's tank database.

    For tank position 1, the ATD Modbus address is automatically configured as the Modbus address of the Rosemount 2410 Tank Hub itself. All the non-level devices on a tank are represented by a single ATD device in the Rosemount Tank Gauging system.

    See "Installing a Rosemount 2460 System Hub" on page 31 and "Installing a Rosemount 2410 Tank Hub" on page 32 for further information on how to configure the tank databases of the 2460 System Hub and the 2410 Tank Hub.

15. Click the **Apply** button to store the tank database configuration.

16. Select the *Device Tags* tab.



17. Verify that the **TankMaster Level Tag** is correct or enter a new one.

18. Verify that the **TankMaster ATD Tag** is correct or enter a new one.
In case there are no ATD device associated with the tank, the ATD tag field will be disabled.

19. Click the **Install New Devices in TankMaster** button to automatically install the devices in the *TankMaster Workspace*. This is the recommended way of installing field devices in TankMaster, but you may install the devices at a later stage by using the device installation wizard, see "Using the device installation wizard" on page 9.

20. Click the **OK** button to store the configuration and close the configuration window.

21. The devices will now be available in the TankMaster workspace, and each device has to be configured via the *Properties* window, see for example "Installing a Rosemount 5900 Radar Level Gauge" on page 46 and "Installing Auxiliary Tank Devices" on page 75.

22. Proceed with installing the tank as described in "Installing a tank" on page 115.

Now the new tank and field devices are installed and configured and will appear in the TankMaster workspace.

3.3 Level gauge calibration

Normally a minor level gauge adjustment is needed in order to accurately match measured and actual product levels. For example, a deviation may result from minor errors in tank geometry parameters such as the tank height (R) or the position of the Gauge Reference Point (see the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900), for more information on tank geometry).

The Rosemount 5900 level gauge can be calibrated by using the **Calibration Distance** parameter. It can be manually adjusted in the *5900S Properties/Geometry* window.

For Rosemount 5900 gauges in Still-pipe applications you may use the **Calibrate** function to let WinSetup automatically calculate an optimized Correction Factor and Calibration Distance based on measurement data and hand dipping at different product levels.

Note
For a comprehensive description of how to calibrate a Rosemount 5900S Radar Level Gauge see the Rosemount 5900S Radar Level Gauge Reference Manual (00809-0100-5900).

3.3.1 Manual Adjustment

A Rosemount 5900 level gauge can be calibrated manually by adjusting the Calibration Distance parameter(1). By comparing hand dipped level values with product levels measured by the gauge, the Calibration Distance can be calculated according to the formula:

New Calibration Distance=Old Calibration Distance+ΔL,

where ΔL=observed level (hand dip) - gauge level reading.

To change the Calibration Distance stored in the gauge database:

1. Select the level gauge icon in the WinSetup workspace.
2. Click the right mouse-button and select the **Properties** option.
3. Select the **Geometry** tab.
4. Type the **Calibration Distance** value in the corresponding input field and click the **OK** button.

   See “Installing a Rosemount 5900 Radar Level Gauge” on page 46 and the *Rosemount 5900S Reference Manual (*Document No. 00809-0100-5900) for further information.

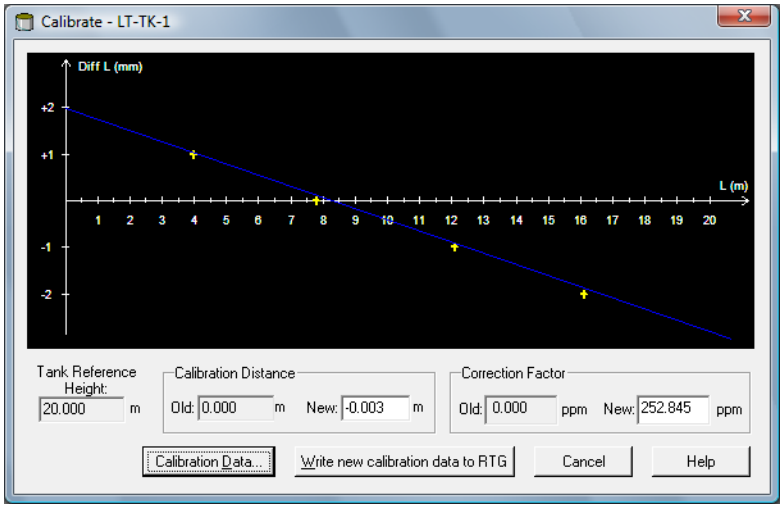
(1) For non-standard antennas the Tank Connection Length (TCL) may need to be adjusted as well.

3.3.2 Using the Calibrate function

The **Calibrate** function is a tool which allows you to calculate the Correction Factor for still-pipe measurements and the Calibration Distance. It optimizes measurement performance from the top to the bottom of the tank by automatically minimizing the offset between actual product levels and level values measured by the gauge.

