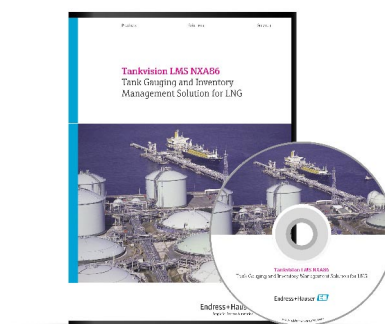
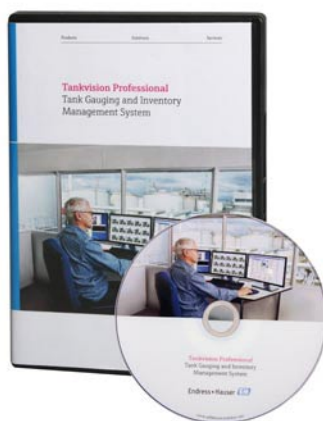


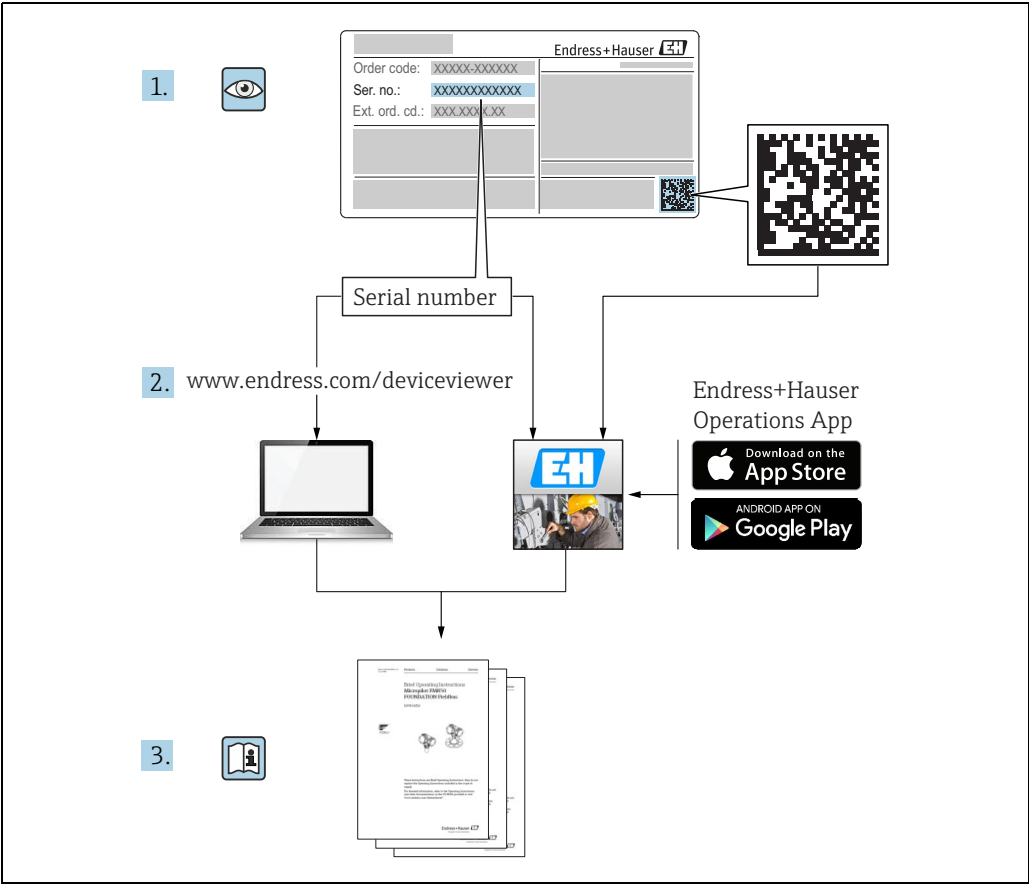
Operating Instructions

Tankvision Professional NXA85

Tankvision LMS NXA86

OPC TG Client Configuration





A0023555

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1 Document information

1.1 Target audience for this manual

This manual should support during the configuration of Tankvision Professional NXA85 and LMS NXA86. It deals with the specific configuration steps one has to perform to setup the OPC client.

It is recommended receiving a training on the system by Endress+Hauser.

1.2 Version history

Document version	Valid for SW version	Changes to the previous version
BA01294G/00/EN/01.14	18.0.2 and 18.0.3	Initial version
BA01294G/00/EN/02.16	18.0.2 and 18.0.3	New features
BA01294G/00/EN/03.17	18.0.2 and 18.0.3	Tankvision LMS added
BA01294G/00/EN/04.17	18.1.1	Unification of the W&M and the non W&M software packages.
BA01294G/00/EN/05.18	18.1.1	Compatibility with Windows 10 and Windows Server 2016



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

1.3 Document function

1.3.1 Used symbols

Safety symbols

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

Electrical symbols

Symbol	Meaning
 A0011197	Direct current A terminal to which DC voltage is applied or through which direct current flows.
 A0011198	Alternating current A terminal to which alternating voltage is applied or through which alternating current flows.
 A0011200	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
 A0011199	Protective ground connection A terminal which must be connected to ground prior to establishing any other connections.

Symbols for certain types of information

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

Symbols in graphics

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

1.4 Documentation

1.4.1 Operating instructions

Document number	Instrument	Type of Document
BA00390G/00	Tankvision Professional & LMS	System Configuration
BA00391G/00	Tankvision Professional & LMS	Data Communications Controller
BA00392G/00	Tankvision Professional	Installation
BA00393G/00	Tankvision Professional & LMS	Maintenance

Document number	Instrument	Type of Document
BA00394G/00	Tankvision Professional	Movements System Configuration
BA00395G/00	Tankvision Professional	Movements Operation
BA00396G/00	Tankvision Professional	System Operation
BA01293G/00	Tankvision Professional & LMS	OPC Tank Data Server
BA01294G/00	Tankvision Professional & LMS	OPC TG Client Configuration
BA01295G/00	Tankvision Professional	Web Server/Client System Operation
BA01363G/00	Tankvision Professional	Product and Tank Data Synchronization
BA01653G/00	Tankvision Professional	Simple Movements
BA01654G/00	Tankvision Professional & LMS	System Monitor
BA01700G/00	Tankvision LMS	Installation
BA01701G/00	Tankvision LMS	System Operation
BA01702G/00	Tankvision LMS	Rollover Prediction in LNG storage tanks
BA01703G/00	Tankvision LMS	Skin Temperature
BA01704G/00	Tankvision LMS	LNG Stratification Detection

2 Identification

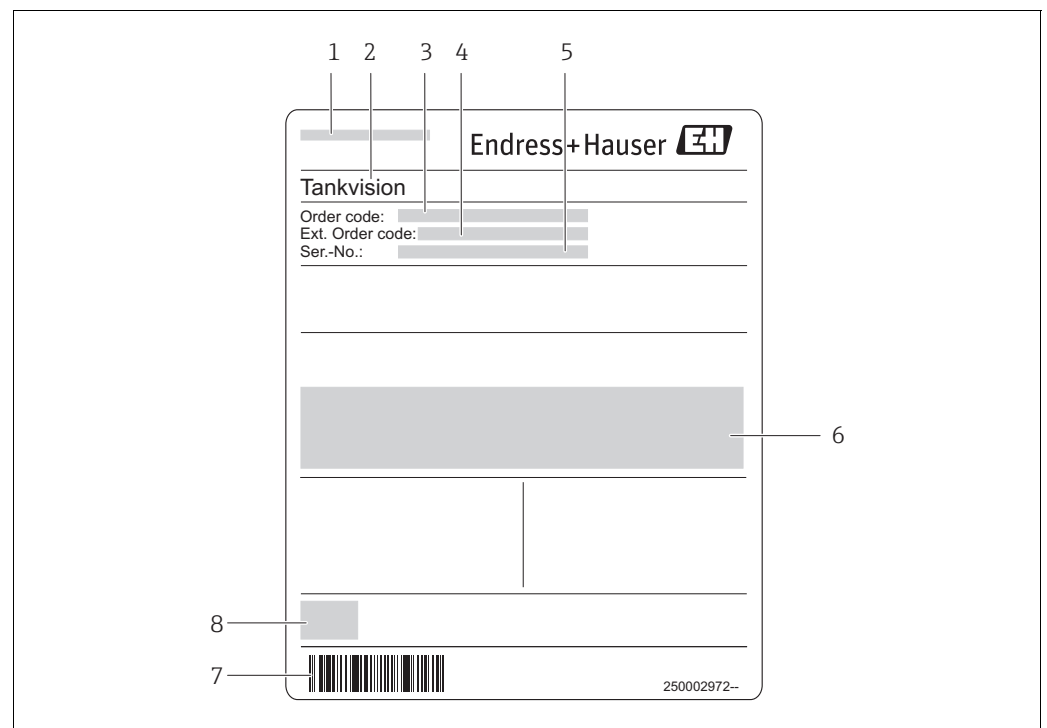
2.1 Product identification

The following options are available for identification of the software:

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

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

2.2 Nameplate



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

2.3 Order code and device version

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

2.4 Device documentation

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

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

2.4.1 W@M Device Viewer

1. Launch the W@M Device Viewer: www.endress.com/deviceviewer
2. Enter the serial number (Ser. no.) of the device: see nameplate.
↳ All the associated documentation is displayed.

