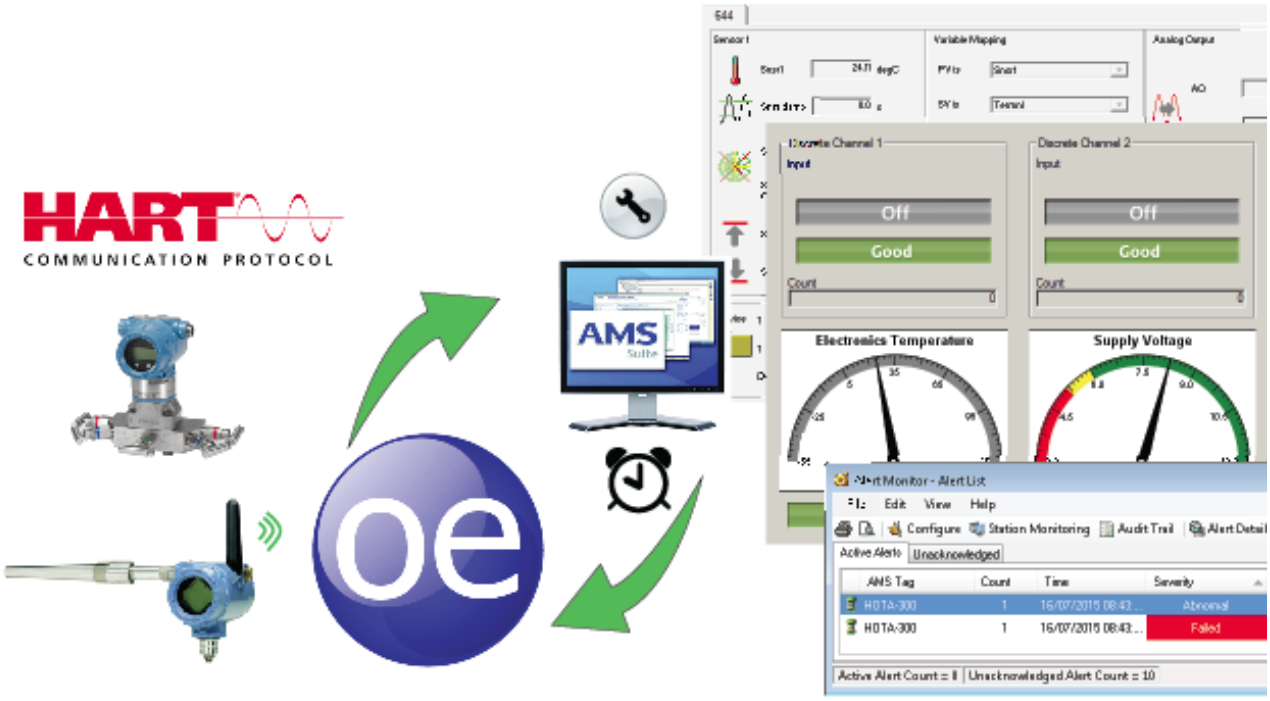
AMS HART® Pass-Through Reference Guide



Energy and Transportation Solutions

EMERSON

System Training

A well-trained workforce is critical to the success of your operation. Knowing how to correctly install, configure, program, calibrate, and trouble-shoot your Emerson equipment provides your engineers and technicians with the skills and confidence to optimize your investment. Energy and Transportation Solutions offers a variety of ways for your personnel to acquire essential system expertise. Our full-time professional instructors can conduct classroom training at several of our corporate offices, at your site, or even at your regional Emerson office. You can also receive the same quality training via our live, interactive Emerson Virtual Classroom and save on travel costs. For our complete schedule and further information, contact the Energy and Transportation Solutions Training Department at 800-338-8158 or email us at *education@emerson.com*.

Contents

1 Introduction

This manual, AMS HART Pass-Through Reference Guide, provides a brief introduction to OpenEnterprise (OE) AMS HART Pass-Through software and covers software installation special notes, initial communications setup, and the integrated features of OE - AMS Device Manager. For full details on using the OpenEnterprise or AMS Device Manager software, please refer to the online help included in each component application.

This manual contains the following chapters:

Chapter	Description
Chapter 1 Introduction	Provides an overview of the general structure of the manual.
Chapter 2 Installing OE and AMS Device Manager	Describes the minimum system requirements, presents pre-installation considerations, and describes the process of installing the OE and AMS components.
Chapter 3 Configuring OE AMS HART Pass-Through	Describes how to configure the components, including adding HART device, viewing HART device information, and managing HART device alerts.
Chapter 4 Using AMS Device Manager Software	Discusses how to start the AMS Device Manager, how to rebuild the RTU hierarchy, and details HART alerts.
Appendix A	Provides a general glossary of OE terms.
Appendix B	Details the tables added to OE for the AMS HART Pass-Through functionality.

This manual is just one of several manuals describing how to use OpenEnterprise. However, you should always refer to the extensive online help provided with the OpenEnterprise software. It is the most current and is the primary source of information on effectively managing OE.

1.1 What is OE AMS HART Pass-Through?

OE AMS HART Pass-Through has several components which tie together to provide the Highway Addressable Remote Transducer (HART®) interface in OE so that AMS Device Manager can interact with the HART devices in an OE SCADA network. This allows you to launch device windows in AMS Device Manager to configure communications with HART and *Wireless*HART® devices.

OE supports serial and IP connection to a hierarchy of RTUs configured in the Network Communications pane. From AMS, you establish communications to an OpenEnterprise network using the AMS Network Configuration Utility.

Once you have defined the OpenEnterprise network, you can launch AMS Device Manager. Use it to view the RTU device hierarchy, configure HART field devices connected to those RTUs, and configure how the system monitors HART devices status alerts.

In addition, you can launch ROCLINK™ 800 or ControlWave Designer from the OE Network Communications pane to configure any ROC, FloBoss™, or ControlWave RTU device and any HART devices attached to those RTUs.

1.1.1 AMS Device Manager

AMS Device Manager is a separate application from Emerson's Asset Optimization AMS Device Manager software suite. AMS Device Manager communicates with wired HART devices or IEC 62591 (WirelessHART) devices. Table 1-1 shows the minimum recommended controller firmware revisions for full AMS compatibility.

Table 1-1. Firmware Versions

Controller/Flow Computer	Firmware Version
ROC800-Series	3.86 (or newer)
FloBoss™ 107	1.86 (or newer)
ControlWave Micro	6.02 (or newer)

- IEC 62591 module firmware must be 1.24 (or newer)
- HART module firmware must be 1.16 (or newer)
- ROCLINK 800 software must be version 2.70 (or newer)

Note
The **Emerson™ Wireless Gateway** is **not** supported for the Pass-Through functionality between OpenEnterprise and AMS Device Manager.

1.1.2 Related Documentation

The following documents may be useful in setting up RTUs and HART devices for the AMS HART Pass-Through:

Document Title	Part No.
ControlWave® Micro HART® / BTI Interface Module Product Data Sheet	D301636X012
FloBoss™ 107 HART® Module Product Data Sheet	D301639X012
ROC800-Series HART®-2 Module Product Data Sheet	D301705X012
ROC800-Series IEC 62591 Interface Product Data Sheet	D301712X012
FloBoss™ 107 IEC 62591 Interface Product Data Sheet	D301713X012
ControlWave Micro IEC 62591 Interface Product Data Sheet	D301714X012
IEC 62591 Wireless Interface Instruction Manual Product Data Sheet	D301708X012
Field Tools Quick Start Guide	D301703X412

2 Installing OE and AMS Device Manager

This chapter covers the following information:

- Minimum System Requirements
- Before You Begin
- Installing OE Components

This chapter covers important notes on installing OpenEnterprise with AMS Device Manager to use with the AMS HART Pass-Through software.

2.1 Minimum System Requirements

For the minimum system requirements, refer to the AMS Installation guide and OpenEnterprise product data sheet.

2.2 Before You Begin

Be aware of the following considerations before you begin the installation of OE and AMS Device Manager:

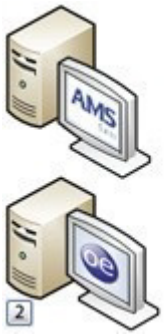
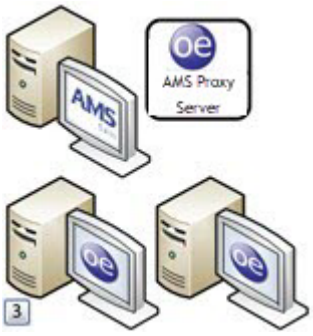
Important

- If you have upgraded from OE 3.2 to OE 3.3, you **must** add the three AMS HART Pass-Through tasks to the OE Session (refer to *Section 3.9*).
- AMS 14.5 or later version must be installed.
- OE 3.3 **cannot** reside on a computer running any components of OE 2x .
- AMS Device Manager functions **only** with controllers which have firmware supporting wired HART or IEC 62591 (*Wireless*HART).
- You **must** have administrative privileges to install AMS Device Manager.
- You **must disable** User Account Control (UAC) prior to the installation. You can re-enable it following a successful installation.
- As part of the installation, device software for both Eltima and MACTec® installs automatically. Depending upon your Windows permissions, Windows may require you to confirm these installations before the installation can proceed.

2.2.1 Installation Options

Depending on the requirements of your site, you can install OpenEnterprise™ and AMS Device Manager in three major configurations:

Figure 2-1. Three Installation Configurations

One-Box	Two-Box	N-Box
		
OpenEnterprise and AMS Device Manager on the same machine.	OpenEnterprise and AMS Device Manager on a separate machine.	OpenEnterprise redundant servers and AMS Device Manager along with OE AMS Proxy Server on a separate machine.

2.3 Installing OE Components

This section provides a brief overview of the OE installation. Once you insert the OE installation DVD in your DVD drive, the OE Introduction screen displays. Links for accessing documentation on the DVD as well as web resources for software licensing and support appear at the bottom of the introduction screen.

Notes

- Install MS Office® Excel® **before** you install OE Server Workstation.
- **Do not** log in as a member of the Domain Administrators group. It can cause an incorrect installation. Ensure that you log in as a **local administrator**. Read the *OpenEnterprise Version 3x Installation Guide* (part D301762X012) **before** installing OE for complete instructions on installing and licensing OE components.

1. Click **Install OpenEnterprise 3.3** on the OpenEnterprise Introduction screen.

   Note
   Some of the installations may require you to reboot the system before you can resume the OE installation.

Figure 2-3. OpenEnterprise Introduction Screen

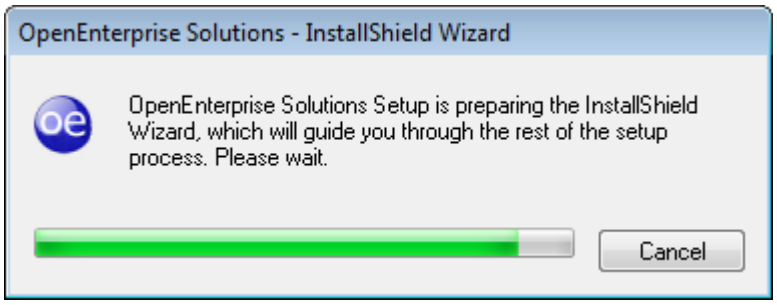
2. The installation process starts and checks whether certain necessary software components exist on the PC. If those components are not present, the installation process prompts you to install them.

Note

The OE installation disc contains **all** required software components.

3. Once the installation of the required components finishes, the OE installation wizard starts.

Figure 2-4. InstallShield Wizard



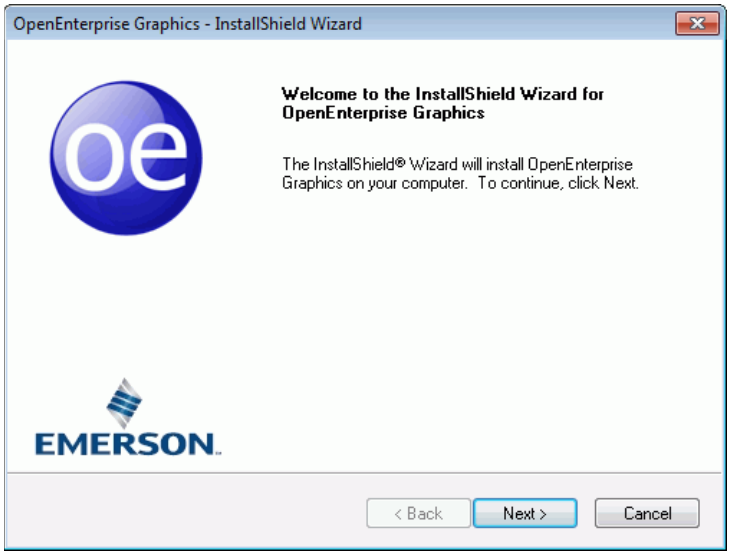
4. On the Setup Type step of the wizard select either **OpenEnterprise Server** or **OpenEnterprise Server/Workstation**.

Figure 2-5. Setup Type Wizard Screen

5. The installation proceeds. If you selected **OpenEnterprise Server**, the wizard does not perform steps 7 and 8. The installer periodically reports which components are being installed. This may take several minutes.

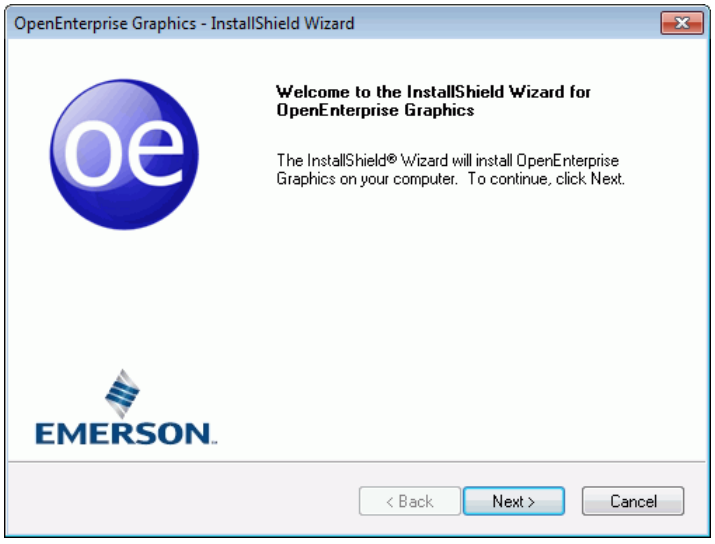
6. If you selected **OpenEnterprise Server/Workstation**, the wizard first installs **OpenEnterprise Graphics**. Click **Next**. This process may take several minutes. The installation require that you reboot before you resume the OpenEnterprise installation.

Figure 2-6. OpenEnterprise Graphics Installer



7. **OpenEnterprise Graphics Licensing** is the second installation process for the OpenEnterprise Server/Workstation option. Click **Next.** This process may take several minutes. The installation again requires that you reboot before you resume the OpenEnterprise Server installation.