To calibrate a Rosemount 5900S Radar Level Gauge

1. Select the Rosemount 5900 icon in the *Workspace* window, click the right mouse button and select **Calibrate**, or select **Calibrate** from the **Service/Devices** menu:



2. Click the **Calibration Data** button to open the *Calibration Data* window. Enter hand dipped level values and the corresponding levels measured by the gauge. Click the **Save Calibration Data in PC Database** button.

   The *Calibration* window displays a straight line fitted through measurement points representing the difference between hand dipped level values and values measured by the level gauge. For still-pipe antennas a sloping line is displayed, otherwise the line is horizontal.

3. Click the **Write new calibration data to RTG** button in order to save the current calibration data.

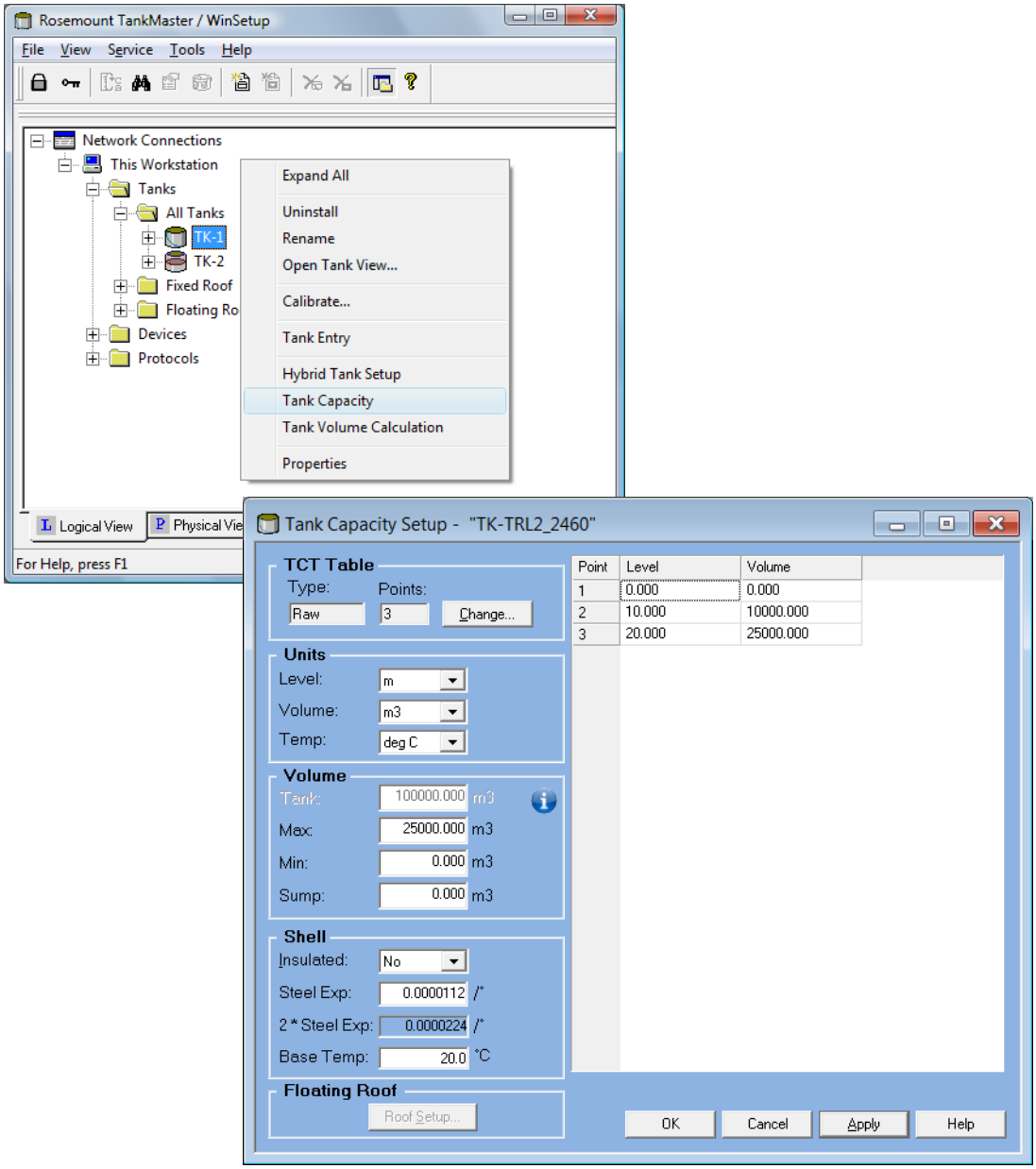
   A new Calibration Distance will be calculated and the level values measured by a Rosemount 5900 are recalculated.

   See the Rosemount 5900S Radar Level Gauge Reference Manual (Document No. 00809-0100-5900) for further information on using the Calibrate function for a Rosemount 5900S.

3.4 Tank capacity

The tank geometry can be defined in the **Tank Capacity Table** (TCT). The TCT is used to convert a product level to the corresponding volume. Several TCT types are available: Raw; International, and Northern.