2.4.2 Endress+Hauser Operations App

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

Via the serial number:

1. Launch the *Endress+Hauser Operations App*.
2. Enter the serial number (Ser. no.) of the device: see nameplate.
↳ All the associated documentation is displayed.

2.5 Registered trademarks

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

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

Java®
Registered trademark of Sun Microsystems, Inc.

Mozilla® Firefox®
Registered trademark of the Mozilla Foundation

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

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

3 Basic safety instructions

3.1 Requirements for the personnel

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

- Trained, qualified specialists: must have a relevant qualification for this specific function and task
- Are authorized by the plant owner/operator
- Are familiar with federal/national regulations
- Before beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions

The operating personnel must fulfill the following requirements:

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

3.2 IT security

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

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

3.3 Designated use

3.3.1 Application

Tankvision Professional NXA85

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

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

All measured and calculated tank parameters are accessible to your tank farm and terminal operators as well as to connected host systems.

Multi-user operation is provided by the inbuilt Web Server offering the opportunity to access data at any connected location (local/remote) e.g. for administrative and accounting purposes.

Tankvision LMS NXA86

Tankvision LMS is a total LNG Tank Storage and Management solution for Peak Shaving, Receiving and Production LNG facilities. The LMS system has been designed to interface to all instruments commonly found on LNG storage tanks, and to collect and present the instrument data through a range of intuitive graphical user interfaces. A typical LNG Tank will have a wide range of measurement instruments to measure Liquid Level, Liquid Density,

Liquid and Vapour Temperature, Liquid and Vapour Pressure, Skin Temperature and much more.

Typically each tank would be fitted with an LTD gauge, two further level gauges configured as a Primary and Secondary, and an Alarm Gauge. The LTD gauge is a servo operated unit mounted on the tank roof. The purpose of the LTD gauge is to take accurate profiles of temperature and density throughout the liquid, and whilst not profiling provide continuous liquid level, temperature and density measurement. The Primary and Secondary gauges can be either servo and or radar operated units also mounted on the tank roof. The purpose of these gauges is to provide continuous liquid level measurement, and average liquid temperature measurement. They provide redundancy on the measurement of level and temperature. The average liquid temperature is derived from a multi point temperature sensor device. The alarm gauge is often a servo or radar based gauge configured to provide volt free contact alarm status to an independent system.

An LMS system can operate in a simple standalone configuration or as a fully redundant system where security and integrity are of paramount importance. The LMS system has a flexible and scalable architecture allowing it to be tailored to a number of different applications easily.

3.4 Workplace safety

For work on and with the device:

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

3.5 Operational safety

Risk of injury!

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

Conversions to the device

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

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

Repair

To ensure continued operational safety and reliability,

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

3.6 Product safety

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

4 Introduction

The following sections offer an introduction to configuring tanks on the **DCC Host** implementation of the OPC Client Tank Gauge Driver (**OPC TG**).

4.1 Audience

This guide is intended for people familiar with OPC (OLE for Process Control) and DCOM (Distributed Component Object Model) involved in the design and commissioning of tank gauging systems.

4.2 System Overview

The **OPC TG Driver** is an OPC Data Access (DA) client that polls for tank data from **OPC DA** servers. The OPC server software may run on the same system as **DCC Host** or on remote systems connected via a network. The driver supports versions 1.0, 2.0 and 3.0 of the **OPC DA** specification.

The **OPC TG** Driver is not a generic OPC Client Driver, as it is specifically designed to poll for tank gauge primary data such as Level, Temperature, Density etc. Thus it will poll for certain data at higher priorities (Level, Temperature etc.) than other background data (Densities, Pressures etc.). This is the same polling mechanism that is used in all other **DCC Host** tank gauging drivers.

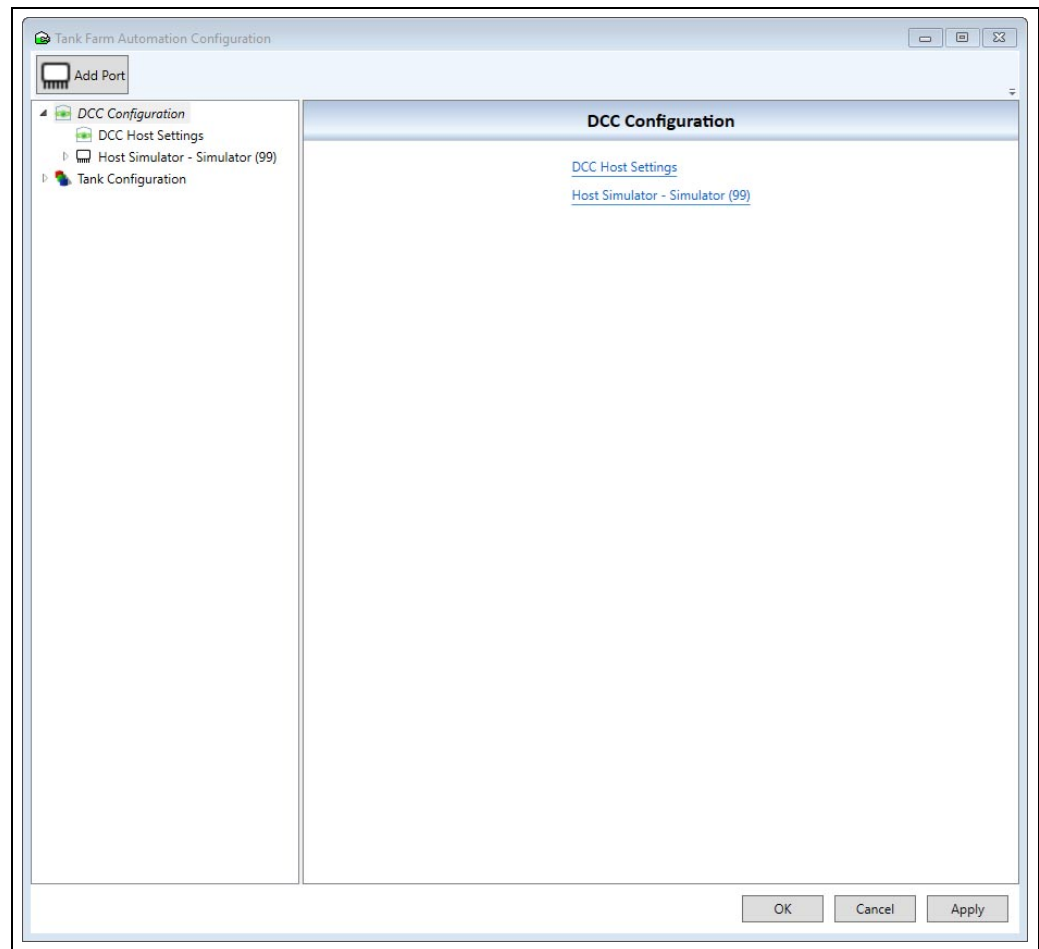
Multiple instances of the **OPC TG** Driver may run on the same machine, each running in its own environment within the **DCC Host** sub-system.

There are three parts to configuring an **OPC TG** interface in **DCC Host**:

- Assigning a port to use the **OPC TG** protocol using the configuration tool.
- Configuring **OPC TG** gauges on the port, using the configuration tool.
- Configuring the data parameters to be polled for each gauge, using the **DCC Host Configuration** screens.

5 Assigning ports to use the OPC TG driver

An **OPC TG** driver is added by adding an **OPC** communications port to **DCC** using the configuration tool. These ports are displayed as per normal **COM Ports**, but are in reality network connections to an **OPC Server**.



BA01294GEN_022

Any existing OPC ports will be listed beneath the **DCC Configuration** item.