Figure 2-7. OpenEnterprise Graphics License Installer



8. The OpenEnterprise InstallShield wizard installs the **OpenEnterprise Server** component after rebooting.

2.4 Installing OE AMS Proxy Server

Overview

A single AMS HART-IP Network is capable of communicating directly with a single standalone OpenEnterprise Server. For AMS to communicate with a redundant OpenEnterprise system (up to 6 servers) the OpenEnterprise AMS Proxy Server must be used.

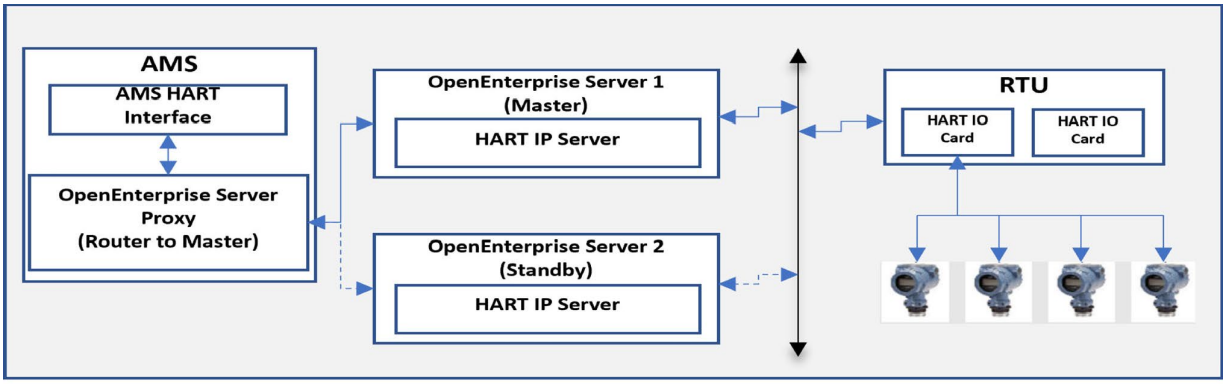
OpenEnterprise AMS Proxy Server features:

1. A Windows Service that provides connectivity between AMS and a redundant OpenEnterprise system.
2. Enables the AMS Hart IP interface to communicate with the current OpenEnterprise master.
3. Provides a user-configurable port for AMS connection and the OpenEnterprise Server addresses.
4. Logs state change events to the Windows application EventLog.

Note

It is recommended to install the OpenEnterprise AMS Proxy Server service on the AMS machine. It can also be installed on a separate machine (firewall exceptions will have to be added manually if required).

Figure 2-8. AMS Proxy Server



Installation procedure:

The "OEAmsProxyServer Setup" folder in the OE service pack ISO provides the installer for the OpenEnterprise AMS Proxy Server application.

The "OEAmsProxyServer Setup" folder contains the below files:

- setup.exe - install the OpenEnterprise AMS Proxy Server service and.NETt Framework 4.7.2 if required.
- OEAmsProxyServerSetup.msi
- A folder named “DotNetFX472” has “NDP472-KB4054530-x86-x64-AllOS-ENU.exe”. (Folder “DotNetFX472” is to handle prerequisite i.e., .NET Framework 4.7.2.)

To Install the OE AMS Proxy Server service

1. Run setup.exe and follow the installation wizard.

The installation path is "C:\Program Files (x86)\Emerson\OpenEnterprise AMS Proxy Server".

Note
Installation does not add any firewall exceptions (it needs to be done manually if required).

Configuration

After installation, follow the below steps:

1. Make OpenEnterprise AMS Proxy Server service startup type Automatic:

- Go to Services.msc
- Select OpenEnterprise AMS Proxy Server service.
- Right-click properties, and change the Startup type to Automatic.

2. Configure OEAmsProxyServer.config file:

All the configurable settings associated with communications are available in the proxyserver and oeservers sections of the OEAmsProxyServer.config file.

Location: C:\Program Files (x86)\Emerson\OpenEnterprise AMS Proxy Server\OEAmsProxyServer.config.

The following is OEAmsProxyServer.config file which needs to be configured as per the required system.

```
<?xml version="1.0" encoding="utf-8"?>
<configuration>
<proxyserver port="5094" />
<oeservers>
<peer hostname="x.x.x.1" port="5094" />
<peer hostname="x.x.x.2" port="5094" />
</oeservers>
</configuration>
```

Table 2-4. Supported HART Devices

Setting	Default	Entry in Config File
Proxyserver Port number for AMS HART IP Network	5094	Port ="5094"
Oeservers peers Hostname or IP address on OE Server		hostname=
Port number for AMS HART IP Network	5094	Port="5094"

Note

Any change to the current settings requires a restart of the OpenEnterprise AMS Proxy Server service.

3 Configuring OE AMS HART Pass-Through

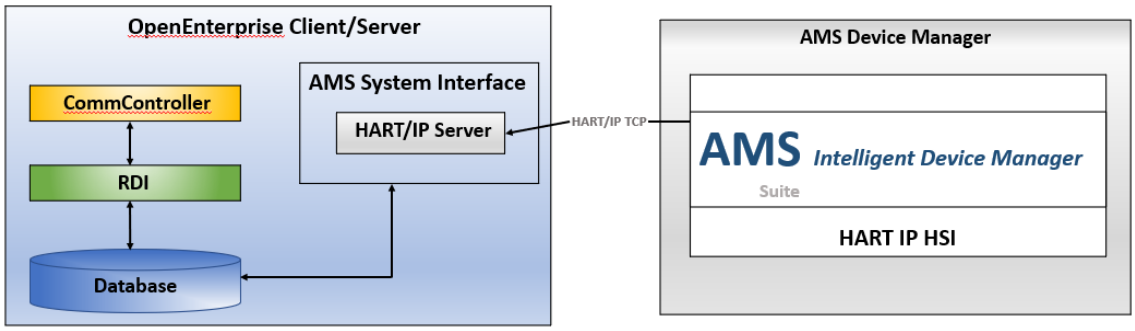
This chapter covers adding HART-compatible RTUs to OpenEnterprise, viewing HART devices, collecting HART parameters and monitoring HART communication status and device status. Topics covered in this chapter include:

- AMS HART Pass-Through components diagram
- Using OE Network Communications with HART devices
- Adding RTUs and viewing HART devices
- Viewing HART device information in OE
- Collecting wired HART status data
- Collecting *Wireless*HART status data
- Preparing the AMS Alert Monitor
- Reproducing *Wireless*HART alerts
- AMS HART Pass-Through session tasks

3.1 Components Diagram

The following diagram shows the components of the HART interface between OE and the AMS Device Manager.

Figure 3-1. OpenEnterprise Server & AMS Device Manager Interface



AMS Device Manager connects to the OE HART/IP Server.

The OE HART/IP server is responsible for:

- Forwarding AMS HART pass-through requests to HART devices attached to RTUs managed by OpenEnterprise.
- Providing AMS with RTU and HART device hierarchy.

3.2 Using OE Network Communications with HART Devices

OE communicates with an RTU or flows computer using either a direct serial connection or an IP network. When you add an RTU with HART devices the OE Server then builds the HART device hierarchy.

On the OE Server you can:

- Add RTUs with HART devices to the OE database. The OE Server then builds the HART device hierarchy.
- For ROC and FloBoss RTUs OE reads the device configuration response to see if the RTU device supports a HART interface before adding it to the hierarchy response.
- Define and control the RTUs and HART transmitters attached to them using RTU Tools.
- Collect data from wired HART and *Wireless*HART™ devices.

On the AMS Device Manager you can:

- Use the AMS Network Configuration utility to establish connectivity with the OE HART server.
- View the HART device hierarchy in the tree-view of AMS Device Explorer.
- Configure the AMS Alert Monitor to monitor OE alarms (alerts) for individual HART devices.
- Use the HART device context menus using the static HART device description information stored in the DD (Device Descriptor) files.

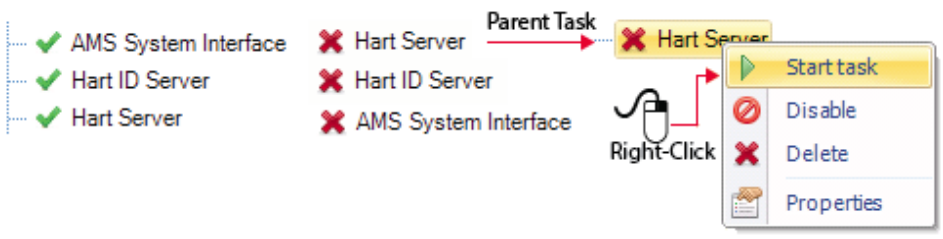
The HART device context menu options allow you to:

- Launch HART device windows and populate the static and dynamic device data after getting it from the OE HART server and update the device windows.
- Configure the HART devices using the tunneled HART pass-through.

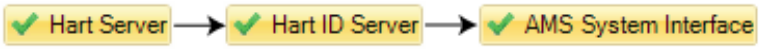
3.2.1 Before You Begin

Note
If you are upgrading from OE 3.2 to OE 3.3, you **must add** the three AMS HART Pass-Through tasks to the OE Session (refer to *Section 3.9*).

Ensure that the AMS HART Pass-Through tasks are running in the OE Container Sessions pane. Green indicates running tasks and red indicates stopped tasks.



The HART Server is the parent dependency for all the AMS HART Pass-Through tasks. Starting this task automatically starts the HART ID Server and AMS System Interface tasks in the following order:



- The AMS System Interface monitors the device status and communication status of each HART device.
- The HART Server is primarily for use with AMS Device Manager; it runs as an OE Session task, starts a TCP/IP server on a configurable port, and provides the pass-through to enable AMS to interact with the HART devices. The default port is **5094**.
- The HART ID Server handles the hierarchy rebuild.

Note

If you have upgraded from OE 3.2 to OE 3.3 you **must** add the above tasks to the OE Session. You also need to modify the **CommManager.config** file, located in the folder *C:\ ProgramData\Emerson OpenEnterprise\Application Data*.

Add the text **GetCmd48RespTimeout="21000"** (21 seconds) to the RasAmsGatewaySettings section at the end of this file. Without this entry OE defaults to using **6** seconds for the Command 48 response.

```
<RasAmsGatewaySettings HartTransport="Tcp" HartPort="5094"
IdentifyDevicesCmdTimeout="300"
GetCmd48RespTimeout="21000"/>
```

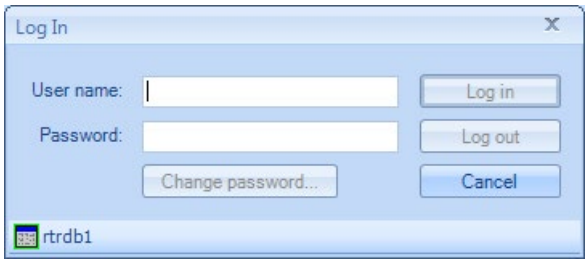
Restart the OE Session for changes to the CommManager.config file to take effect.

3.2.2 Starting OE

You can access the AMS HART Pass-Through components in the OpenEnterprise Container Network Communications and Sessions panes.

1. Start OE either from the desktop icon or click **Start > Programs > Emerson OpenEnterprise > OpenEnterprise.**
2. In the Log In the dialog enter your User name and Password and click **Log in**.

Figure 3-2. Log In Dialog



Note

The very first time you log in, use **SYSTEM** for the User name and leave the Password field blank. Once you've logged in with these defaults, OpenEnterprise prompts you to change your password.

3. The OE Container opens. *Figure 3-3* shows the Network Communications pane with RTUs already added.

Figure 3-3. OpenEnterprise Network Communications pane

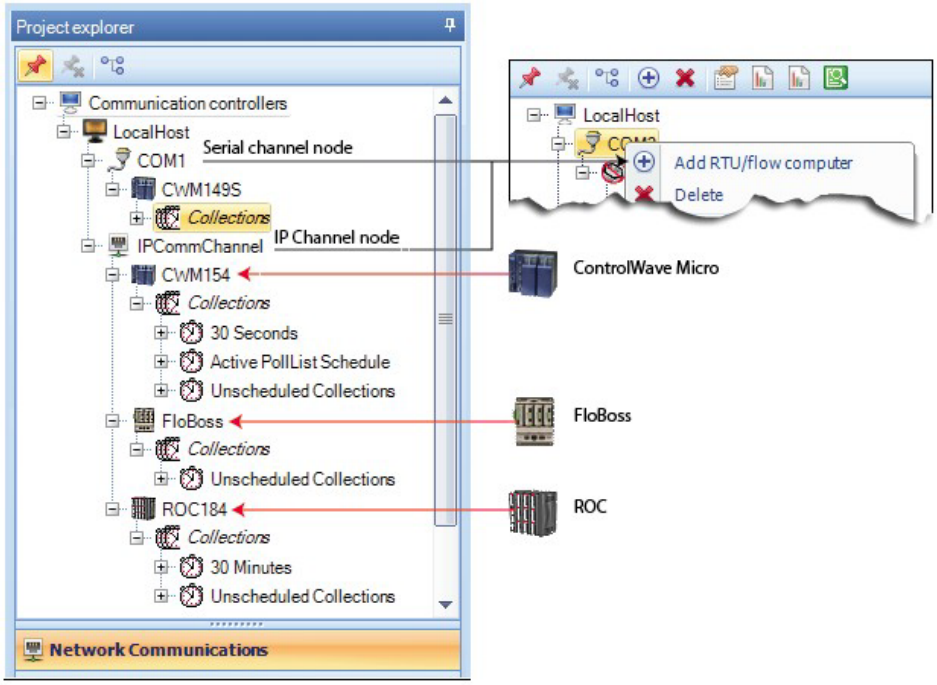
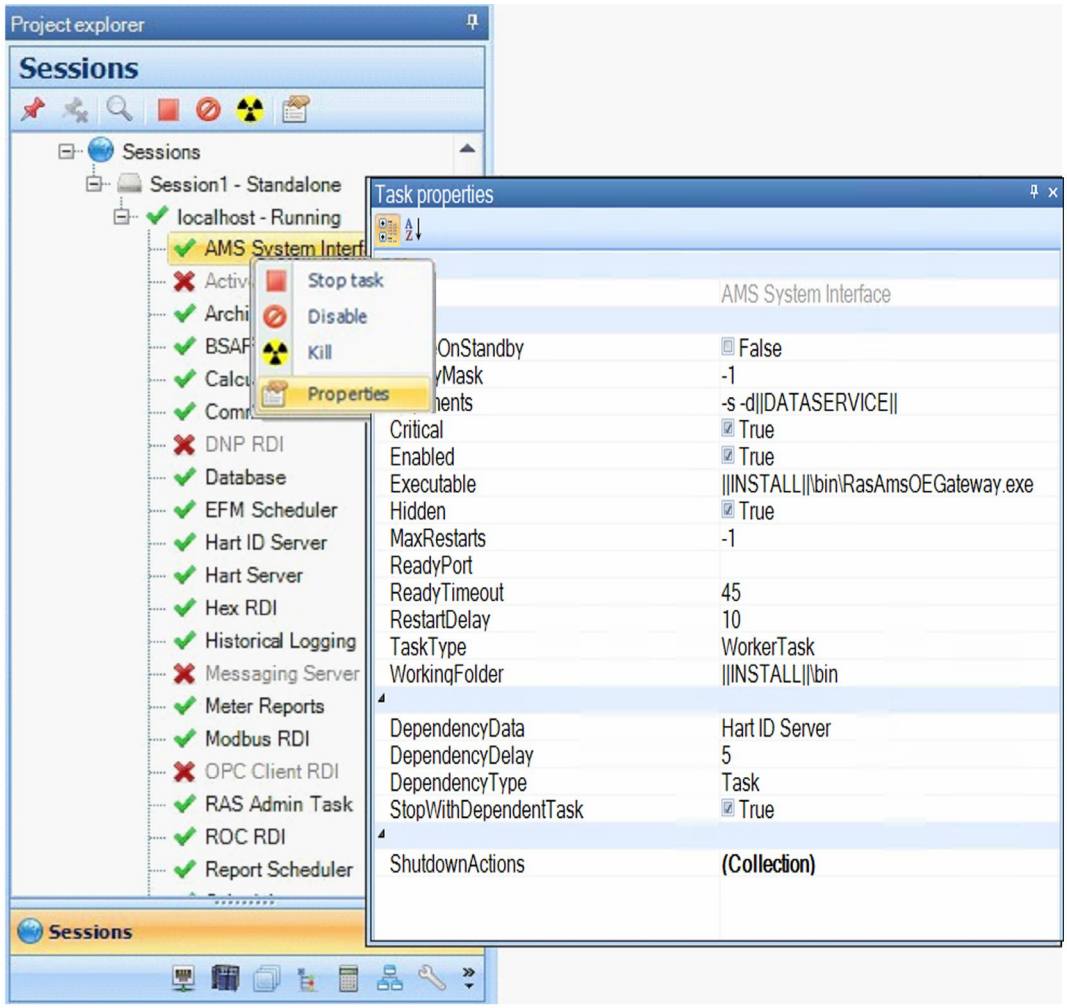