To open the *Tank Capacity Setup* window for a certain tank, select the tank icon in the workspace window, click the right mouse button and select the Tank Capacity option:

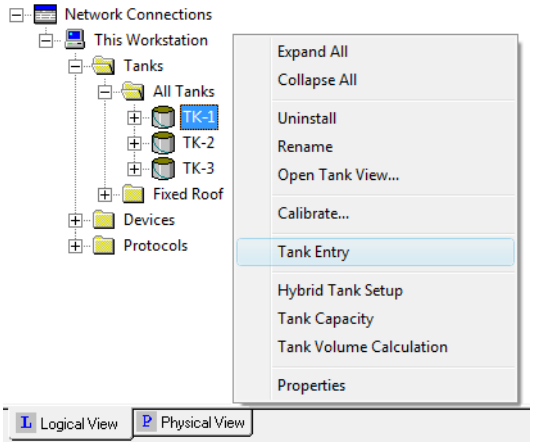


See the Rosemount TankMaster WinOpi Reference Manual (Document No. 00809-0200-5110) for more information on the *Tank Capacity Setup* window and how to set up a Tank Capacity Table.

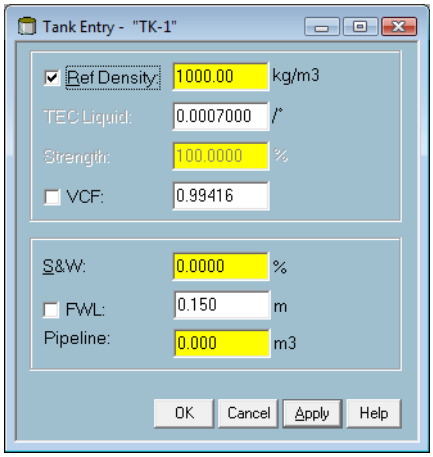
3.5 Tank Entry

The *Tank Entry* window is used for specifying a number of product parameters for inventory calculations. TankMaster can use measured data, or data that is manually entered. To open the *Tank Entry* window:

1. In the WinSetup workspace select the tank to configure.



2. Click the right mouse button and select the Tank Entry option:



3. To enter manual values select the check box and type the desired value in the input field. Manual values are marked with yellow as illustrated above.

See the Rosemount TankMaster WinOpi Reference Manual (Document No. 00809-0200-5110) for further information on how to use the *Tank Entry* window.

3.6 Setting up a hybrid system

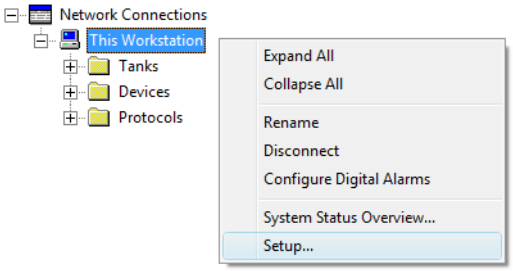
This is a description of how to install a Rosemount Tank Gauging system for on-line density measurements and mass calculations. Before starting the setup make sure the Tank Database of the 2460 System Hub is configured accordingly, see "Installing a Rosemount 2460 System Hub" on page 31.

For the mass calculations to work properly, a tank strapping table (also referred to as a Tank Capacity Table) must be entered.

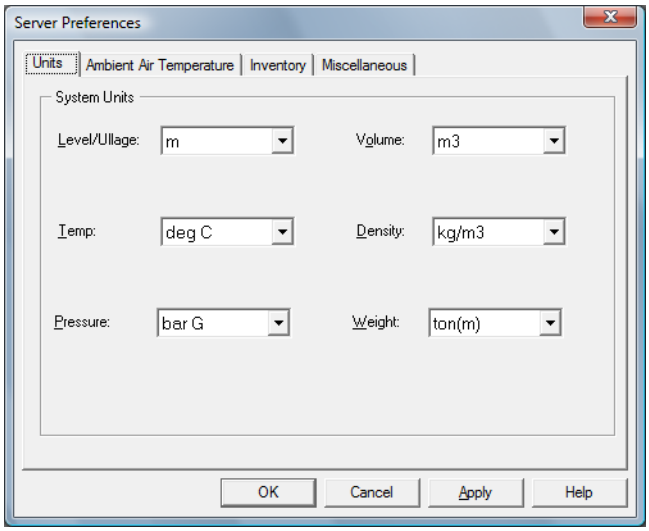
See "Tank capacity" on page 139 and the Rosemount TankMaster WinOpi Reference Manual (Document No. 00809-0200-5110) for more information.