5.1 Add an OPC Port

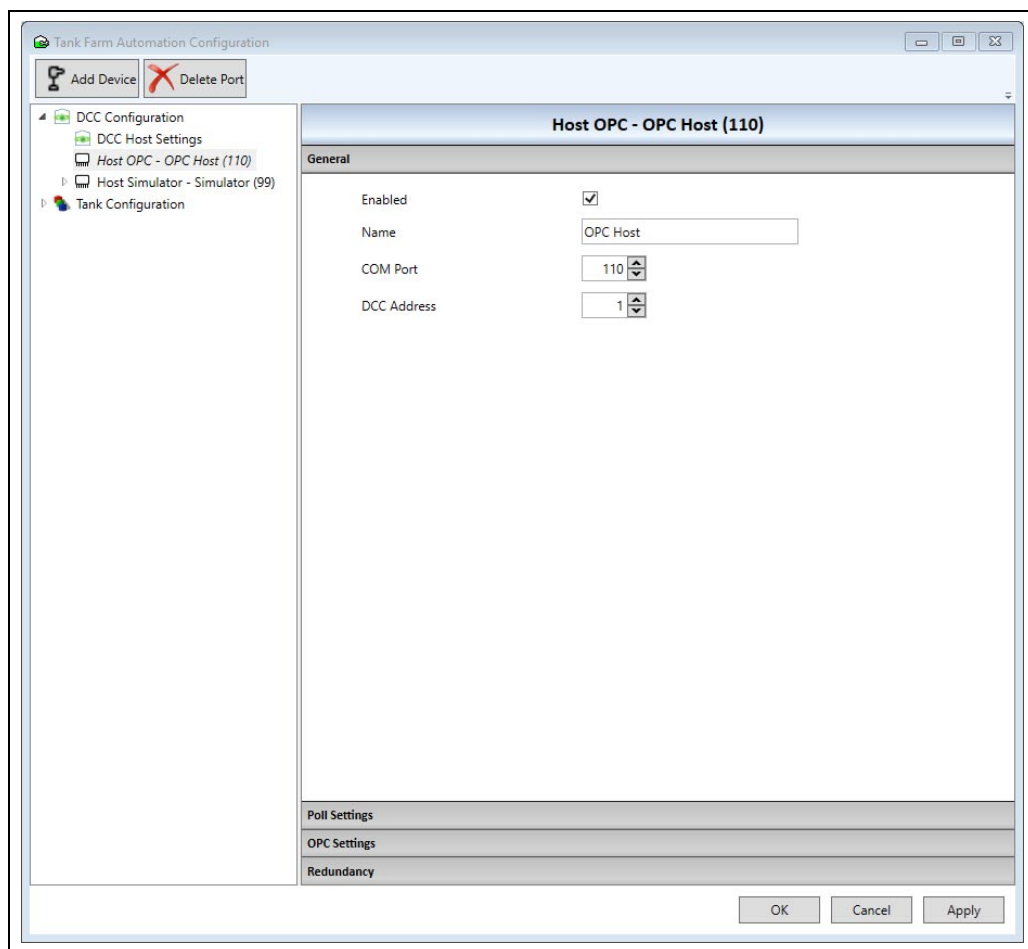
Add a port using the following method:

1. Open the Add Port dialog by using one of the following two methods:
 - Click **DCC Configuration** and then click the **Add Port** button in the tool-bar.
 - Right-click **DCC Configuration** and select **Create Port** from the pop-up menu.



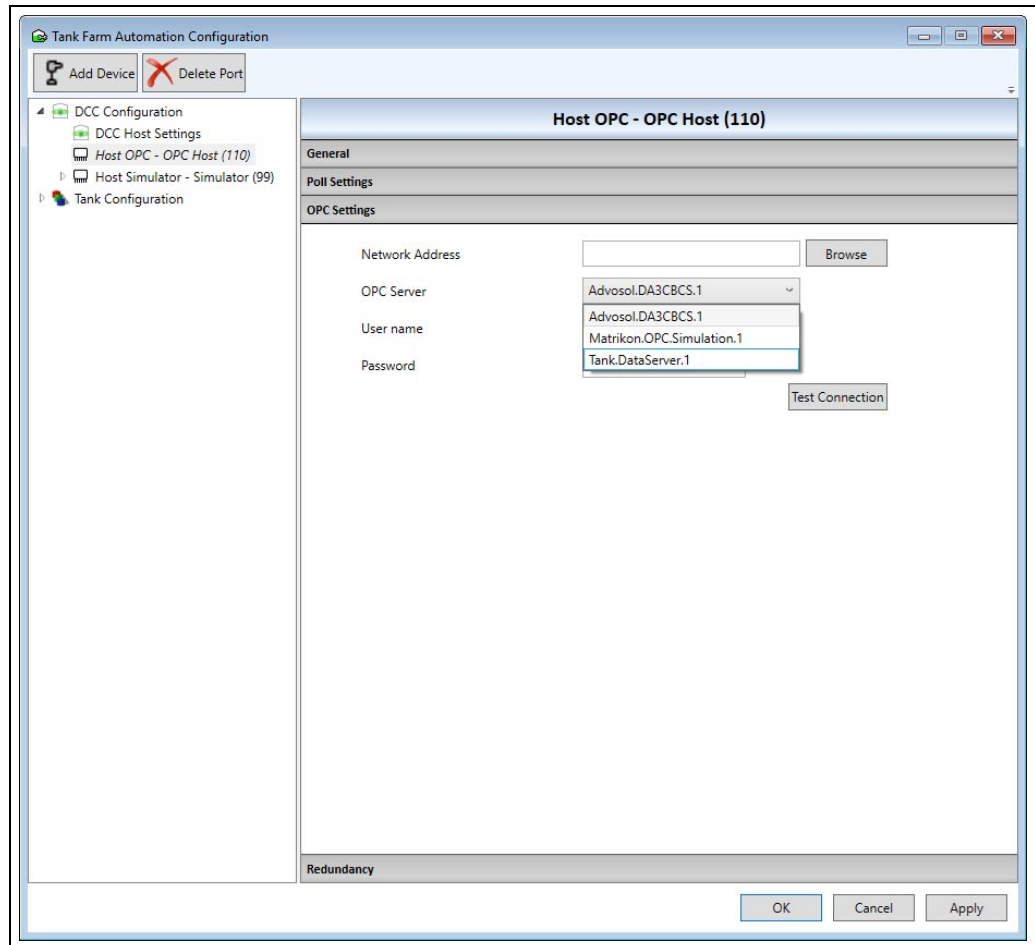
BA01294GEN_023

2. Ensuring that the **Port Direction** is set to **Host**, change the **Port Type** to **OPC**.
3. Click **Add**.
A new OPC port will now appear in the configuration tool window. The new ports **COM Port** will be assigned the first free number from 110 upwards.