Figure 3-4. OpenEnterprise Sessions pane and AMS System Interface Task Properties pane



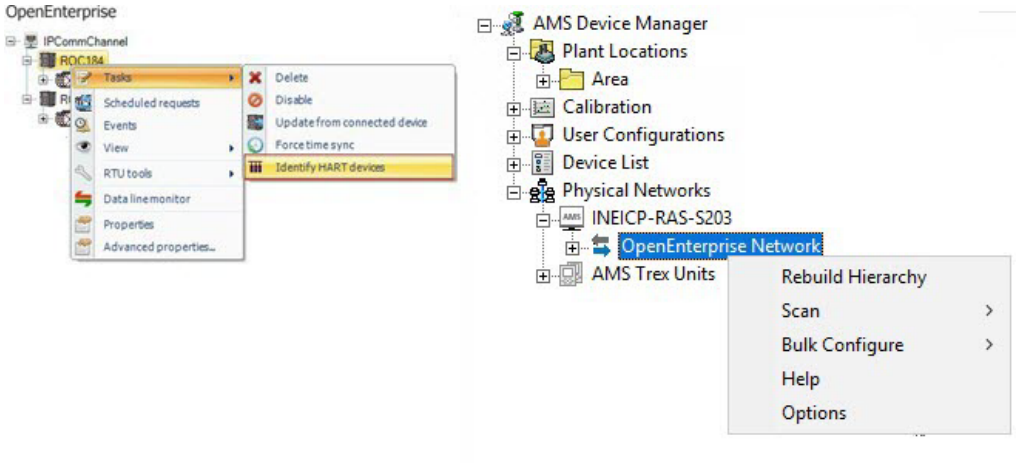
3.3 Adding RTUs and Viewing HART Devices

Add RTUs from the Network Communications pane using the **Add RTU/flow computer** option from either the Serial or IP Channel menu.

Note

When adding or removing HART devices from an RTU, select **Update from connected device** from the RTU/Task menu in OE, and then select **Identify HART devices**. Next, in AMS Device Manager, select **Rebuild Hierarchy** from the OE network node to reflect the change in the AMS hierarchy.

Figure 3-5. Identify HART Devices and Rebuild Hierarchy



3.3.1 About RTU Devices and HART Devices

AMS HART Pass-Through works with ROC800, FloBoss107, and ControlWave Micro (CWM) RTU devices that are configured for HART Pass-Through with either wired HART or *Wireless*HART.

ROC800	FloBoss107	ControlWave Micro
		

Note

The term *HART device* refers to a HART transmitter attached to an RTU (the OE HART alarm type "Device Added to OE" refers to the **RTU** device.)

Wired HART device	*Wireless*HART device	*Wireless*HART Adapter (THUM™) connected to wired HART device
		

OpenEnterprise supports the following numbers of HART devices:

Table 3-1. Supported HART Devices

Type	ROC800/ROC800L	FloBoss™ 107	ControlWave® Micro
Wired HART	**ROC800-Series HART-2 module** HART devices supported by HART module: Each module has 4 channels supporting either 4 devices in point-to-point configuration or 20 devices (5 per channel) in multi-drop configuration. The number of HART modules is limited only by the number of available slots and the power demand on the RTU which is affected by whether the HART devices are loop powered or directly powered.	**FloBoss 107 HART module** HART devices supported by HART module: Each module has 4 channels supporting either 4 devices in point-to-point configuration or 20 devices (5 per channel) in multi-drop configuration. Limited to 1 HART module.	**ControlWave Micro HART/BTI Interface module** Each module has 8 channels supporting either 8 devices in point-to- point configuration or 5 devices per channel in multidrop configuration. Limited to 2 HART modules.
*Wireless*HART	**ROC800-Series IEC 62591 interface** Up to 60 *Wireless*HART devices in the commissioned list	**FloBoss 107 IEC 62591 interface** Up to 20 *Wireless*HART devices in the commissioned list	**ControlWave Micro IEC 62591 interface** Up to 100 *Wireless*HART devices (based on load).

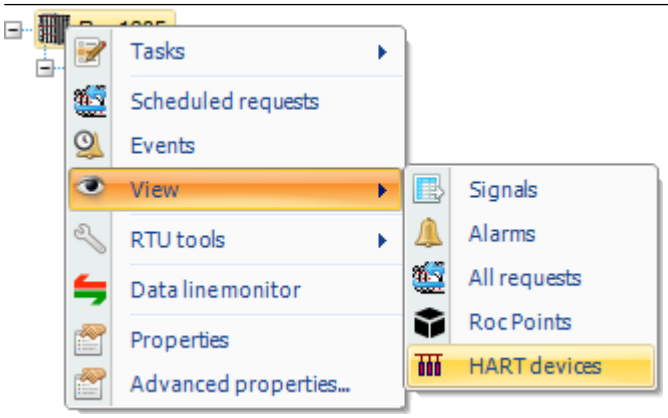
Note

Configure the RTUs and HART devices **before** you add them to OE. HART devices added to RTUs already defined to OE require an "**Update from connected device**" then "**Identify HART devices**" from the corresponding RTU Tasks menu in OE and a "**Rebuild Hierarchy**" from the AMS Device Manager OE Network menu.

Refer to the documentation for each RTU and HART module for information about the recommended firmware versions.

3.4 Viewing HART Device Information in OE

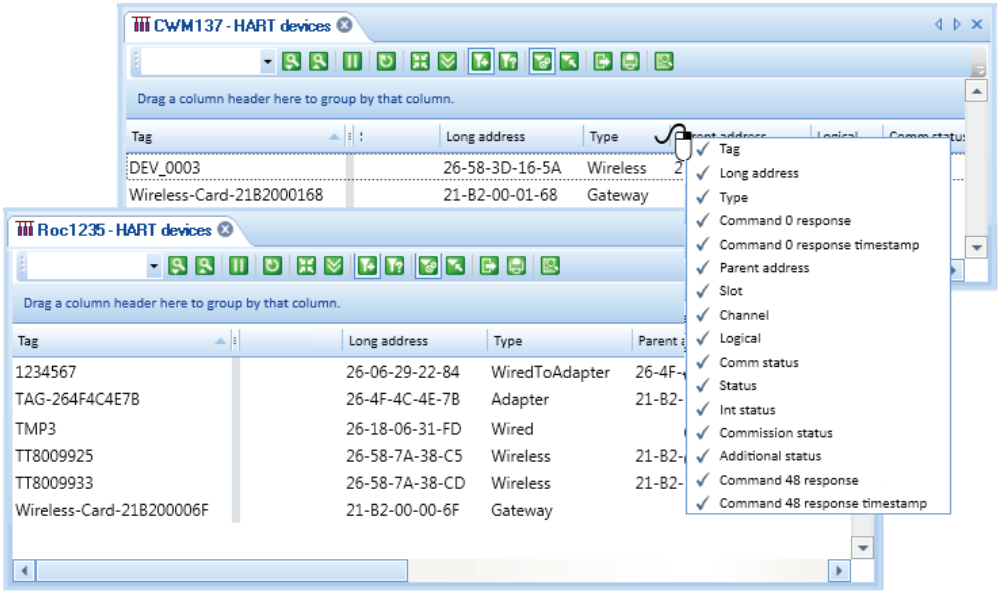
The RTU menu's **HART devices** option displays all the HART devices attached to that RTU. Right-click the RTU node in the Network Communications tree and select **View** > **HART devices** from the menu bar.



3.4.1 About the HART Devices View

This option shows a list containing detailed information for all the HART devices for the selected RTU device.

Figure 3-6. HART Devices View in OE Container



Right-click a column header to show an editable list of available column items. You can toggle show/hide status for each item.

Column Heading	Description
Tag	This is the Long Tag Name as set in the HART device and is the name used for the HART device.
Long address	This is the unique 38-bit number address of each device. Also used as the primary key for the hartdevices_table for a HART device.
Type	The type of HART device (Wired, Wireless, Gateway, Adapter, WiredToAdapter).
Command 0 response	Read Unique Identifier.

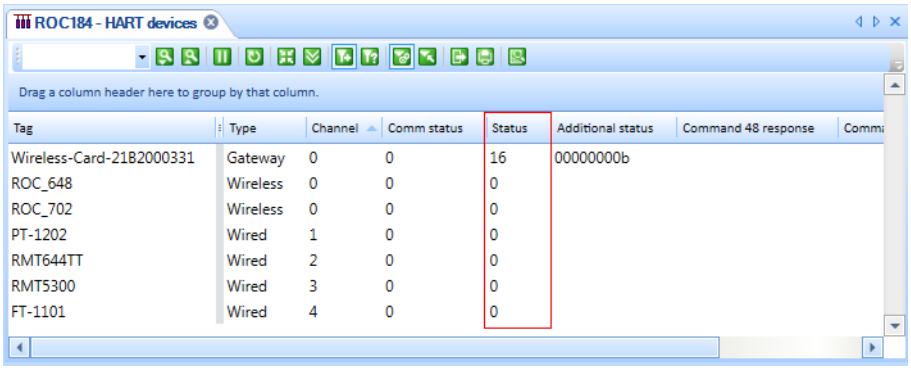
Column Heading	Description
	This is a data link layer management command. Returns the Expanded Device Type Code, Revision Levels, and Device Identification Number This provides the information necessary for AMS to determine which device the alert is for and whether it is present in the AMS Device Manager database.
Command 0 response timestamp	The time of the last attempted Command 0 read.
Parent address	The Long Address of the Wired or Wireless I/O HART card that a HART device sits under.
Slot	The physical slot in the RTU that a wired or Wireless I/O HART card occupies.
Channel	The Wired Channel under the Wired I/O card if present.
Logical	L = **Logical** number within the RTU TLP. **Type** (of point), **Logical** (or point) number, and **Parameter** number.
Comm status	Communication Status of the HART device.
Status	The current value for the HART device's status, the value will be either one or a sum of the values (see HART device status), for example 144 =128 + 16 (Device Malfunction and More Status Available).
Int status	Indicates the internal status flag of the HART device as seen on the host-side indicating whether device is responding to command requests: 1 = Communicating 2 = Commissioned (commissioned device connected to the *Wire- less*HART interface card). 4 = UpdateAddlStatus (flag when set is used as a trigger to update the HART device's additional status (command 48 response).
Commission status	HART device Commission status, possible values of this for a commissioned *Wireless*HART device in all RTU platforms. Commissioning process states: • Idle State. Idle = 0 • Configuring_burst_message = 1 • Configuring_burst_variables = 2 • Configuring_burst_rate = 3 • Enabling_bursting = 4 Commissioned states: (color as seen in ROCLINK IEC62591 Transmitter tab) • Commissioned states: Bursting (green) • Bursting = 5 • Commissioned states: Bursting (yellow) • Values_Stale = 6 • Commissioned states: Bursting (red) • Communication_failure = 7 Decommissioning Process State: • Disabling_bursting = 8 • Bursting_delayed_response = 9 The device commission status for the HART device is not available or not able to be read from the RTU. • NotAvailable = 255
Additional status	HART device additional status flags encoded as ASCII 1s and 0s.

Column Heading	Description
Command 48 response	Read Additional Transmitter Status. Returns transmitter status information not included in the response codes. This command also returns the results of the transmitter self test, Command #41. (Refer to the transmitter specific document for the information contained in each transmitter specific status byte). Response Code #8 (Warning: "Update in Progress", system returns whenever a response can be made and the status information is pending the completion of a command that requires a relatively long time to complete. Refer to the transmitter specific document for specific implementation details.)
Command 48 response timestamp	The time of the last attempted Command 48 read.

3.4.2 HART Device Status Values Explained

The current value for a HART field device's "Device Status" value is either 0 (zero) or a sum of the values in the following table (for example 144 = 128 [Device Malfunction] + 16 [More Status Available]).

Figure 3-7. HART Devices View: Status Column



Value	Meaning	Description
128	Device Malfunction	The device detected a serious error or failure that compromises device operation.
64	Configuration Changed	An operation was performed that changed the device's configuration.
32	Cold Start	A power failure or "Device Reset" has occurred.
16	More Status Available	More status information is available via Command 48, Read Additional Transmitter Status.
8	Loop Current Fixed (PV analog output fixed)	The loop current is being held at a fixed value and is not responding to process variations.
4	Loop Current Saturated (PV analog out- put saturated)	The loop current has reached its upper (or lower) endpoint limit and cannot increase (or decrease) any further.
2	Non-Primary Variable Out of Limits (Non PV out of limits)	A device variable not mapped to the PV is beyond its operating limits.