A Rosemount Tank Gauging hybrid system typically includes two pressure sensors, P1 and P3, and a Rosemount 5900S Radar Level Gauge. In case there is always atmospheric pressure in the tank, the P3 sensor may be excluded. To configure the hybrid system:

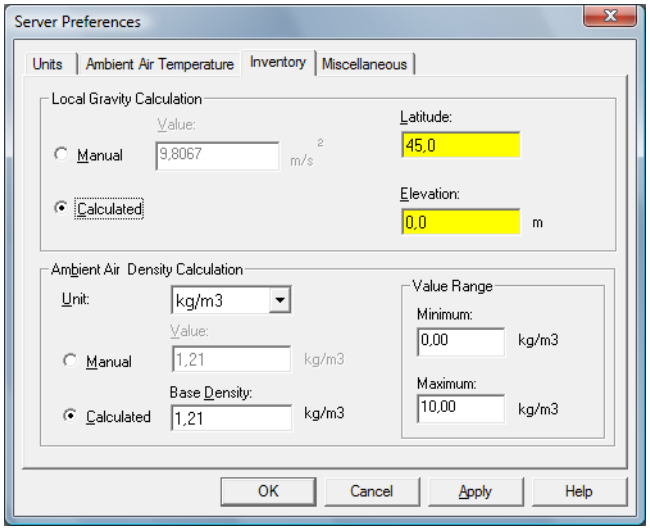
1. Start the TankMaster WinSetup program.
2. In the *Workspace* window select the tank server icon (*This Workstation* in the example below):



3. Click the right mouse button and select **Setup**, or select menu option **Service>Servers>Setup** to open the *Server Preferences* window.
4. Select the *Units* tab.

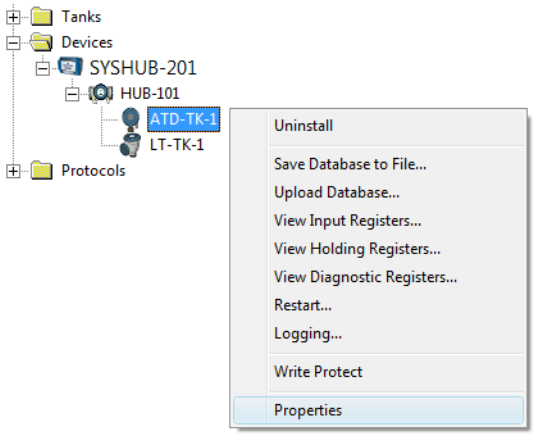


5. Select the desired measurement units for **Density** and **Pressure**.
6. Click the **Apply** button to store the settings.
7. Select the *Inventory* tab.



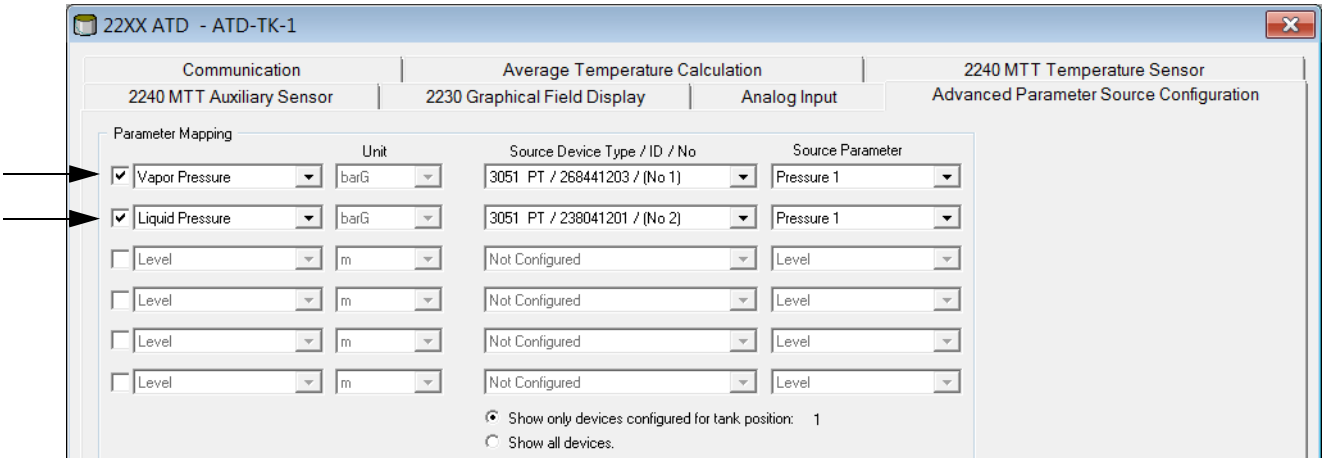
8. For Local Gravity select calculation method **Manual** or **Calculated**. The Local Gravity is used as input for calculating the Observed Density.
Manual: enter a local gravity value in the “Value” field.
Calculated: enter the latitude and elevation of the site where the tank is located.
9. Click the **OK** button to store the configuration and close the window.

10. In the *Workspace* window select the ATD device icon:



11. Click the right mouse button and select **Properties**, or from the **Service** menu select **Devices>Properties** to open the *22XX ATD* window.

12. Select the *Advanced Parameter Source Configuration* tab.



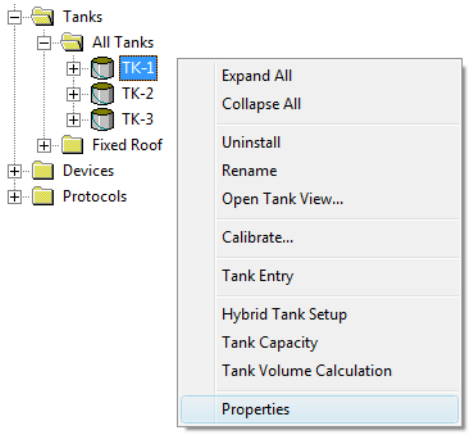
13. Verify that the parameters **Vapor Pressure** and **Liquid Pressure** are mapped to the correct pressure sensors (Source Device).
See "Advanced parameter source configuration" on page 85 for further information on how to map system parameters to source devices.