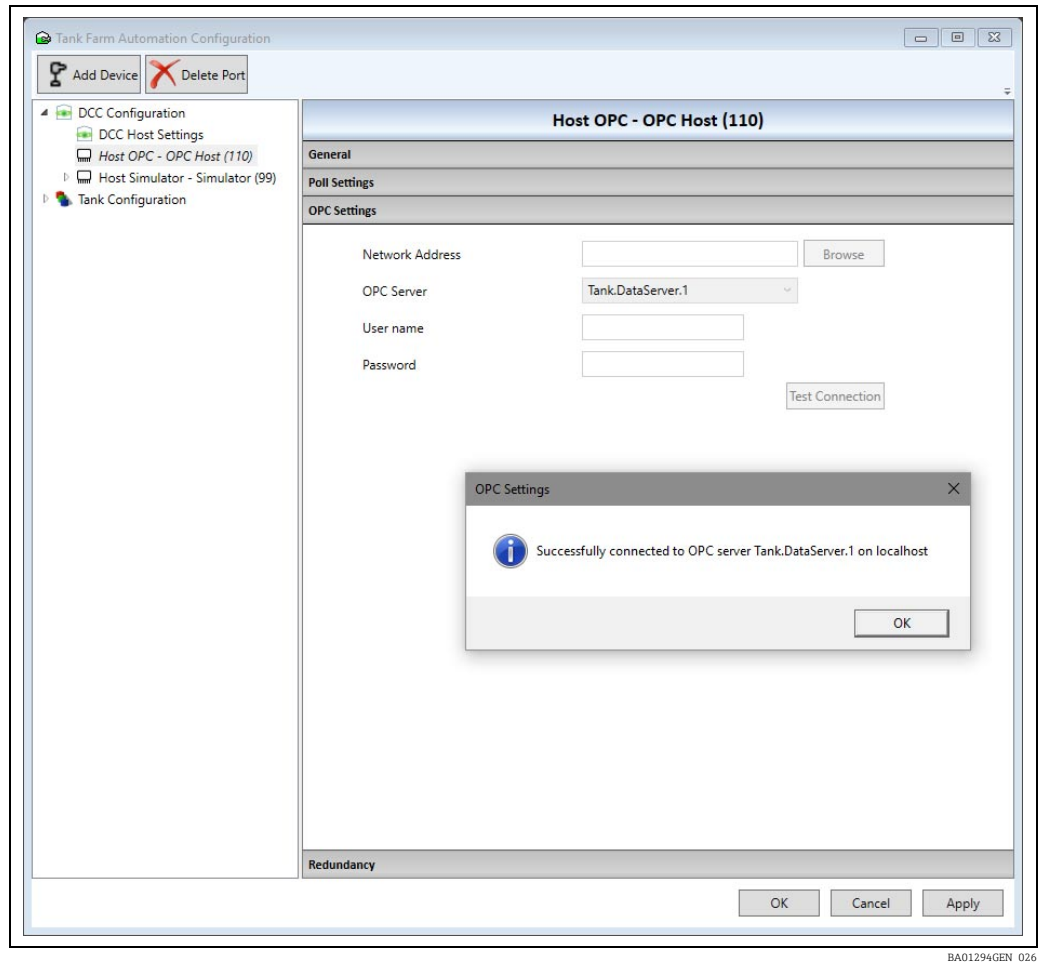


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4. No changes are required in the **General** section except the user can change the name of the port if desired.
 5. Poll settings and Redundancy Settings follow the same rules as any other port type. See the DCC Configuration manual BA00391G for details.
 6. In the OPC Settings section, enter the network address of the remote OPC server. If this is left blank, the system defaults to the local machine.
 7. Click **Browse**. The **OPC Server** drop down selection will be populated with the available OPC servers at the given network address.
-  Obtaining a list of OPC servers relies on DCOM security being setup correctly on BOTH local and remote machines. This is beyond the scope of this manual. You should consult your system administrator for assistance.



8. Enter any **User name** and **Password** required to access the remote OPC server as notified by your system administrator.
 9. Select the desired OPC server from the drop-down list. At this point it is recommended that the user checks the connection by clicking the **Test Connection** button. A message will be displayed to confirm the success (or failure) of the connection.
-  Success here means that DCOM is configured sufficiently to allow the remote OPC server to be contacted. It does not necessarily mean that DCOM has been configured sufficiently to allow data items to be read!



BA01294GEN_026

10. Remember to click **Apply** or **OK** to permanently save the changes.

5.2 Disable an OPC Port

As with any port in the system, an OPC Port can be disabled by un-ticking the **Enabled** check-box in the **General** section (→ 13).

5.3 Delete an OPC Port

As with any port in the system, an OPC Port can be permanently deleted in one of the following two ways:

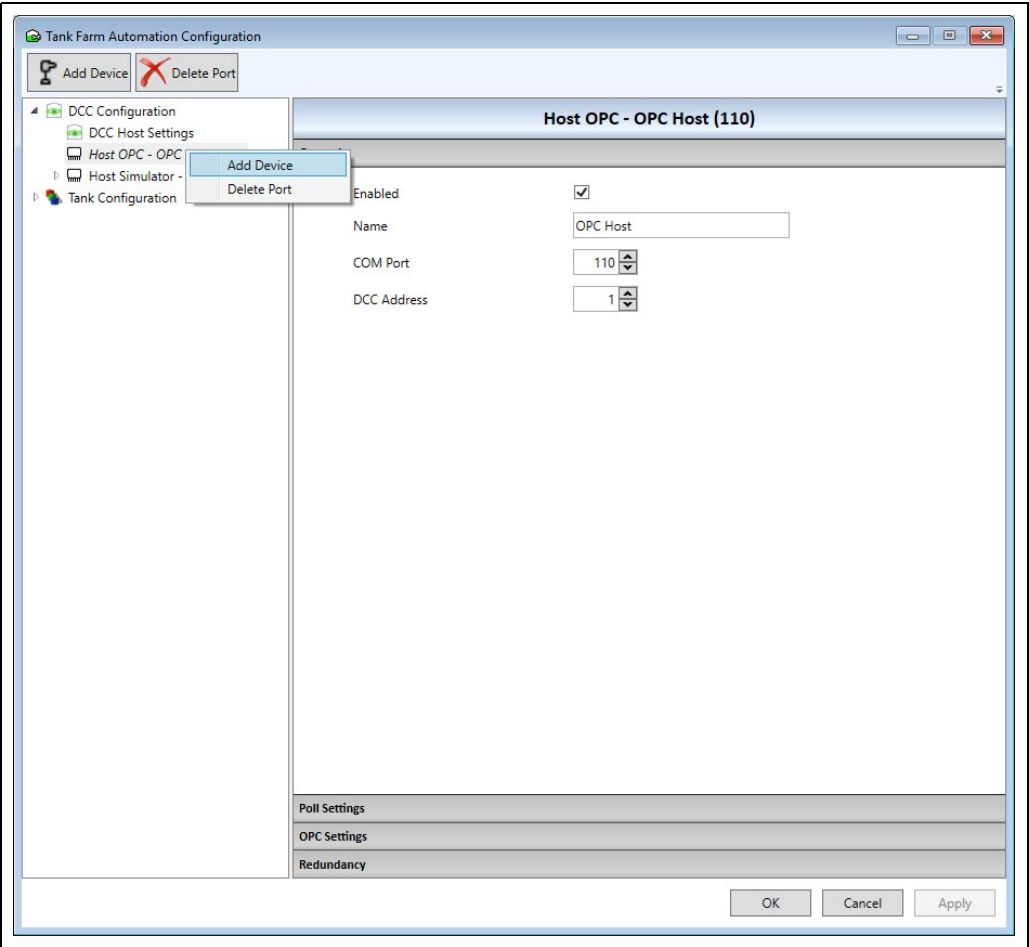
- Select the port and click the **Delete Port** button in the tool-bar.
- Right-click the port and select **Delete Port** from the pop-up menu.

6 Assigning gauges to use the OPC TG driver

Gauges must be configured in the tank gauging database to use the **OPC TG** driver.

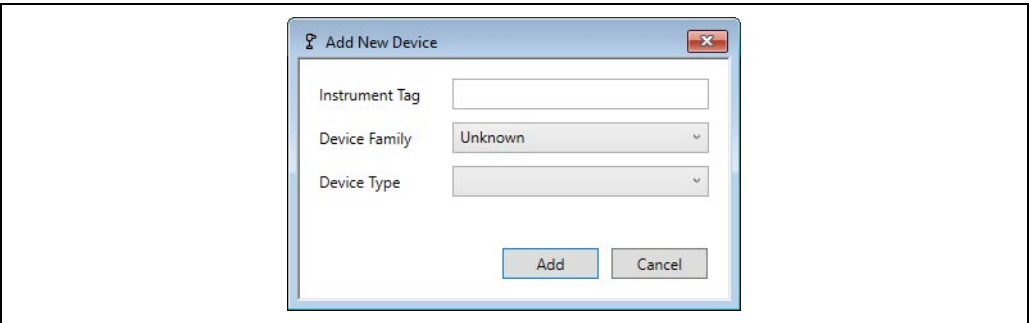
6.1 Add an OPC device

1. Add a device using one of the following two methods:
 - Select the desired OPC port and click the **Add Device** button in the tool-bar.
 - Right-click the desired OPC Port and select **Add Device** from the pop-up menu



BA01294GEN_027

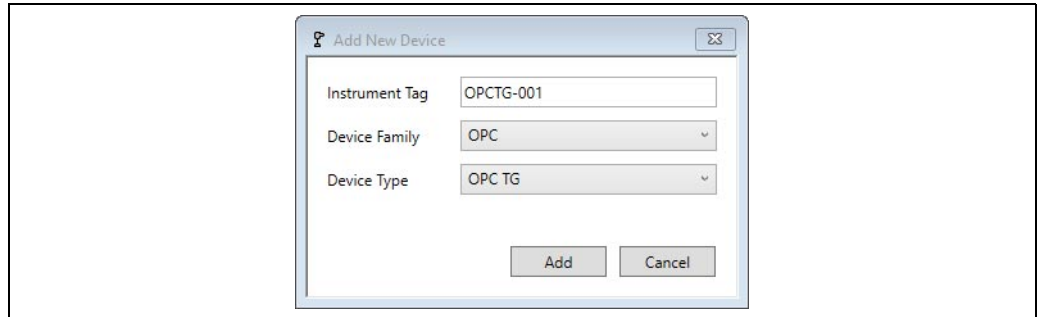
An **Add New Device** dialog will open.