Value	Meaning	Description
1	Primary variable Out of Limits (PV out of limits)	The PV is beyond its operating limit.
	(AMS Alert Monitor text if different)	

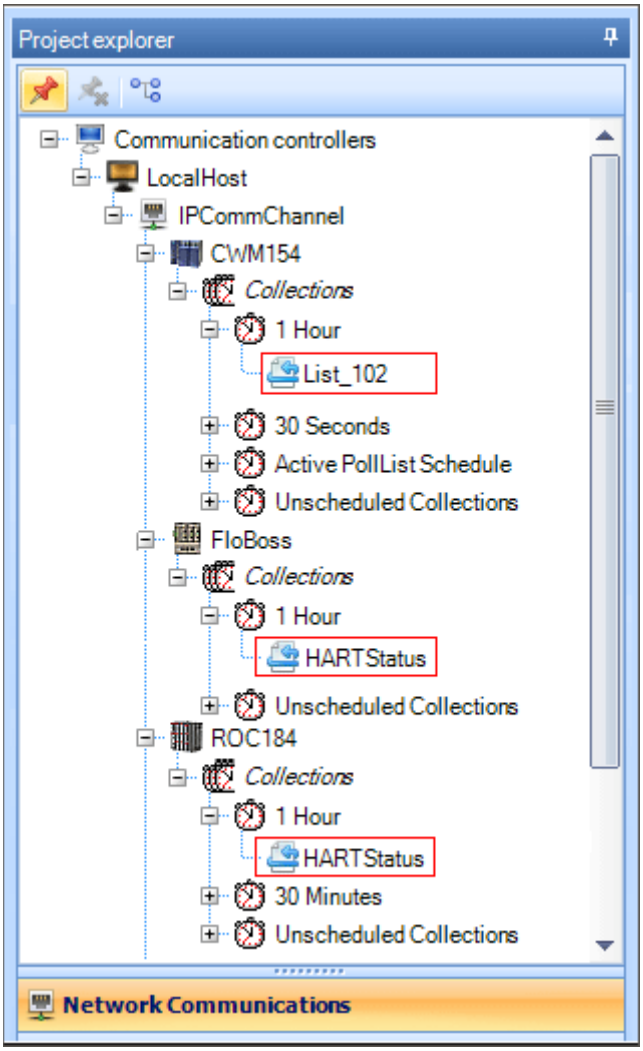
3.5 Collecting HART Status Data

The collections node under each RTU displays the data collection requests that have been configured for that device. The request types differ for each device type. Use requests to read HART device process and status variables and store them in signals in the OE database. This section covers the collection of HART status data and the Command 48 response.

For detailed information on collecting process variables, refer to the OE main help: from the Container help menu, select **Network Communications** > **AMS HART Pass-Through** > **Data Collection**.

From the **Network Communications** pane click **…**to expand an RTU node then click **…** to expand the **Collections** node.

Figure 3-8. OE RTU Devices and Collections



Collection request types differ for each device type. A status collection request should include the **Tag Name**, **Communication Status**, and **Device Status** HART device variables.

- **ControlWave Collections**
  Individual lists for each HART device containing above status signals need to be part of the ControlWave Micro's load. Additionally you must configure the **HartDevices.config** file in OE to match the signal naming format used in the ControlWave load.

- **ROC and FloBoss Collections**
  ROC and FloBoss HART collections require the above points (signals) to be identified and added to OE. A collection is then created manually. You can create a device template to simplify the process of adding a ROC/FloBoss where RTUs have similar configurations.

Note

You can associate collection requests with a Schedule for collection at set intervals of time, such as once every minute. One (1) minute is the recommended minimum interval for Command 48 Status requests. If a collection is **not** associated with a schedule it **remains** in the Unscheduled Collections node.

3.5.1 Adding Wired ROC or FloBoss Points (for Statuses) to OE

3.5.1.1 Adding Wired HART Status Points

To collect wired HART device status data you need to add the wired HART points to OE.

1. From the Network Communications pane, right-click a ROC or FloBoss RTU device node. A context menu displays; select **Advanced properties**.

Figure 3-9. ROC RTU Device Node menu: Advanced Properties

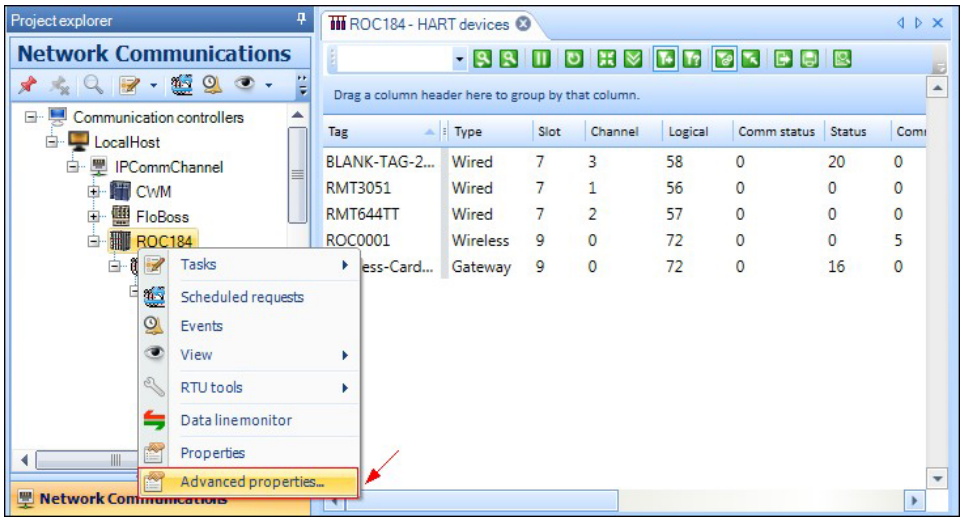
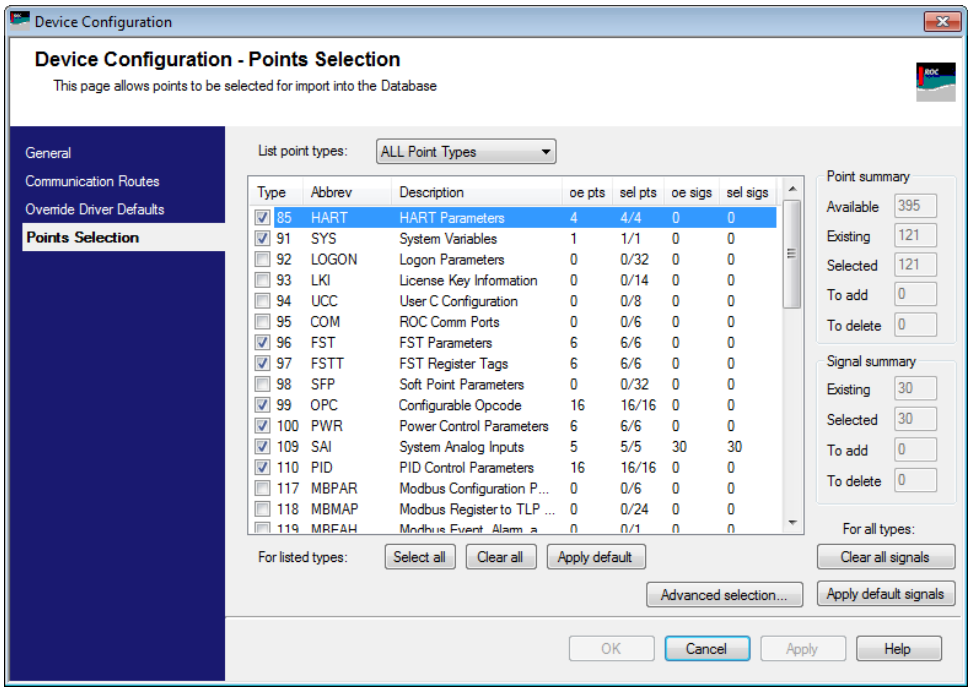


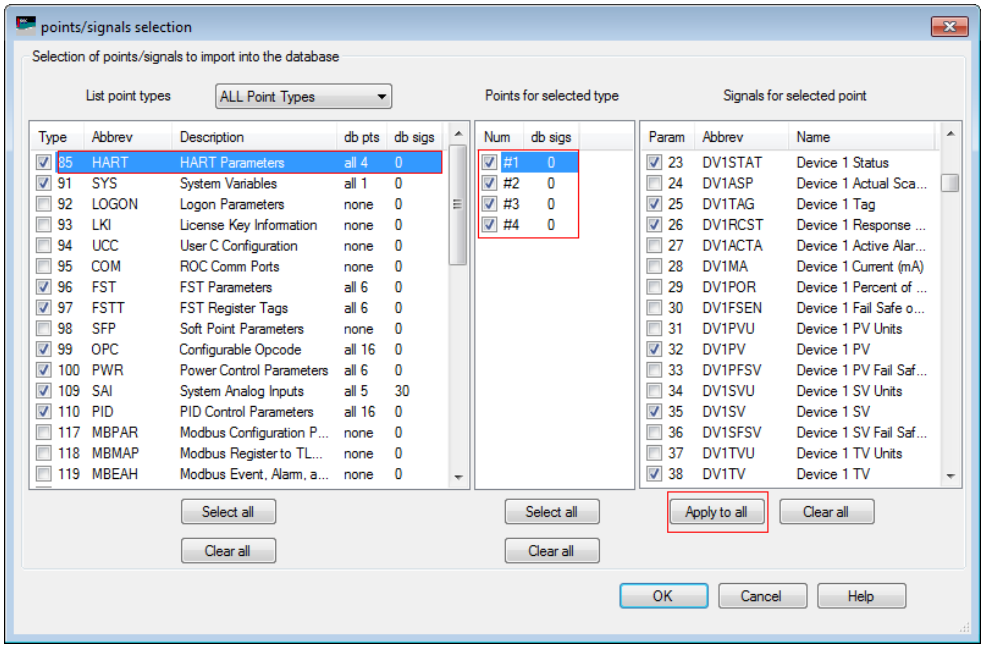
Figure 3-10. Device Configuration Wizard: Points Selection



2. In the Device Configuration wizard, select **Points Selection**.

3. Select **Type 85** and click **Advanced selection**.

Figure 3-11. Points/Signals Selection dialog



4. The **Points for selected type** column shows the list of points for the wired HART module. The **Signals for selected point** column shows the available signals for the selected point number.
5. Select the points (signals) to add to the OE database. You can click **Apply to all** to use the same select for all the points in the **Points for selected type** column. Refer to the following table for a list of the HART device information/status varables for ROC or FloBoss.
6. Click **OK**.

If the wired HART device is connected in point-to-point mode, use the DV1 values. If connected in multi-drop mode (where up to five HART devices can be connected per channel), use the relevant DV1, DV2, DV3, DV4, and DV5 values for the HART device.

Status Variables	Tag	Device Status	Communication Status
Description	PointTagId - Unique Point Identifier	Response Code Status Last fault status received	Communication Status of device
Param No. / Signal(At- tribute)	25 / DV1TAG	26 / DV1RCST	23 / DV1STAT

3.5.2 Collecting ROC or FloBoss Wired HART Statuses

3.5.2.1 Adding a Collection for Wired HART Status

To collect the wired HART device status values into OE you need to create a collection request.

1. From the **Network Communications** pane select the ROC/FloBoss RTU device Collections node then click **New data collection (general)**.

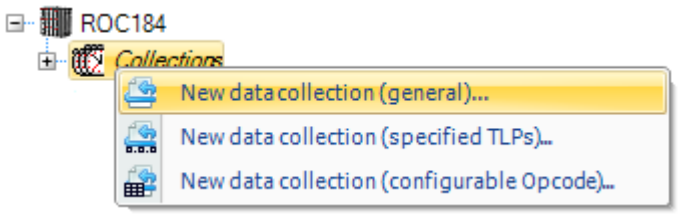
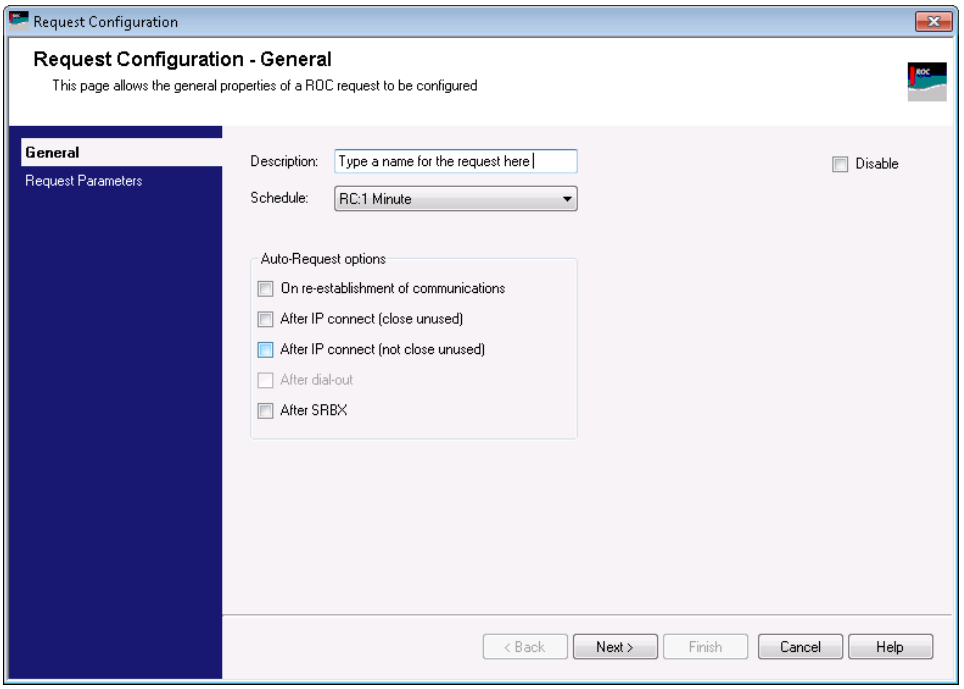
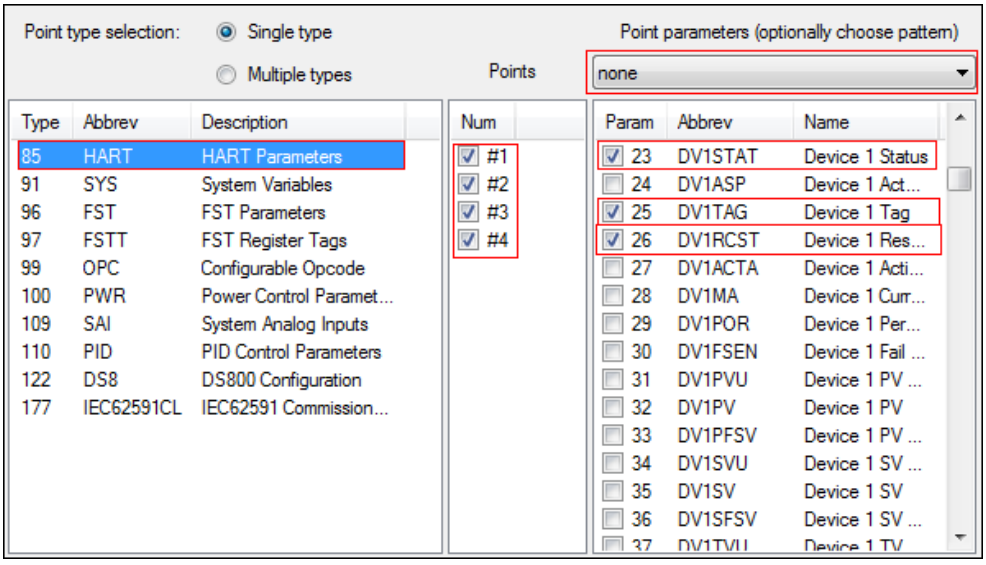


Figure 3-12. ROC Request Configuration Wizard



2. Enter a description for the collection request and either set a schedule for collection or leave it blank (you can configure this later). Click **Next**.