14. Click the **OK** button to store the configuration and close the window.

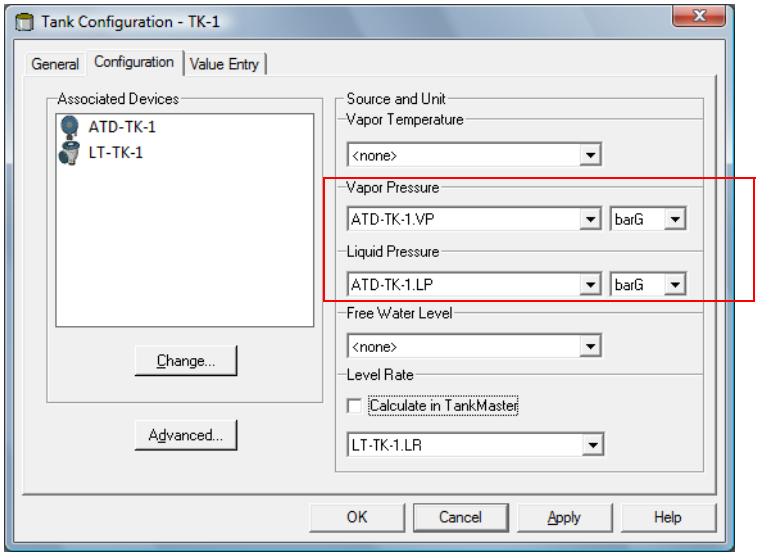
15. Open the *Tank Configuration* window:

    a. In Winsetup select the desired tank icon in the workspace window.

    b. Click the right mouse button and select **Properties**, or from the **Service** menu select **Tanks>Properties** to open the *Tank Configuration* window.



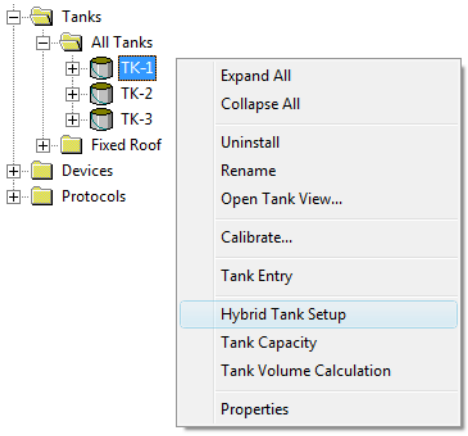
16. Select the *Configuration* tab.



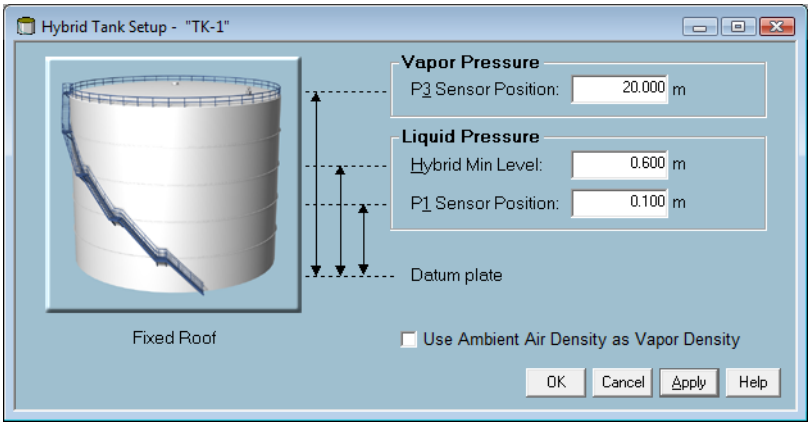
17. Select source parameter and measurement unit for **Vapor Pressure** and **Liquid Pressure**.

18. Verify measurements by opening the *Tank View* window (**Service>Tanks>Open Tank View**).

19. Configure the Liquid Pressure and Vapor Pressure sensors. In the WinSetup workspace window select the tank icon:



20. Click the right mouse button and select **Hybrid Tank Setup**, or from the **Service** menu select **Tanks>Hybrid Tank Setup**, to open the *Hybrid Tank Setup* window.



21. Enter the **P1 Sensor Position**, i.e. the center position of the sensor membrane for the Liquid Pressure transmitter.