BA01294GEN_028

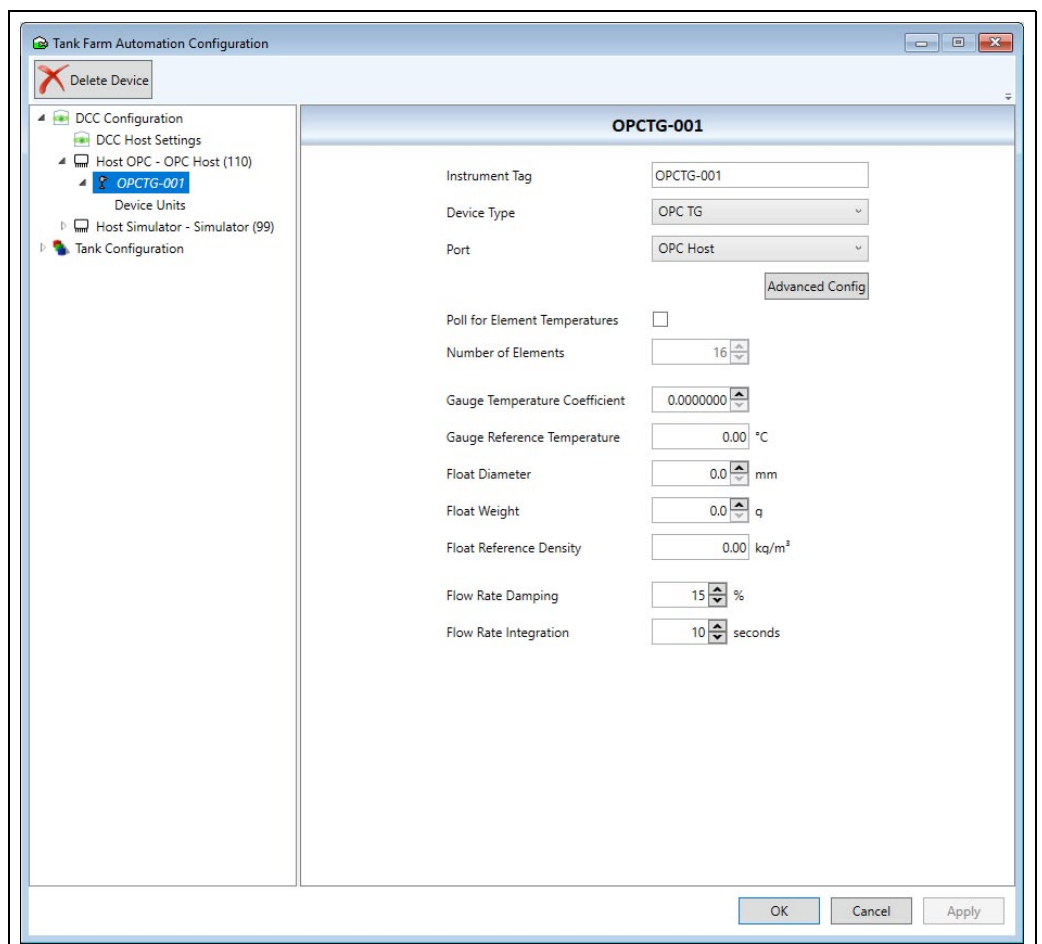
 It is recommended that every device in the system is given a meaningful **Instrument Tag**.

2. Select **OPC** as the **Device Family**.
3. Select **OPC TG** as the **Device Type**.



BA01294GEN_029

4. Finally, click the **Add** button to add the device.
5. The new device will appear beneath the selected OPC port.
-  Before the device will actually read values, it must be assigned to Tank using the device mapping feature. This is explained in full in the Configuration manual BA00390G.
6. Click the **Advanced Config** button to assign data values from the remote OPC server to tank input parameters in the system (→  18).



BA01294GEN_030

7 Configuring the data items using DCC Host configuration screens

The data to be polled for each gauge (i.e. Level, Temperature etc.) must be defined and configured using the **DCC Host Configuration** screens.

Each gauge must be individually configured, allowing for a flexible set of parameters to be requested.

The advanced map consists of a set of interfaces, each of which may have:

- A set of default parameter details which apply to ALL gauges on the interface
- A set of gauge parameter details which apply only to the selected gauge

All parameters are optional and need not be defined in the map, as they will default to a set of standard values (→  23).

8 DCC Host Configuration Tool

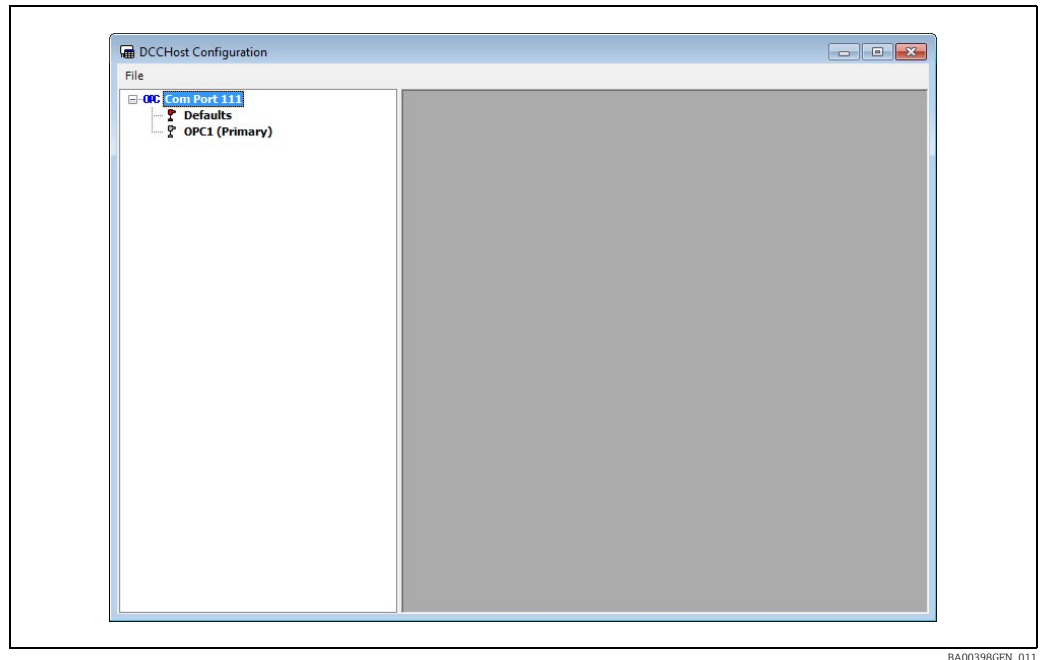
The **DCC Host Configuration** tool allows data field parameters to be configured for gauges on all ports that use the following drivers:

- Modbus TG
- OPC TG

This document will only describe how to configure **OPC TG** field parameters in the **DCC Host Configuration** tool. Refer to the **ModbusTG** configuration in the manual BA00391G Data Communications Controller Configuration for details on that protocol.

8.1 Accessing the tool

The **DCC Host Configuration** tool can be started by selecting the menu option **Configuration → DCC Host Configuration** from the tank gauging Home Page or by clicking the **Advanced Config** button as described in the previous section (→ 17). The **DCC Host Configuration** tool appears as shown below.



BA00398GEN_011

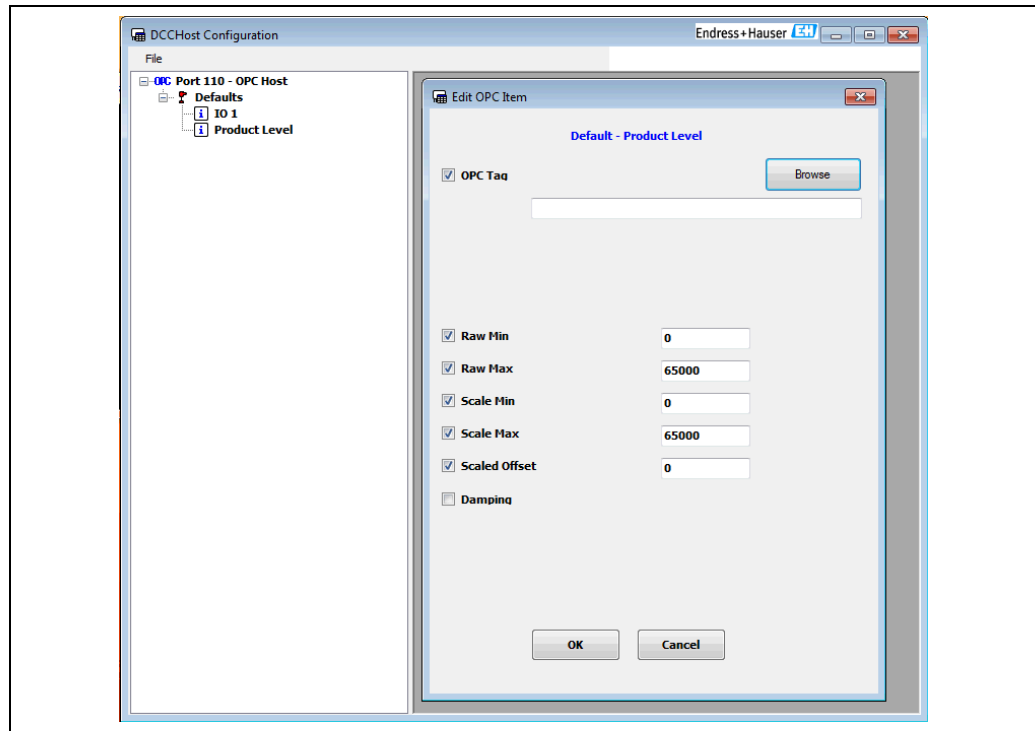
All COM ports that have been configured as **OPC TG** (and **Modbus TG**) interfaces and have at least one **OPC TG** gauge assigned to them will be listed in the left hand panel. The list of COM ports can be expanded to display all gauges assigned to a port.