Figure 3-13. ROC Request Configuration Wizard – Parameters



3. Change the **Point parameters (optionally choose pattern)** to **none** using the drop-down menu.

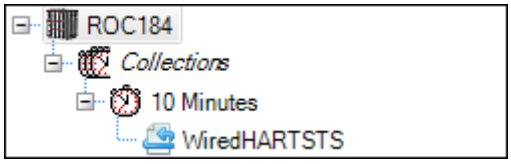
4. Select the points (signals) you want to add to the collection.

Note

The required variables for wired HART device status are Param/Abbrev: 26 / DVRCST (Device Status), 25 / DV1TAG (Tag Name), and 23 / DV1STAT (Communication Status). The **1** in the **Abbrev** column refers to the wired HART device's Logical position for the selected Point. If the wired HART device is connected in point-to-point mode, use the DV1 values. If the device is connected in multi-drop mode (where up to five HART devices can be connected per channel), use the relevant DV1, DV2, DV3, DV4, and DV5 values for the HART device.

5. Click **OK**.

Figure 3-14. Wired HART Status Collection Added to Device Collections Node



3.5.2.2 Viewing Wired HART Status Signals

Once you have added the wired HART status points to OE they can be displayed in a Signal view.

1. From the Network Communications page, right-click the ROC/FloBoss RTU node and then select **View** > **Signals**.

Figure 3-15. Wired HART Status Collection Added to Device Collections Node

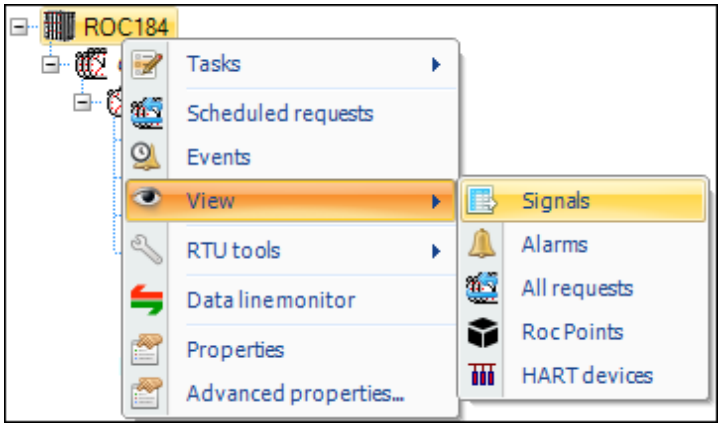
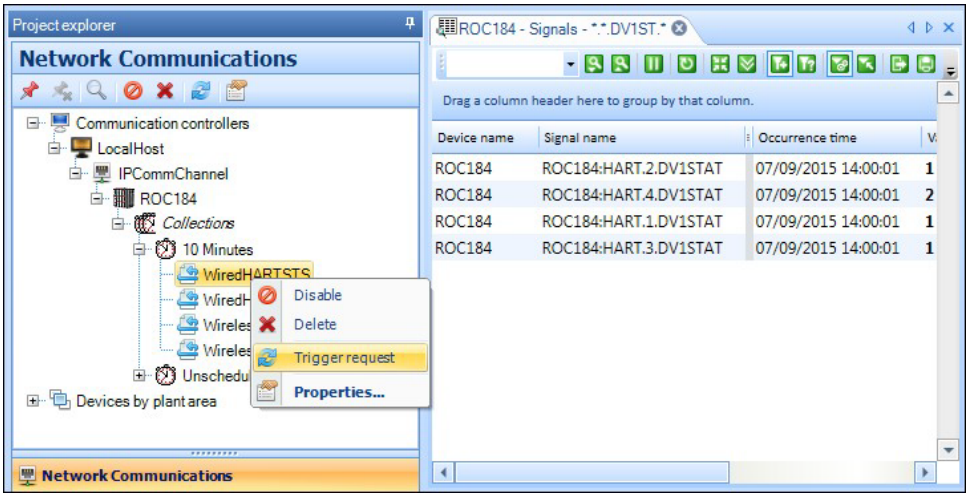


Figure 3-16. Signal Filter dialog

2. Enter **STAT** (Communication Status) or **RCST** (Device Status) in the Attribute field and click **Show signals**.

Figure 3-17. ROC/FloBoss RTU Device Collection and Wired Device Status Signals



3. Right-click the wired HART status request from the ROC/FloBoss RTU Collections node and select **Trigger request**. The system updates the signal values in the signals view.

3.5.3 Adding Wireless ROC or FloBoss Points (for Statuses) to OE

3.5.3.1 Adding Wireless HART Status Points

To collect wireless HART device status data you need to add the wireless HART points to OE.

1. From the Network Communications pane, right-click a ROC or FloBoss RTU device node. A context menu displays; select **Advanced properties**.

Figure 3-18. ROC RTU Device Node menu: Advanced Properties

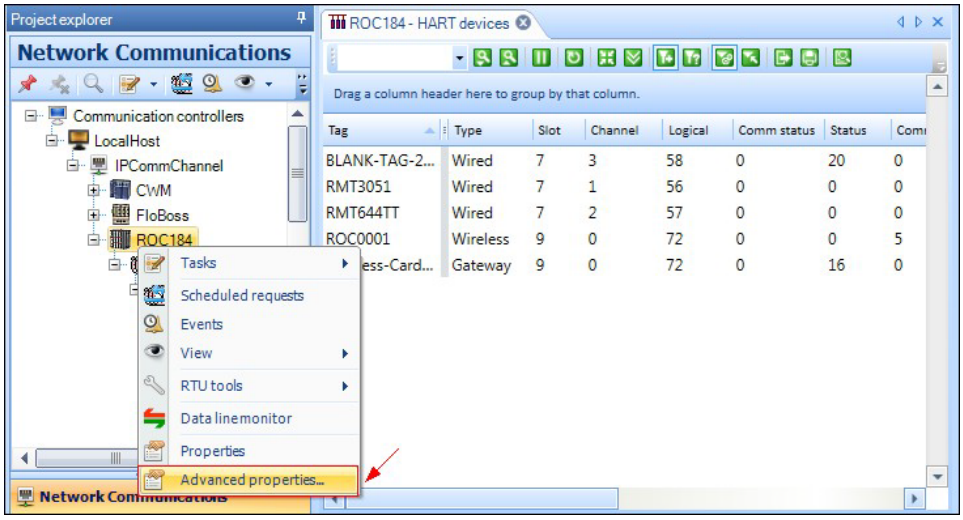
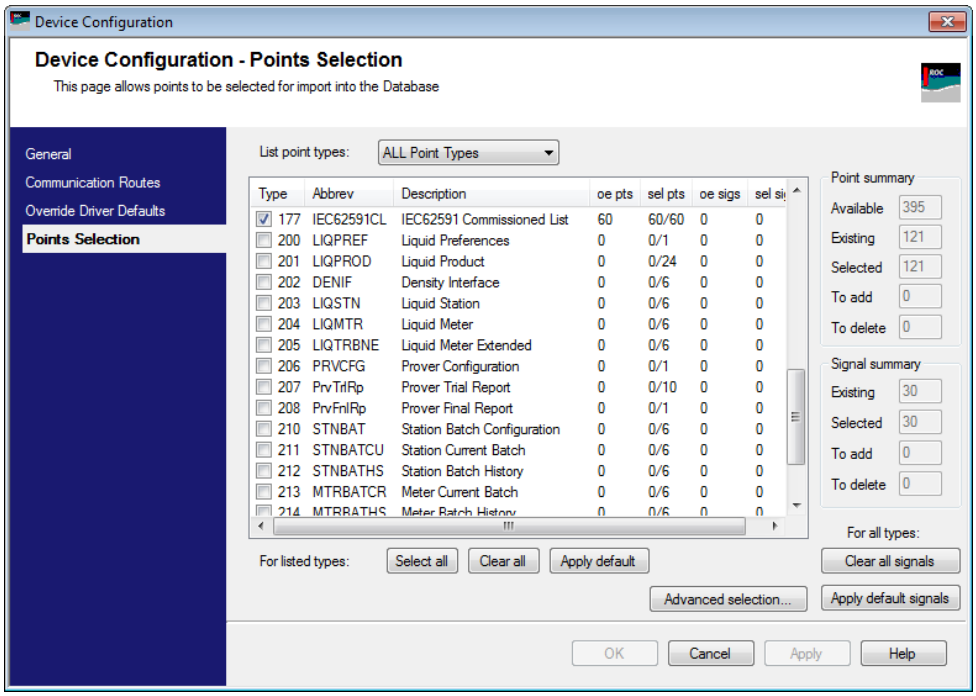
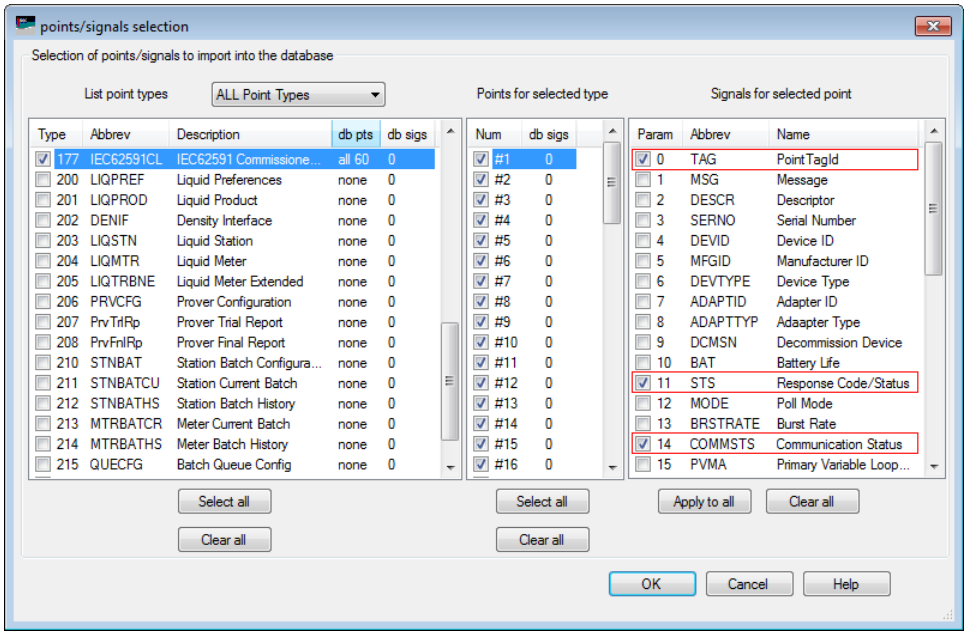


Figure 3-19. Device Configuration Wizard: Points Selection



2. In the Device Configuration wizard, select **Points Selection**.
3. Select **Type 177** and click **Advanced selection**.

Figure 3-20. Points/Signals Selection dialog



4. The **Points for selected type** column shows the list of points for the wireless HART module. The **Signals for selected point** column shows the available signals for the selected point number.

5. Select the points (signals) to add to the OE database. You can click **Apply to all** to use the same select for all the points in the **Points for selected type** column. Refer to the following table for a list of the HART device information/status varables for ROC or FloBoss.

6. Click **OK**.

To collect the signal data and monitor the *Wireless*HART Device Status and Communication Status you need to add the following *Wireless*HART points to OE.

Status Variables	Tag	Device Status	Communication Status
Description	PointTagId - Unique Point Identifier	Response Code Status Last fault status received	Communication Status of device
Param No. / Signal(At- tribute)	0 /TAG	11 / STS	14 / COMMSTS

3.5.4 Collecting ROC or FloBoss Wireless HART Statuses

3.5.4.1 Adding a Collection for Wireless HART Status

To collect the wireless HART device status values into OE you need to create a collection request.

1. From the **Network Communications** pane select the ROC/FloBoss RTU device Collections node then click **New data collection (general)**.

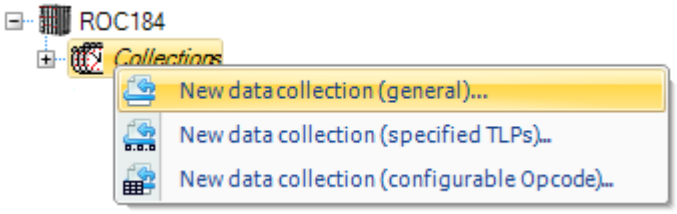
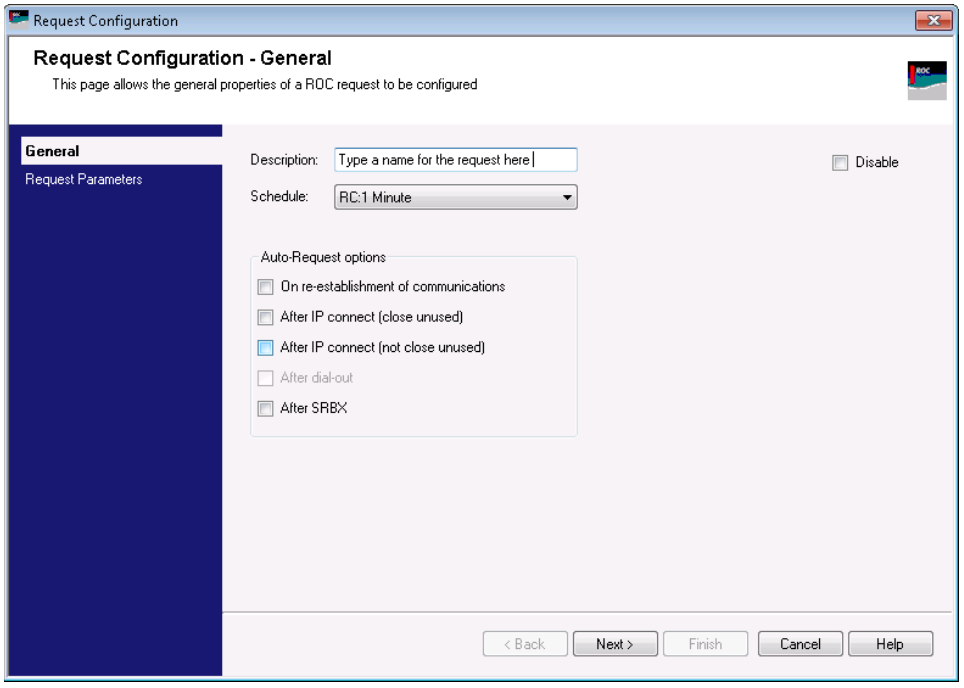
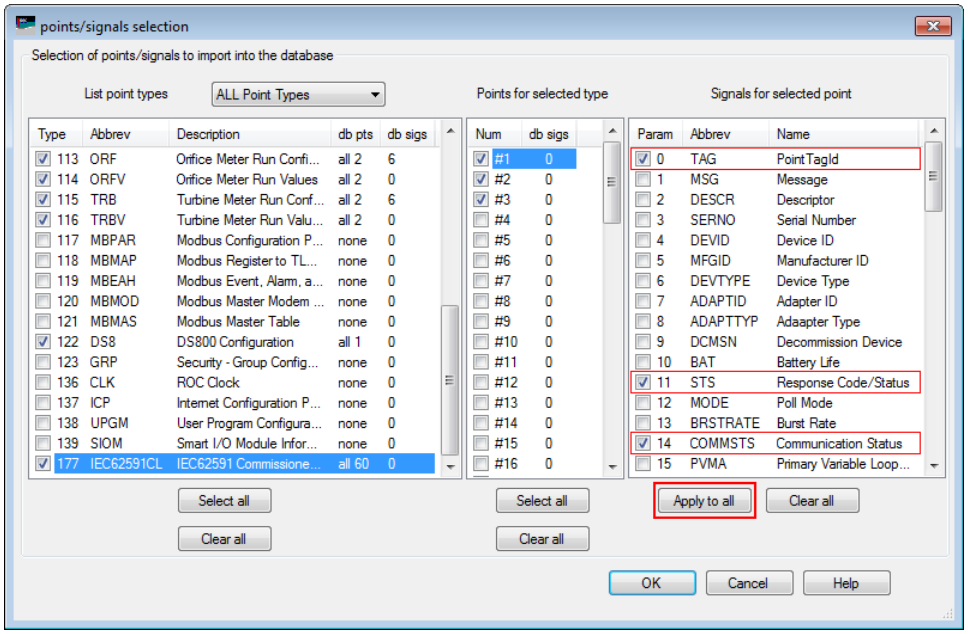


Figure 3-21. ROC Request Configuration Wizard



2. Enter a description for the collection request and either set a schedule for collection or leave it blank (you can configure this later). Click **Next**.