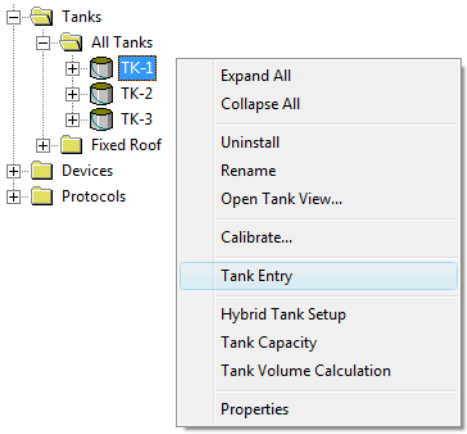
22. Enter the **P3 Sensor Position**, i.e. the position of the center of the Vapor Pressure sensor membrane

23. Enter the **Hybrid Min Level**. This value specifies the lowest product level at which TankMaster calculates the **Observed Density**. Normally, the accuracy of pressure sensors is poor at low pressures, i.e. at product levels close to the sensor membrane. Therefore, you can enter a limit below which the density calculation is “frozen”. For example, if Hybrid Min Level is equal to 0.6 meter, TankMaster WinOpi will present the same density value for product levels below 0.6 meter.

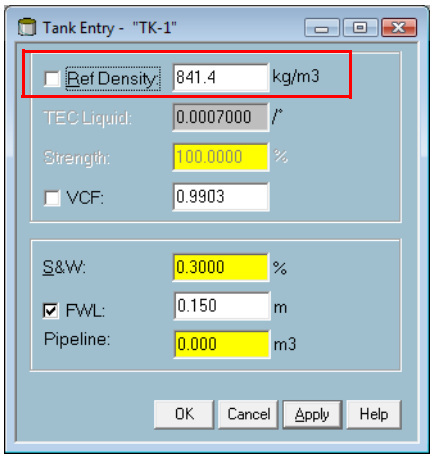
Note
Specify the actual minimum product level and not the distance between the pressure sensor and the product surface.

24. Click the **Apply** button to save the Hybrid Tank Setup configuration, or the **OK** button to save and close the window.

25. In the WinSetup workspace window select the tank icon:



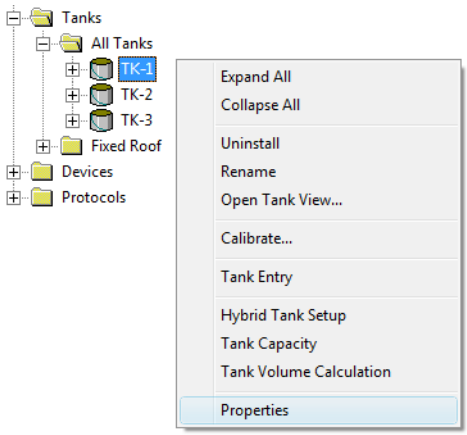
26. Click the right mouse button and select **Tank Entry**, or from the **Service** menu select **Tanks>Tank Entry** to open the *Tank Entry* window:



27. Ensure that the **Reference Density** is measured automatically, i.e. the check box is unmarked.

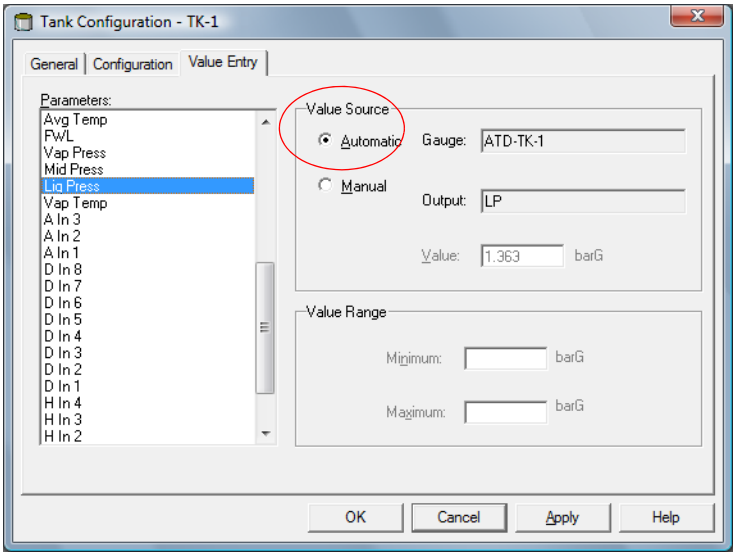
28. Click the **Apply** button to save the configuration, or click the **OK** button to save the configuration and close the window.

29. In the WinSetup workspace window select the tank icon:



30. Click the right mouse button and select **Properties**, or from the **Service** menu select **Tanks>Properties** to open the *Tank Configuration* window.

31. Select the *Value Entry* tab.



32. Ensure that **Value Source** is set to **Automatic** for the **Liquid Pressure** and **Vapor Pressure** measurement variables.

33. Click the **OK** button to save the configuration and close the window.

34. Check the result in the *Tank Inventory* window:
    a. Start the *TankMaster WinOpi* program.
    b. In the *WinOpi* workspace select the tank icon.
    c. From the View menu, select the Tank>Tank Inventory option.

If the inventory calculations seem to be incorrect, see chapter *Checklist for Inventory Parameter Setup* in the *TankMaster WinOpi* Reference Manual (00809-0200-5110*)* for more information.