If no interfaces appear in the list, then ensure that all **OPC TG** interfaces have been defined and at least one gauge of type **OPC TG** has been assigned to each interface. For details on how to do this, → 12, → 16.

8.2 Use of the configuration tool

Each Com Port will have a list of all tanks assigned (including the gauge duty, i.e. Primary, Secondary etc.) and also a section called **Defaults** as shown below.



BA01294GEN_031

The fields that are to be polled for each gauge will be displayed beneath the gauge they apply to. These fields include product level, temperature, pressure etc. and will only be polled by the **OPC TG** interface if they are added to the configuration in this tool.

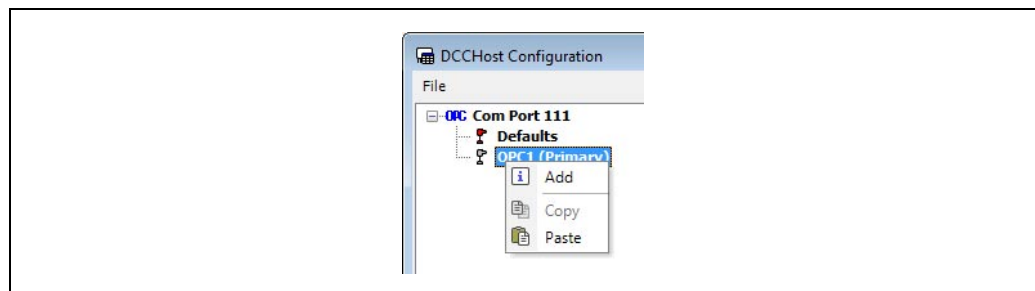
The **Defaults** section allows the user to configure **OPC TG** field definitions that will be added to ALL gauges on this **OPC TG** interface. If a field is added to the **Defaults** section it will be polled by a gauge even if the field has not been added to the individual gauge.

Each gauge can be configured with field definitions that apply only to that gauge. All field data entered for an individual gauge will override data entered in the **Defaults** section. Thus data common to all gauges may be entered in the **Defaults** section and then individually tailored for each gauge as required.

8.3 Adding a field

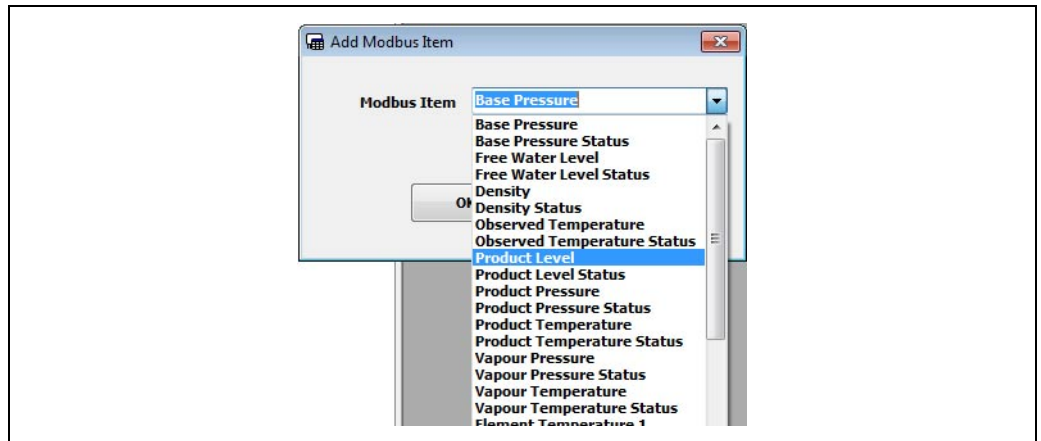
To add a new field to a gauge or the "Defaults", proceed as follows.

1. In the Navigation Window, right click on the item.



BA00398GEN_013

2. Then select **Add** from the context menu.
3. Select the field from the dialog.

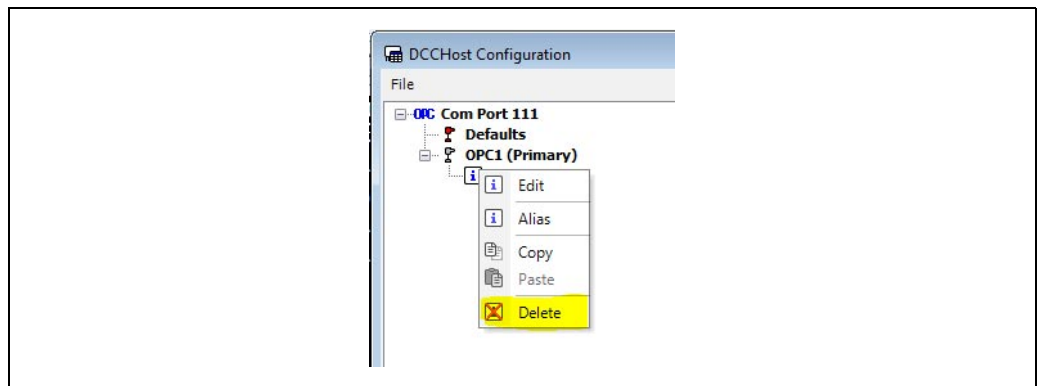


BA00398GEN_014

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

8.4 Deleting a field

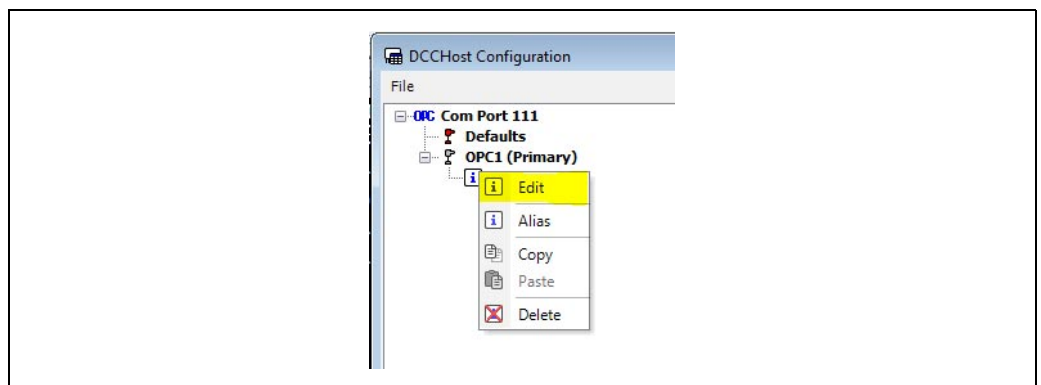
1. To delete a field, right click on the field and select **Delete** from the context menu.