Figure 3-22. ROC Request Configuration Wizard – Parameters



3. Change the **Point parameters (optionally choose pattern)** to **none** using the drop-down menu.
4. Select the status points (signals) to add to the collection.

Note

The required variables for *Wireless*HART device status are Param/Abbrev: 11 / STS (Device Status), 0 / TAG (Tag Name), and 14 / COMMSTS (Communication Status).

5. Click **OK**.

3.5.4.2 Viewing Wireless HART Status Signals

Once you have added the wireless HART status points to OE they can be displayed in a Signal view.

1. From the Network Communications page, right-click the ROC/FloBoss RTU node and then select **View** > **Signals**.

Figure 3-23. Wireless HART Status Collection Added to Device Collections Node

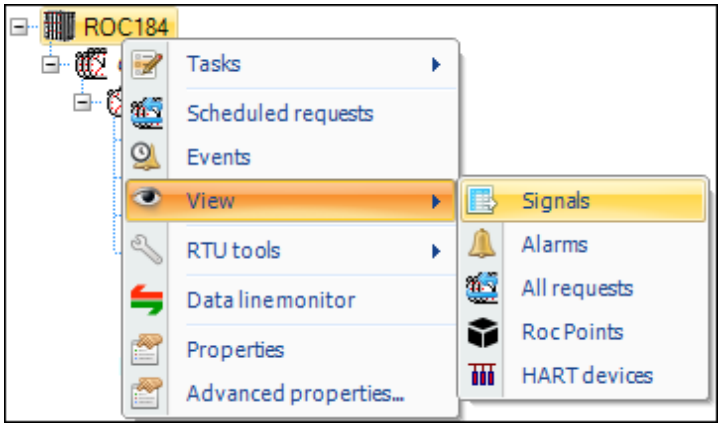
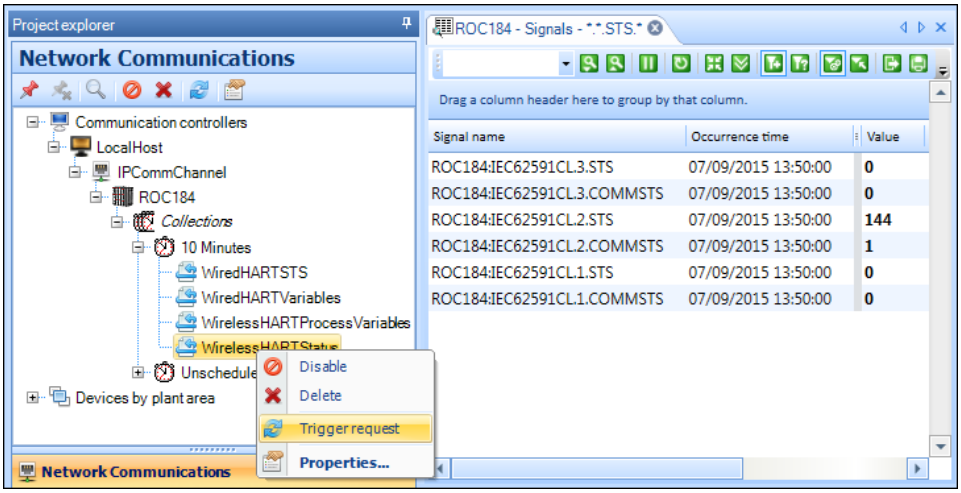


Figure 3-24. Signal Filter dialog

2. Enter **STS** in the Attribute field and click **Show signals** (this displays the Communication Status and Device Status).

Figure 3-25. ROC/FloBoss RTU Device Collection and Wireless Device Status Signals



3. Right-click the wireless HART status request from the ROC/FloBoss RTU Collections node and select **Trigger request**. The system updates the signal values in the signals view.

3.5.5 Collecting ControlWave HART Status Signals

3.5.5.1 Collecting HART Status using Lists

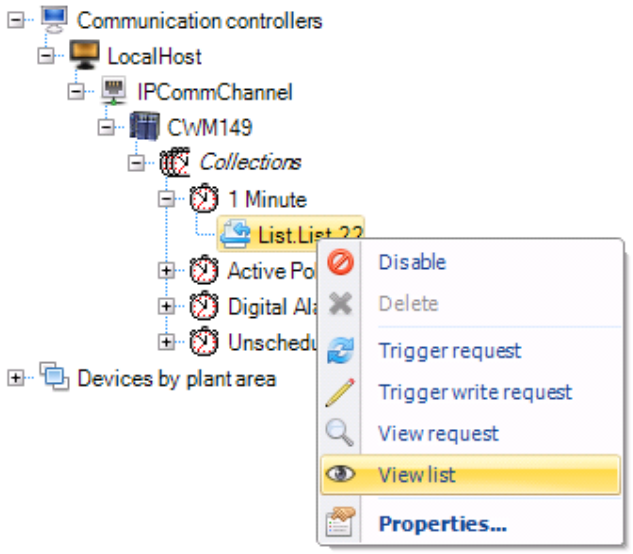
To collect HART status values from HART devices on a ControlWave Micro into OE you need to establish what the status signal names are in the RTU and whether any collections (lists) have been created to request the signal values.

Notes

- Configure the status signal name format in the HartDevices.config file in OE. For more information see the *HartDevices.config File* online help topic.
- If a list has been created for the HART device status signals, lists with the device **tag name** should be triggered first or be under the same schedule as the **device status** and **communication status** signals, or the **tag name**, **device status**, and **communication status** signals should be in the same list. If OE requests the status signals before requesting the tag name no alert is generated because the AMS System Interface task does not know the tag name to watch.
- Set the schedule applied to the status list to at least 1 minute.

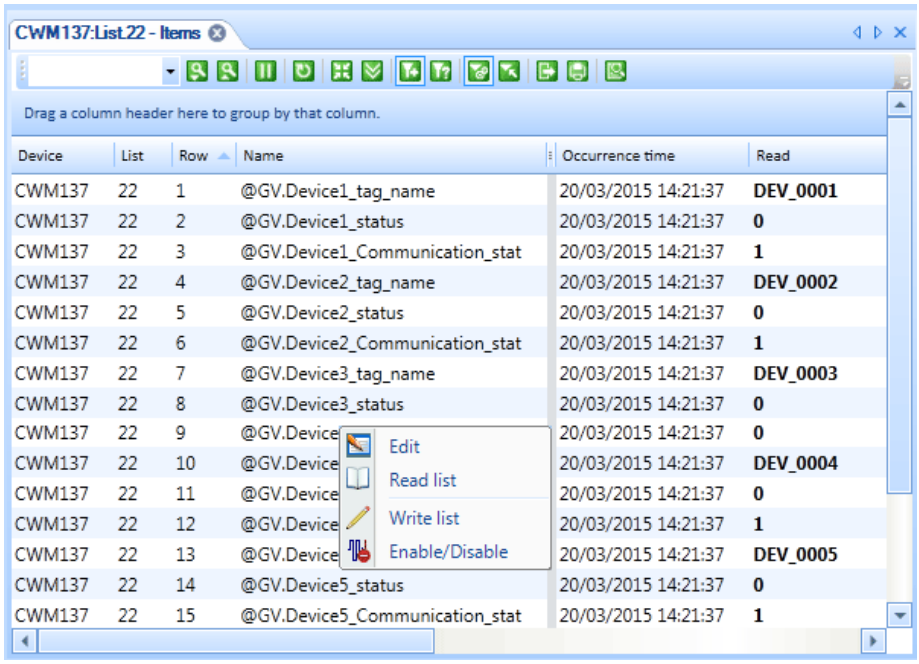
1. From the **Network Communications** pane, right-click the ControlWave Micro RTU Collections node and select **View list**.

Figure 3-26. ControlWave Collection List Menu



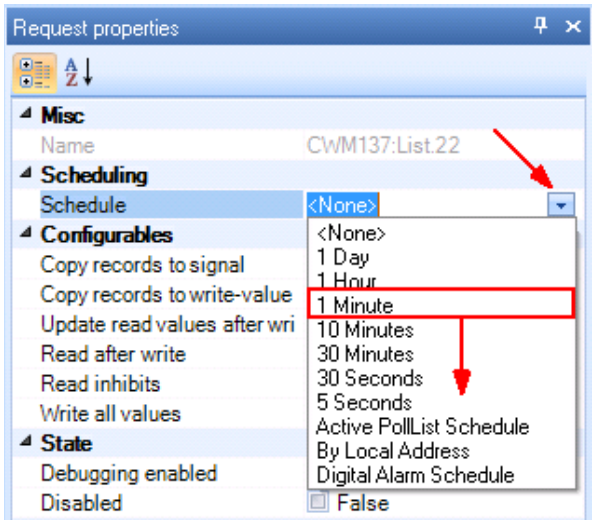
2. Right-click the list view to display a context menu. Select **Read list** to get the latest status values from the HART devices.

Figure 3-27. ControlWave Collection List Menu



3. From the Network Communications pane, right-click a ControlWave Micro RTU Collections node, and then select **Properties**.

Figure 3-28. List Properties pane



4. The Request properties pane opens. Use the drop-down to set the Schedule to a time interval of 1 minute (or higher).

3.5.5.2 HART Devices Configuration File for ControlWave

For OE to collect HART Status values from a ControlWave Micro you need to ensure the signal naming convention in the ControlWave Designer load matches the signal naming convention in the HartDevices.config file. The AMS System Interface Sessions task uses the HartDevices.config file to generate alarms.

Figure 3-29. Example HartDevice.config File

```
<HARTConfiguration>
<HARTStatusNamingConvention>
<PrefixStatus>@GV.Device_Status_</PrefixStatus>
<SuffixStatus></SuffixStatus>
<PrefixComm>@GV.Device_Comm_Status</PrefixComm>
<SuffixComm></SuffixComm>
<PrefixTagName>@GV.Tagname_</PrefixTagName>
<SuffixTagName></SuffixTagName>
</HARTStatusNamingConvention>
<HARTCmd48ClearMSARetries>6</HARTCmd48ClearMSARetries>
</HARTConfiguration>
```

The HartDevices.config file is in the directory *C:\ProgramData\Emerson \OpenEnterprise\Application Data*. This file has two purposes:

1. ControlWave RTUs are highly configurable regarding the naming convention of signals. For the **AMS System Interface** task to determine which device status and communication status signals to listen for, it reads the **HartDevices.config** file to establish the prefixes and suffixes of the signal's name. Based on these prefixes and suffixes, the Interface knows to filter and monitor only the signals which match this configuration.

   Note
   The AMS System Interface task doesn't support multiple naming conventions. You cannot have multiple prefixes for the same signal.

   The instance number of the signals should be between prefix and suffix of the signal name, such that:

   ```
   <PrefixTagName>@GV.Tagname_</PrefixTagName>    < SuffixTagName
   ></ SuffixTagName >
   ```

   works with the following format:

cw:@GV.Tagname_10	10/23/2015 2:47:01 PM	**Fisher_4320**
cw:@GV.Tagname_11	10/23/2015 2:47:01 PM	**Thum_3051**
cw:@GV.Tagname_12	10/23/2015 2:47:01 PM	**RSMT_248**
cw:@GV.Tagname_13	10/23/2015 2:47:01 PM	**RSM_648**
cw:@GV.Tagname_14	10/23/2015 2:47:01 PM	**RSMT_3051WL**

2. The AMS System Interface task creates HART device status alerts by sending Command 48 messages to the IEC Module. Based on what is received, the alert is created, updated, or cleared. To prevent an infinite loop on sending Command 48 messages, the HartDevices.config file has a node (HARTCmd48ClearMSARetries) which limits the number of retries (the default setting is 6 retries).

Note
If the HARTDevices.config file is modified when the AMS System Interface task is running you must restart the task for the modifications to take effect.

3.6 Triggering a Command 48 Response

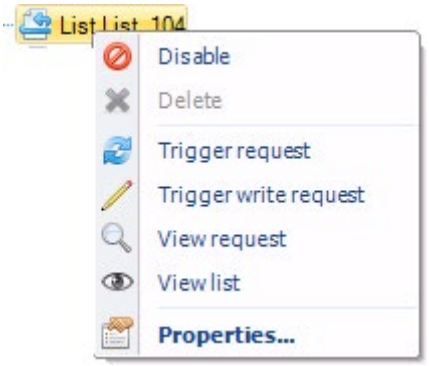
Each HART device should have a corresponding Collection request (or, for ControlWave, a list) containing the three HART status variables: Tag Name, Communication Status, and Device Status.

Figure 3-30. ControlWave List for device DEV_0004 showing status signals

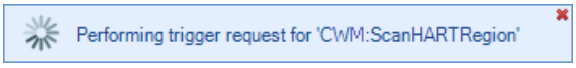
Device	List	Row	Signal name	Occurrence time	Read
CWM149	104	1	T1.DEVDATA_4.TagName	28/04/2016 12:45:58	**DEV_0004**
CWM149	104	2	T1.DEVDATA_4.Active	28/04/2016 12:45:58	**0**
CWM149	104	3	T1.DEVDATA_4.PV	28/04/2016 12:45:58	**0**
CWM149	104	4	T1.DEVDATA_4.SV	28/04/2016 12:45:58	**0**
CWM149	104	5	T1.DEVDATA_4.TV	28/04/2016 12:45:58	**22.5**
CWM149	104	6	T1.DEVDATA_4.QV	28/04/2016 12:45:58	**8.9959**
CWM149	104	7	T1.DEVDATA_4.DevCommishSta...	28/04/2016 12:45:58	**5**
CWM149	104	24	T1.DEVDATA_4.DeviceStatus	28/04/2016 12:45:58	**0**

If the More Status Available (MSA) bit is set in the Device Status variable, OE initiates a Command 48 response.