Section 4 Device Handling

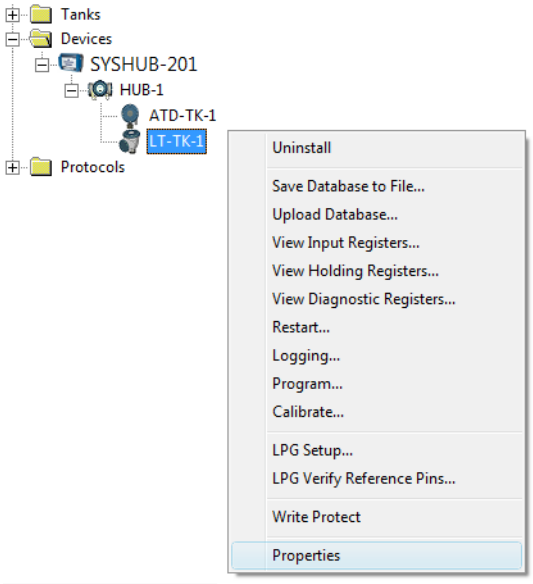
This section provides information on how to change configuration of installed devices.

4.1 To change device configuration

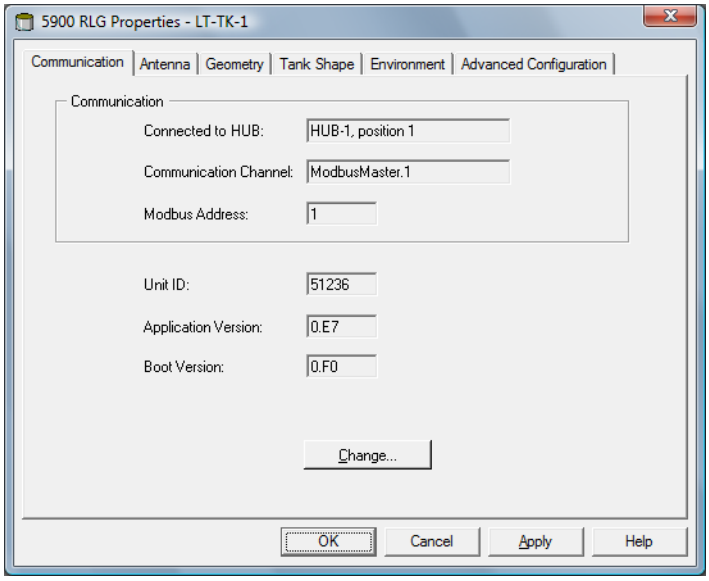
Once a device is installed and configured, you can modify the current settings at any time by opening the **Properties** dialog.

To open the Properties dialog do the following:

1. In the WinSetup *Workspace* window select the desired device.
2. Open the **Devices** folder and select the device icon.



3. Click the right mouse button and select the **Properties** option, or from the **Service** menu select the **Devices/Properties** option.
4. The device properties window (*5900S RLG Properties* window in this example) appears with various tabs allowing you to change the current device settings.



A number of tabs allows you to configure communication parameters, tank geometry, device specific parameters and advanced options.

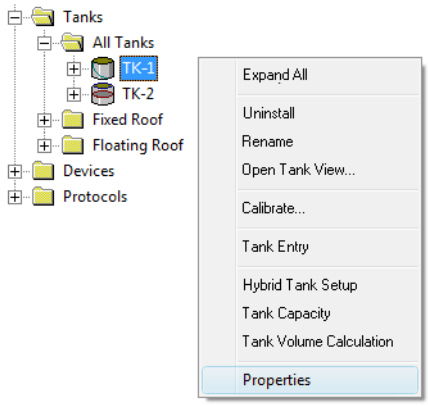
Some of the tabs refer to steps in the device installation wizard. Similar dialogs are available for other device types as well, for example the Rosemount 2410 Tank Hub.

See Section 2: Device Installation for detailed descriptions on how to configure various devices.

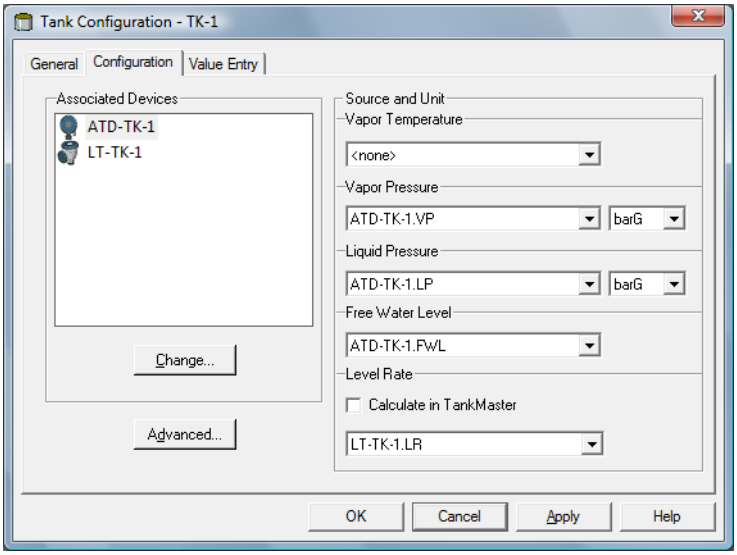
4.2 To uninstall a device

A device can be uninstalled from the WinSetup workspace at any time. However, prior to uninstalling the device it needs to be disconnected from the associated tank.