BA00398GEN_015

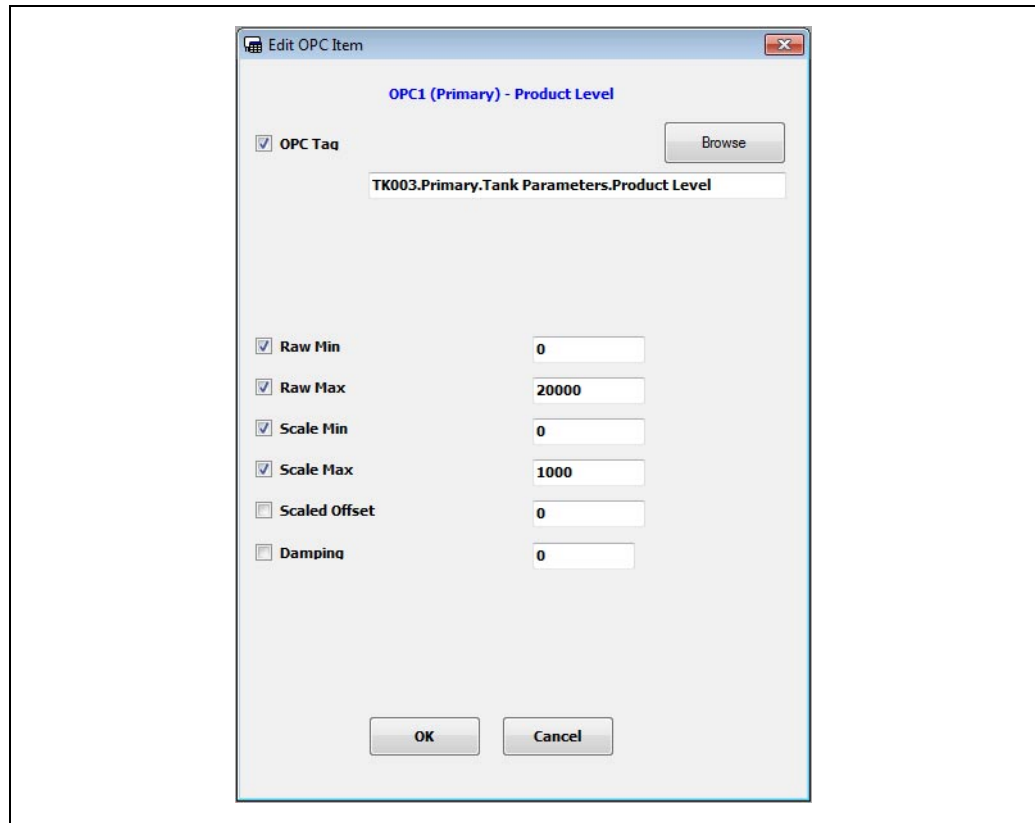
8.5 Editing a field

1. To change a field, right click on the field and select **Edit** from the context menu.



BA00398GEN_016

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



BA00398GEN_017

8.6 Common parameters

The parameters are optional and are only used if the right hand box is ticked. Any parameters not ticked will use the default values. See information on default data at end of this section, → 23.

The parameters displayed in the edit window will vary, depending on the data being edited. These are split into three types: values, statuses and alarms.

The following parameters are common to all fields:

- **OPC Tag** – The tag name in the **OPC Server** that holds the data for this field. This can be manually entered or the server can be browsed. The latter option obviously requires the **OPC Server** to be connected to the client. See later section on browsing for tag names → 24.
- **Raw Min** and **Raw Max** – The raw data range. Used in scaling data (see below) and also for Status fields if the value is outside the raw limits then the value status will be set to illegal, i.e. DN04.
- **Scaled Min** and **Scaled Max** – The scaled data range. For status fields it is recommended that these should be set to the same as the raw limits. Data will be converted using the formula:

$$V_{scaled} = ((V_{raw} - R_{min}) / (R_{max} - R_{min})) * (S_{min} - S_{max}) + S_{min} + K$$
 Where:
 - V_{scaled} : Scaled value reported to tank gauging system.
 - V_{raw} : Raw value from the OPC interface.
 - R_{min} : Minimum raw value expected from the OPC interface.
 - R_{max} : Maximum raw value expected from the OPC interface.
 - S_{min} : Minimum scaled value to be reported to the tank gauging system.
 - S_{max} : Maximum scaled value to be reported to the tank gauging system.
 - K : Offset applied to value, where raw and scaled zeroes do not coincide.
- **Scaled Offset** – Value to be added to (or subtracted from) the scaled value.

- **Damping** – Not used for status values. A percentage value that is used to damp values that fluctuate rapidly. This field should be entered in the range 0 to 100, with 0 and 100 being treated the same as NO damping. The formula used is:

$$V_n = V_{n-1} + ((V_{raw} - V_{n-1}) * Damping) / 100$$

Where:

- V_n : Current value for the field reported to the tank gauging system.
- V_{n-1} : Previous value for the field reported to the tank gauging system.
- V_{raw} : Raw value reported from the OPC interface.
- $Damping$: Damping factor.

8.6.1 Status field parameters

The following parameters are used only for status fields:

- **Status Type** – Defines any special values for good/bad status. May be one of the following:
 - None
 - One illegal value
 - One good value
 - Bits set good
 - Bits set bad
- **Status Test Value** – Defines the value used to test any special case for validity, depending on the value of status type. If status type is **Bits set good** or **Bits set bad** then any of the bits in this value will be tested.

8.6.2 Alarm field parameters

The following parameters are used only for alarm fields:

- **Alarm Type** – Defines any special values for good/bad status. May be one of the following:
 - None
 - Equals value sets alarm
 - Not equals value sets alarm
 - Bits set alarm
 - Bits cleared set alarm
 - Greater than value sets alarm
 - Less than value sets alarm
- **Alarm Test Value** – Defines the value used to test if the alarm is set, depending on the value of alarm type. If alarm Type is **Bits set alarm** or **Bits cleared set alarm** then any of the bits in this value will be tested.
- **Alarm Hysteresis** – Defines the hysteresis value for resetting the alarm. It is only used if alarm type is **Greater than value sets alarm** or **Less than value sets alarm**.

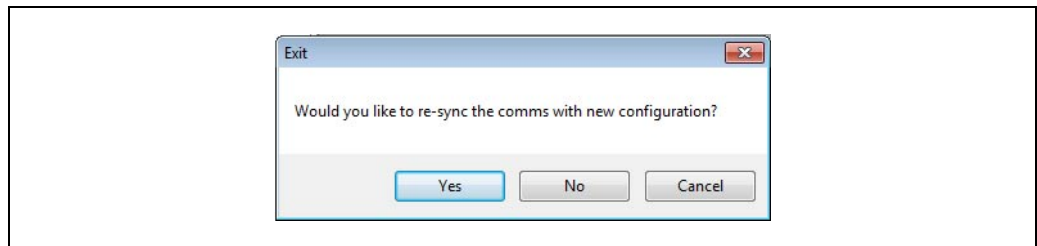
Any field parameters not defined for an individual gauge will use those defined in the **Defaults** section. If the field parameter has not been defined in the **Defaults** section then the following defaults will be used by the **OPC TG** interface when polling for data.

Field Parameter	Value
OPC Tag	"" (empty string)
Raw Min	0
Raw Max	65535
Scaled Min	0
Scaled Max	65535
Scaled Offset	0
Status Type	Status fields – One illegal value Alarm fields – Equals value sets alarm
Test Value	0x8000 (status and alarm fields only)
Damping	0 (i.e. not used) (value fields only)
Hysteresis	0 (alarm fields only)

2. Click **OK** in the edit dialog to save the parameters for the **OPC Field**.

8.7 Saving the new OPC Field Map

1. To save the new OPC configuration to the xml file, close the **DCC Host Configuration** tool. If any changes have been made then a dialog, as shown below, will be displayed.



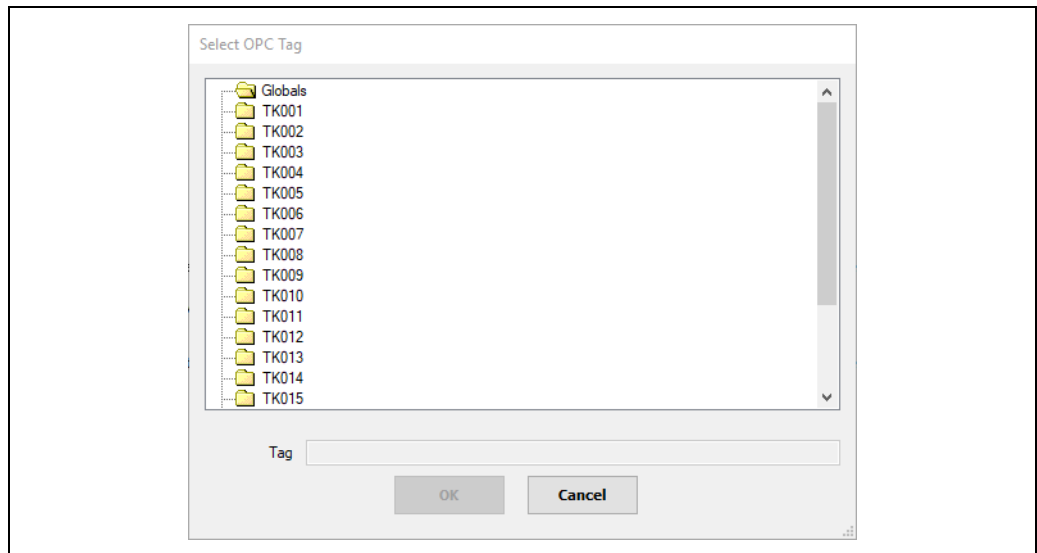
BA00398GEN_018

2. Click **Yes** to save the data and automatically force the **DCC Host** service to reload the new **OPC** (and **Modbus**) **Map** for any **OPC TG** (and **Modbus TG**) interfaces.