Note
Do not use a schedule of less than one minute for this request.



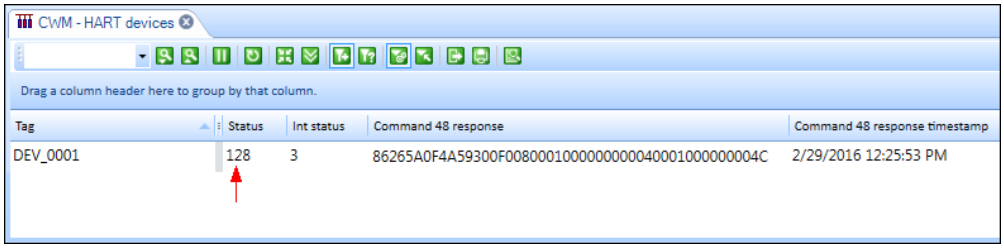
The Command 48 response cycles through the request process for each *Wireless*HART device.



OE displays the successfully completed message.

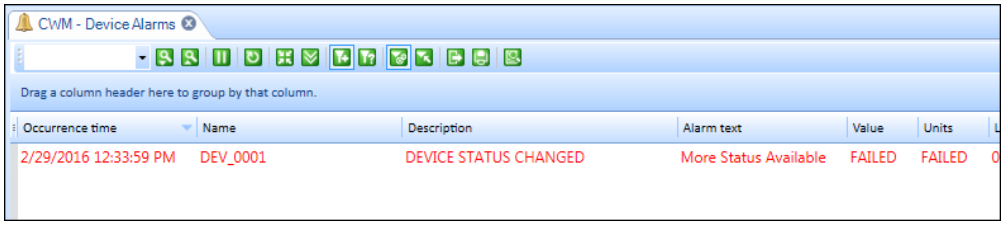
OE updates the status value, which you can review in the HART devices view's Status column:

Figure 3-31. HART Devices View – Status column



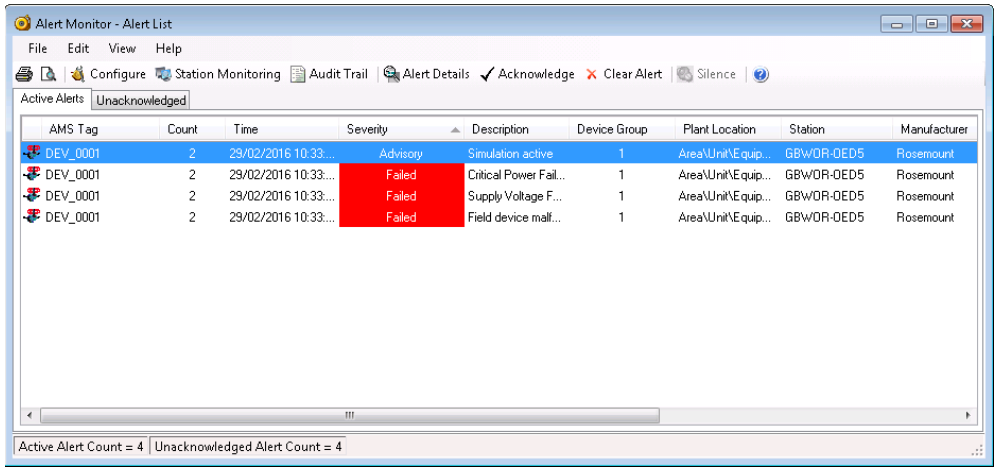
This creates an alarm in OE if the HART device's status value is higher than 16 (meaning the More Status Available bit is set). The initial value in *Figure 3-31* was 144 (the sum of 16 "More Status Available" plus 128 "Device Malfunction"). The Command 48 response updated the value in OE to 128. See the **HART Device Status** online help topic for more information on HART device status values.

Figure 3-32. RTU Alarms view showing DEVICE STATUS CHANGED Alarm



Note the **Alarm text (**More Status Available) and the **Value (**FAILED). OE propagates the alert in the AMS Alert Monitor with detailed alerts which vary for each HART device based on the information in the HART device's Device Descriptor (DD).

Figure 3-33. AMS Device Manager – Alert Monitor



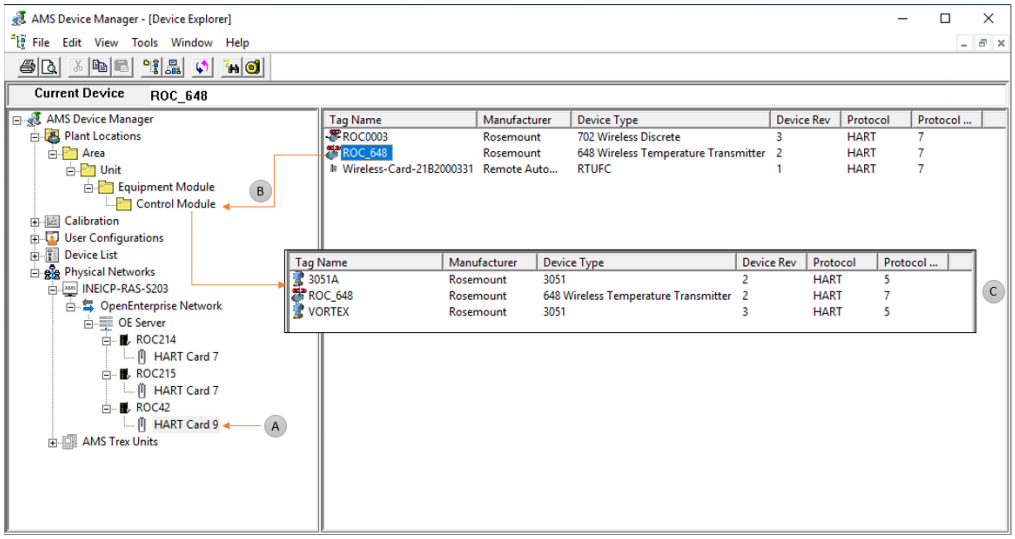
Note

To enable AMS Device Manager to received alerts for a HART device, you must add the device to the Control Module and the Alert Monitor. See *Preparing the AMS Alert Monitor* online help topic.

3.7 Preparing the AMS Alert Monitor

To enable AMS Device Manager to receive alerts for a HART device, you need to add the device to the Control Module and configure it in the Alert Monitor.

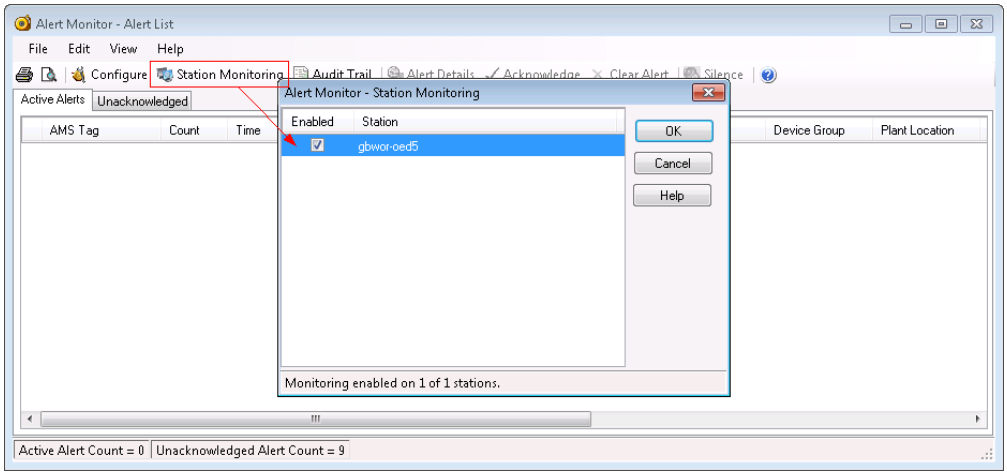
Figure 3-34. Adding a HART Device to the Control Module in AMS Device Manager



1. Select the node (**A**) under the RTU in the AMS Device Manager – OE network tree that has the HART device(s) to monitor.
2. Expand the AMS Device Manager - Plant Locations node (**B**) to show the Control Module folder, then select the HART device form the window on the right and drag it into the Control Module.

   Do this for **each** HART device in the network that you want to monitor.
3. Select the Control Module folder (**C**) to show all the HART devices available to add to the Alert Monitor.

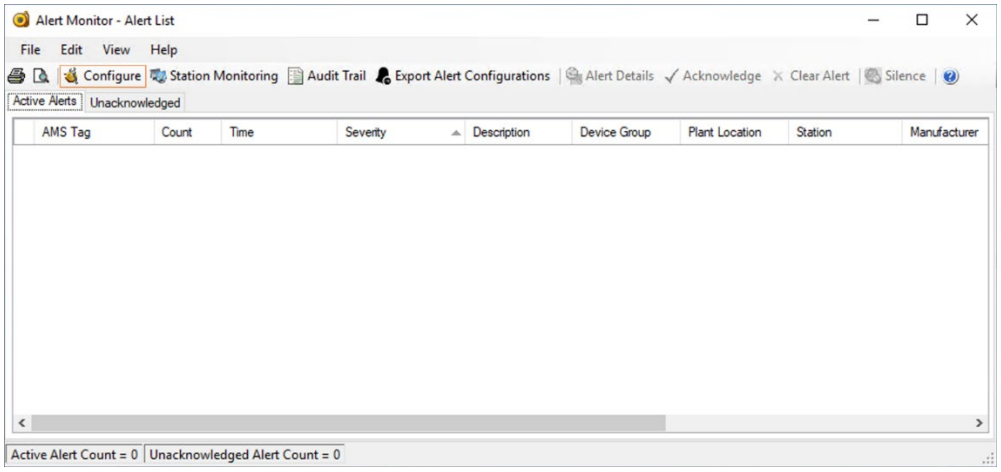
Figure 3-35. Station Monitoring Enabled



Next, enable Station Monitoring from the Alert Monitor so AMS can poll OE for HART device alerts.

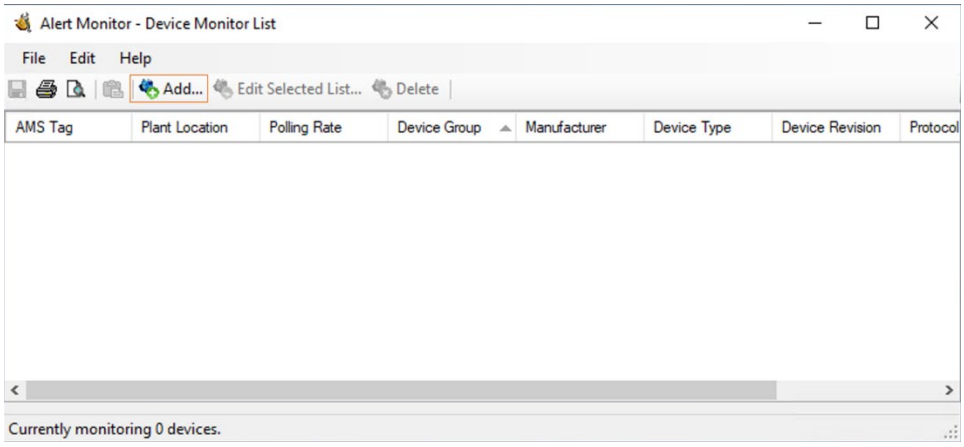
1. Select **Alert Monitor** from the AMS Device Manager's View menu. When the Alert Monitor opens, click **Configure** from the Alert List menu.

Figure 3-36. Alert Monitor – Alert List



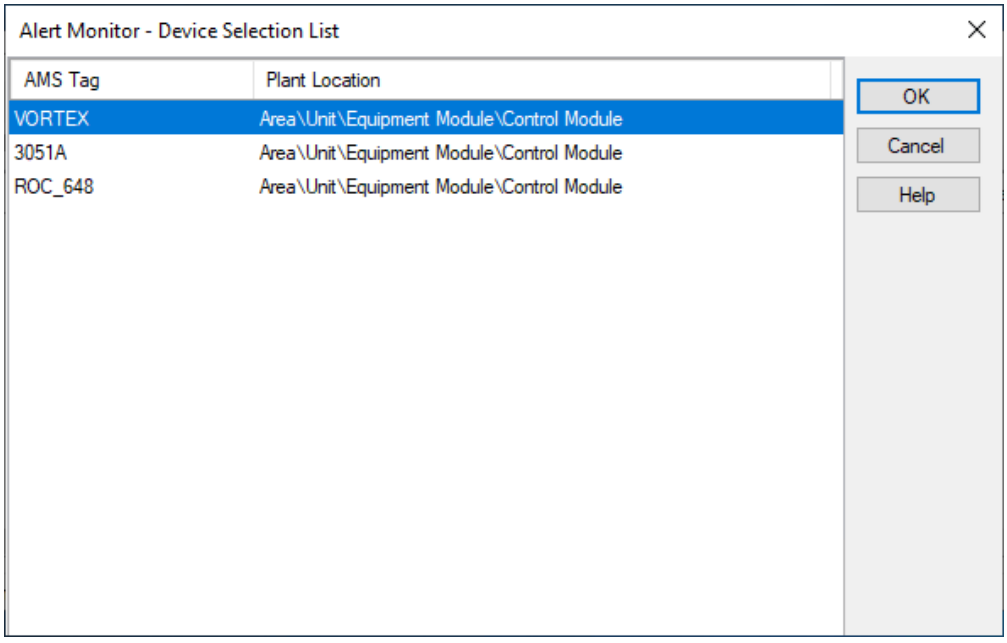
2. When the Device Monitor List opens, click **Add**.

Figure 3-37. Alert Monitor – Device Monitor List



3. When the Device Selection List opens, select the HART device(s) to add to the Alert Monitor list and click **OK**.

Figure 3-38. Alert Monitor – Device Selection List



4. For each HART device, select it and then click Edit Selected List to open the Device Monitor Configuration dialog. Use this dialog to adjust the Polling Rate to 1 minute for testing purposes. Click **OK**.