1. In the WinSetup workspace, select the desired tank and click the right mouse button.

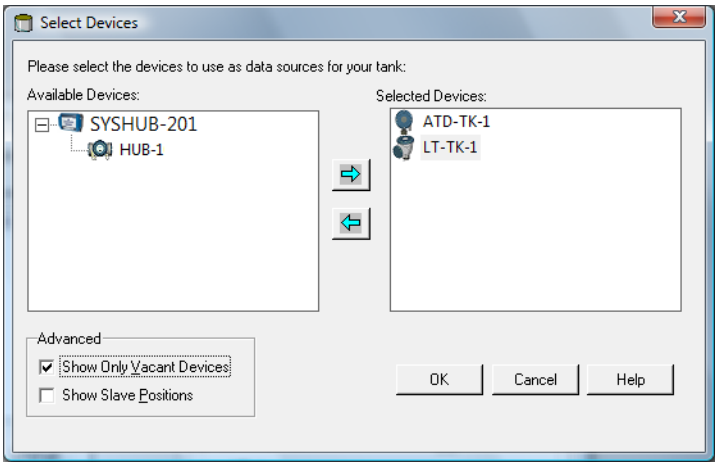


2. Select the **Properties** option.



3. Select the *Configuration* tab.

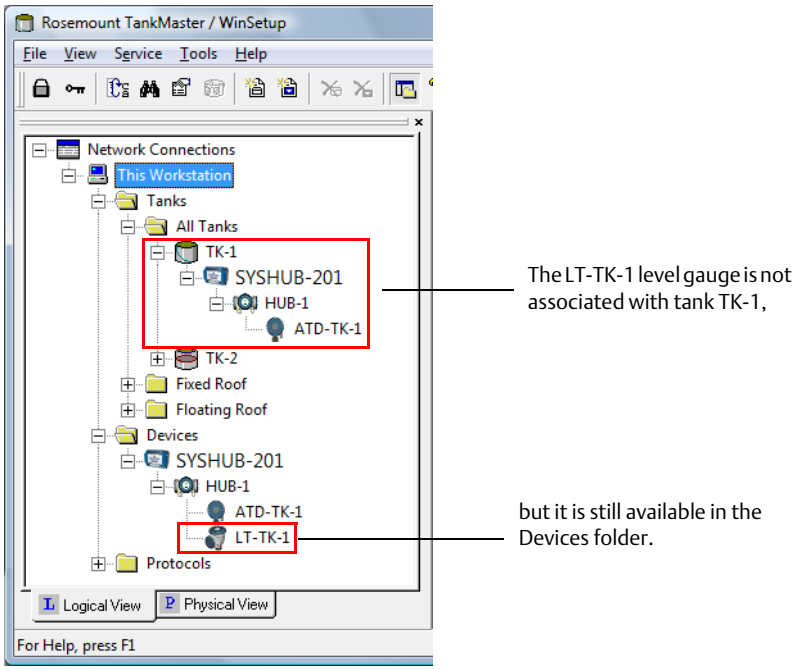
4. Click the **Change** button.



5. In the right-hand side of the *Select Devices* window, select the device (LT-TK-1 in this example) and click the ⇦ arrow button. The device will be removed from the *Selected Devices* pane to the *Available Devices* pane.

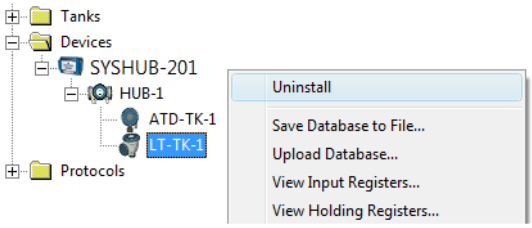
6. Click the **OK** button.

7. Open the **Tanks** and Devices folders:



8. Verify that the device (LT-TK-1 in this case) is no longer associated with the tank but still available in the **Devices** folder.

9. Select the device and click the right mouse button:

10. 

11. Select the **Uninstall** option.

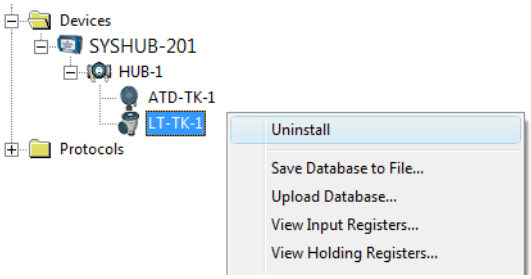
    Now the device will be removed. However, the tank is still available in the WinSetup workspace.

4.3 To uninstall a tank and associated devices

In case you wish to uninstall a tank and its associated devices, start by uninstalling the tank and then proceed with uninstalling the devices:

1. Uninstall the tank as described in "To uninstall a tank" on page 127.

2. In the WinSetup workspace select the desired device.



3. Click the right mouse button and select the **Uninstall** option.

4. Repeat for each device you wish to remove.

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