8.8 Browsing for OPC server tags

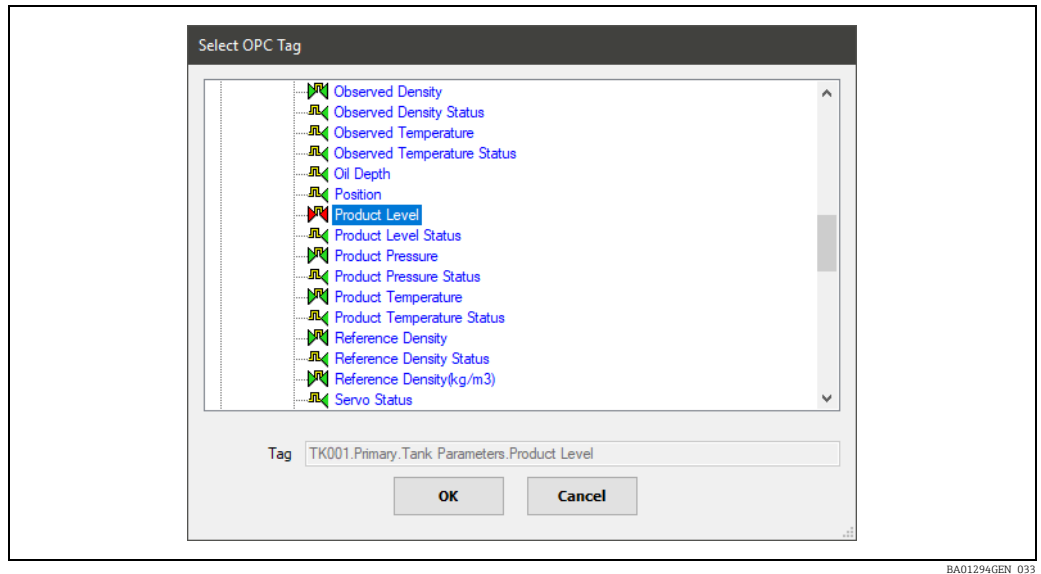
When editing a data field, the **OPC** tag name must be specified in full, to allow the **OPC TG** driver to connect to the correct tag in the **OPC Server**. If this exact tag name is not known then the **OPC Server** may be browsed to find the correct tag.

1. To browse for Tag names, edit the data field then click on the **Browse** button. If the client can successfully connect to the **OPC Server** a graphical tree representation of the data tags will be displayed as shown below.



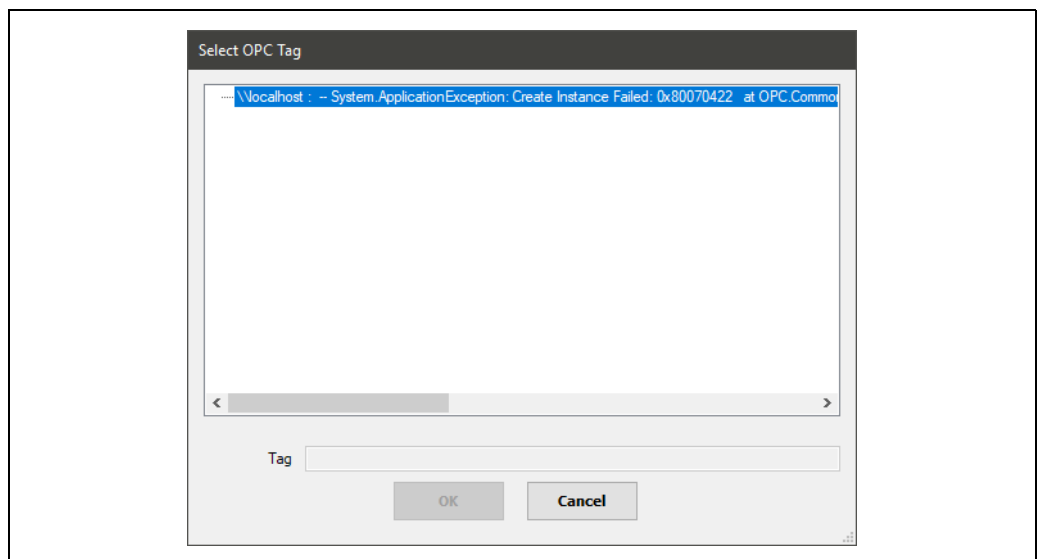
BA01294GEN_032

2. Select the desired tag by navigating within the tree structure. The full name of the tag will be displayed in the **Tag** field once it is selected as shown below.



BA01294GEN_033

3. Click on the **OK** button to close the dialog and automatically update the **OPC Tag** field in the edit window.
If the **DCC Host Configuration** tool fails to connect to the **OPC Server** it will display an OPC connection error. An example is shown below:



BA01294GEN_034

Any error code will be displayed in the message.

There are many reasons why a client may fail to connect to the server. Some of the more typical causes are listed below:

- The two systems are not connected by a network cable
- The **DCOM** settings in the **OPC Server** or client system are not setup correctly for **OPC**. In addition the following must be carried out:
 - The default installation for Windows forces remote users to authenticate as Guest. This means that **DCOM** clients cannot connect to a server running on a Windows machine unless the Guest account is enabled and has enough rights to launch the server.
 - The default settings can be adjusted from the control panel: **Administrative Tools** → **Local Security Policy** → **Local Policies** → **Security Options** → **Network access: Sharing and security model for local accounts**
Change this setting to: **Classic - users authenticate as themselves**.

- The client is logging on with a user account that does not have the correct permissions on the server. To correct this, in the section **Remote Logon Account**, enter a valid user name and password for an account on the **OPC** server system and then click on the **Reconnect OPC** button. This will attempt to reconnect using the new account details.

8.9 OPC Field definitions

The **Defaults** section and any Gauge node can contain a set of fields which will be polled by **OPC TG**. Each field node can contain one or more attributes which define the field and how the **OPC TG** driver will decode the incoming data when polled.

The **OPC TG** interface is specifically designed to poll for tank gauging data and thus data fields are polled in a defined way.

There are three basic types of fields in the **OPC TG** driver, which operate in slightly different ways.

The fields are:

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

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

These are:

- Product Level
- Product Level Status



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

The following fields will be polled at high priority if they have been defined in the advanced **OPC TG** Map

- Product Temperature
- Product Temperature Status
- Density High Alarm
- Density Low Alarm
- Level High Alarm
- Level High High Alarm
- Level Low Alarm
- Level Low Low Alarm
- Temp High Alarm
- Temp Low Alarm
- User Defined Alarms 1 - 8
- Gauge Status

Other fields are only polled on background scans, and only if they have been defined in the **OPC TG** advanced map. The background scan period is defined per interface and defaults to three minutes.

These fields include:

- BasePressure
- BasePressureStatus
- FreeWaterLevel
- FreeWaterLevelStatus
- Density
- DensityStatus
- ObservedTemperature
- ObservedTemperatureStatus
- ProductPressure
- ProductPressureStatus

- VapourPressure
- VapourPressureStatus
- VapourTemperature
- VapourTemperatureStatus
- ElementTemperature1
- ElementTemperature1Status
- ElementTemperature2
- ElementTemperature2Status
- ElementTemperature3
- ElementTemperature3Status
- ElementTemperature4
- ElementTemperature4Status
- ElementTemperature5
- ElementTemperature5Status
- ElementTemperature6
- ElementTemperature6Status
- ElementTemperature7
- ElementTemperature7Status
- ElementTemperature8
- ElementTemperature8Status
- ElementTemperature9
- ElementTemperature9Status
- ElementTemperature10
- ElementTemperature10Status
- ElementTemperature11
- ElementTemperature11Status
- ElementTemperature12
- ElementTemperature12Status
- ElementTemperature13
- ElementTemperature13Status
- ElementTemperature14
- ElementTemperature14Status
- ElementTemperature15
- ElementTemperature15Status
- ElementTemperature16
- ElementTemperature16Status

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

The validity of a value field is determined by the following:

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

A status field may be added to the map in addition to the value field. These are generally used in cases where the status of the data is set in a separate **OPC Tag**. However the status field may be decoded from the same **OPC Tag** as the value.

For status fields there are an extra set of parameters that determine how to decode the status. They work in the following manner:

- If the status is outside the raw scaling limits then the value will be set to illegal status i.e. DN04
- If the status is within the raw limits then the **Status Type** parameter will be used to determine how to test for illegal status using the **Status Test Value**.

Many **OPC** servers implemented by slave devices do not have separate status registers (or bits) but instead set the value to some error figure (i.e. full scale etc.). In this case the status field should be set to the same **OPC Tag** and parameters of the value field (i.e. same raw scaling parameters).

Alarm fields must have the status type and status test values fields configured. They are used to test the incoming data to check whether the alarm is active or inactive. In this case if the data tests "Good" then the alarm is active, if it tests "Bad" then the alarm is inactive.

9 OPC DCOM issues

OPC over **DCOM** can be difficult to configure in regard to security permissions, especially when crossing domain boundaries.

The tunneling servers offered by many **OPC** vendors can be a practical and simple solution to these problems.



Almost every issue with OPC server connectivity can be traced back to issues with incorrect configuration of DCOM security and/or Windows™ Firewall.

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