Figure 3-39. Edit Selected List button

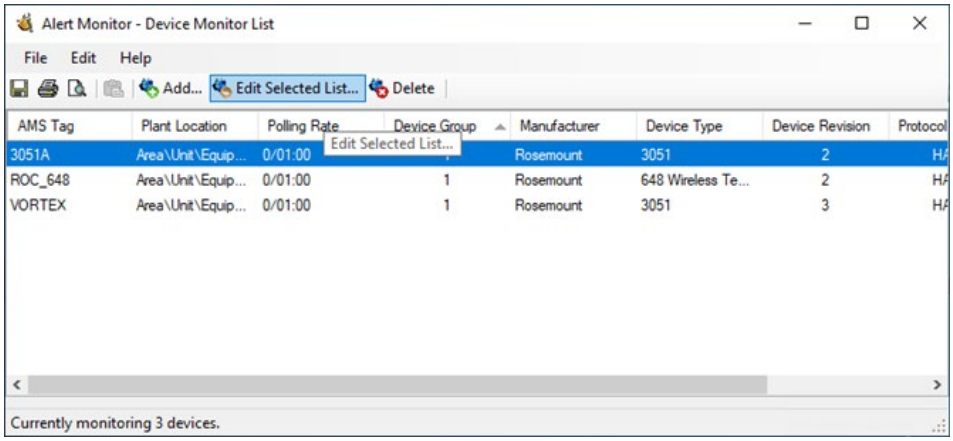
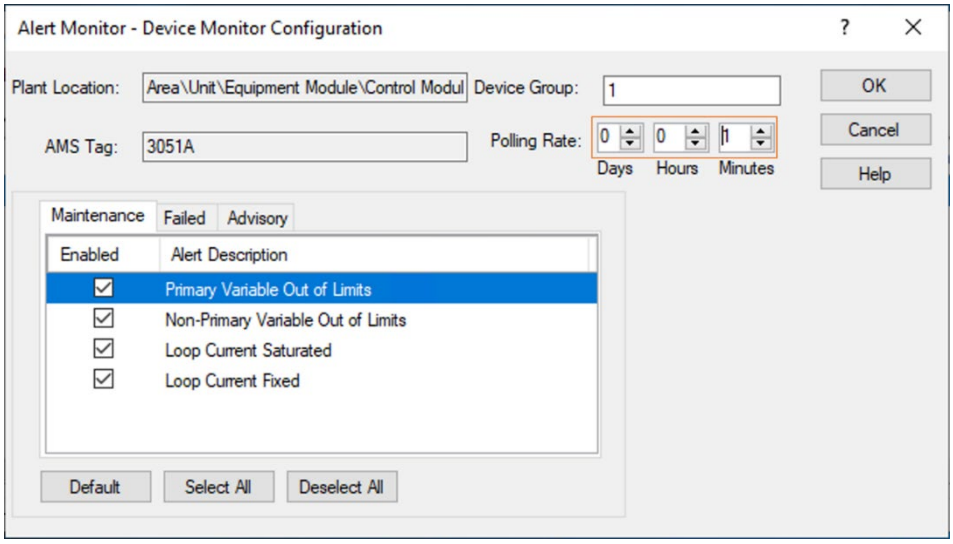
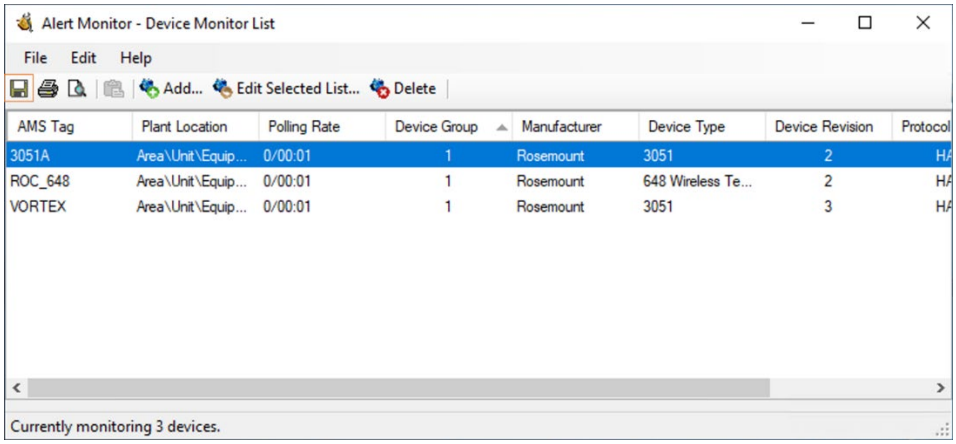


Figure 3-40. Adjusted Polling Rate – click OK



5. Click **Save** and close the Device Monitor List.

Figure 3-41. Device Monitor List – Save button



Any alerts generated in monitored HART devices will be collected by AMS Device Manager as per the configured polling rate.

3.8 Reproducing *Wireless*HART Alerts (Example)

This section provides an example of how to use a HART device's simulation functionality to test the OE and AMS integration setup.

Wired HART and *Wireless*HART transmitters vary widely in their functionality. Many have the ability to simulate values for test purposes. The example in this section uses a *Wireless*HART Rosemount 702 Discrete Transmitter, and assumes that you have added the RTU with the HART device to OE and performed a Rebuild Hierachy for the AMS Device Manager OE network.

Ensure the AMS Device Manager server has been set up to monitor alerts for the HART device (see *Preparing the AMS Alert Monitor*). Ensure also that the HART device being used to simulate a value

is not currently used in a live situation. As a reminder, the system displays the following warning at the start of a simulation:

⚠ WARNING

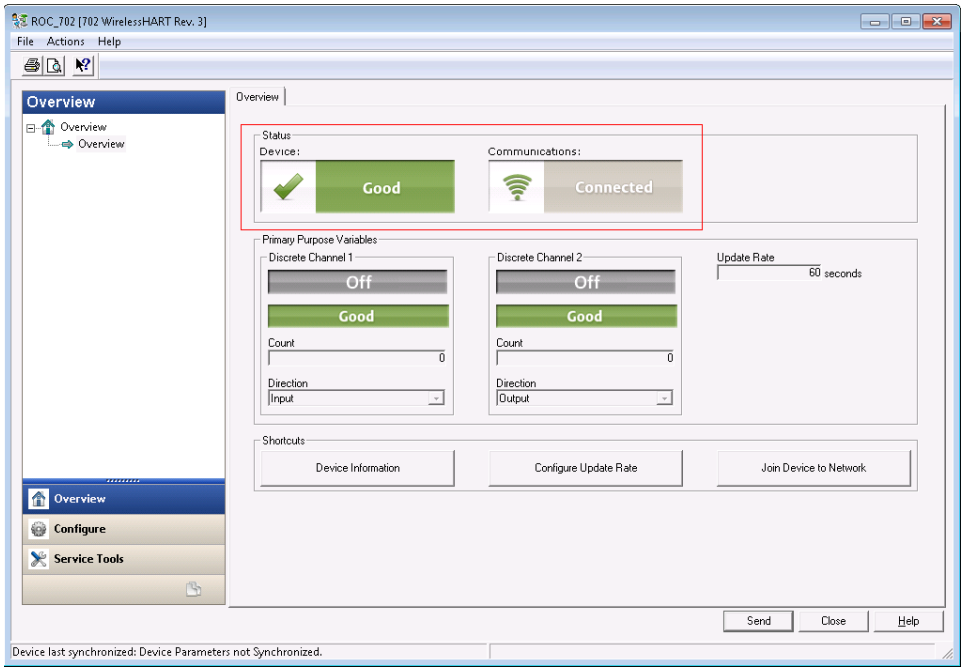
WARNING – Continuing this simulation will change the device output. Put control loop in manual.

3.8.1 Setting up the Device Simulation

This section shows how to prepare a HART device to simulate a value.

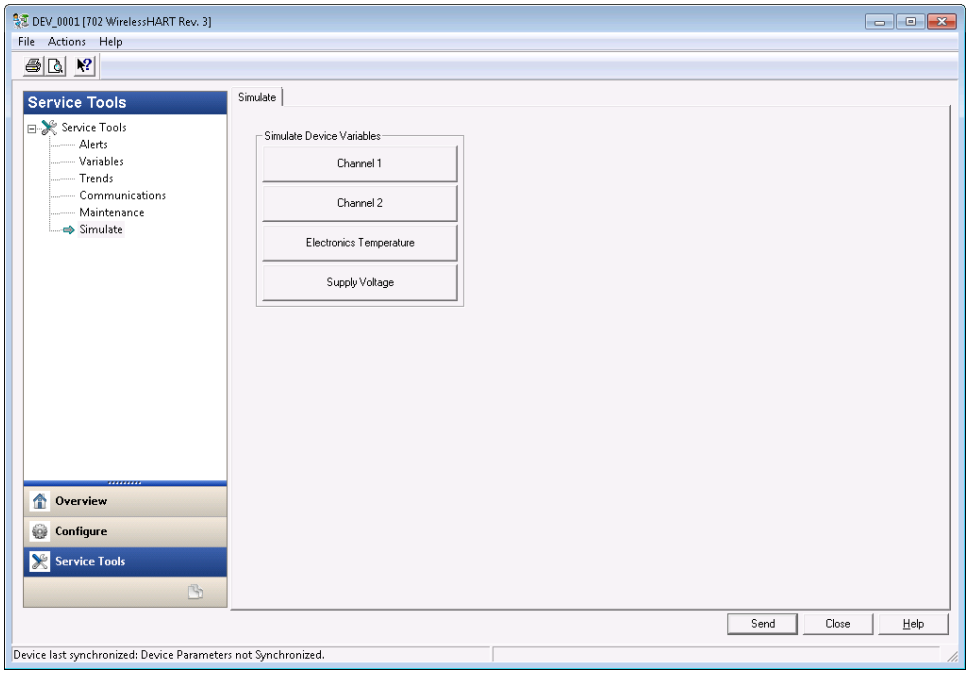
1. From the AMS Device Manager's Device Explorer window, select the **Central Module** folder and double-click the HART device. The Device window opens and a *Reading Parameter Values* message displays. This process can take a while.

Figure 3-42. AMS Device Window - Overview



2. Ensure the Device status is **Good** and the Communication status is **Connected**. Do not proceed if either value is not correct as there may be a problem with the device. Click the **Service Tools** button in the left-hand pane.

Figure 3-43. AMS Device Window – Service Tools



3. Click **Supply Voltage** to start the simulation.

4. Wait for the simulation wizard to start.

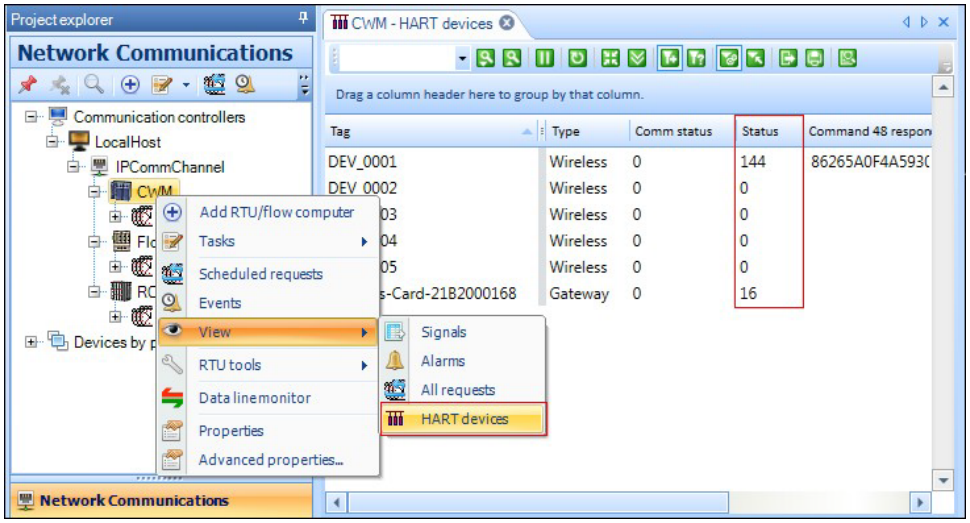
The first page of the simulation wizard displays a warning to ensure you are not using a device in a live setting. With the wizard at this point follow the instructions in the *Steps to Reproduce Alerts* section.

3.8.2 Steps to Reproduce Alerts

Performing the following steps simulates a Device Status Changed alarm in OE and passes HART device alerts to AMS. Prepare the **HART devices** and **Device Alarms** views in OE.

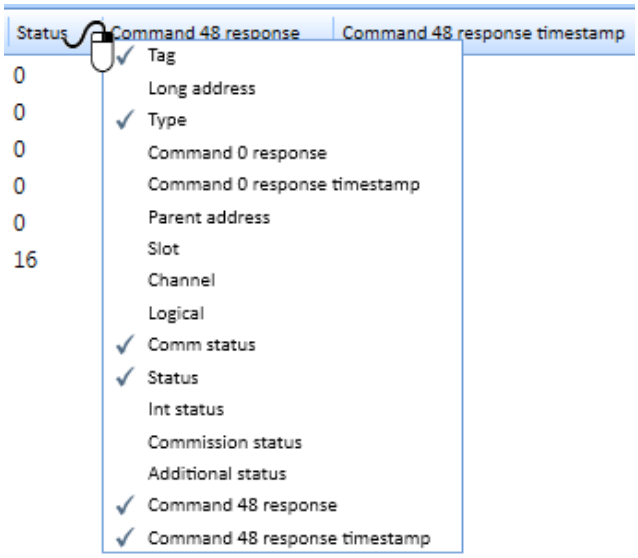
1. Open the HART Devices view. In the OE Container's Network Communications pane, right-click on the RTU node and select **View**>**Hart devices.**

Figure 3-44. HART Devices View



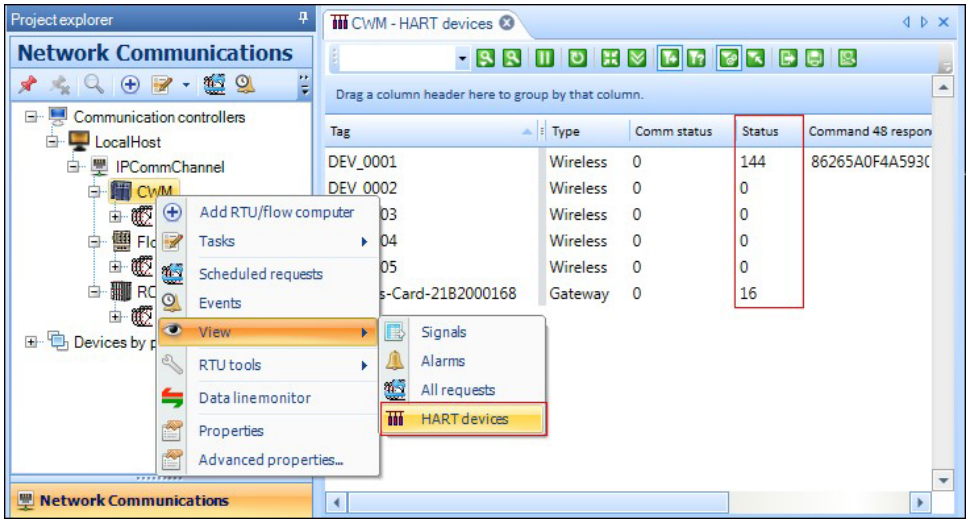
This view displays all the RTU's wired or *Wireless*HART devices.

2. Right-click the column header to show **only** the following columns: **Tag**, **Type**, **Comm Status**, **Status**, **Command 48 response**, and **Command 48 response timestamp**.



3. Open the Alarms view. Right-click on the RTU node and select **View** > **Alarms**.

Figure 3-45. HART Devices View



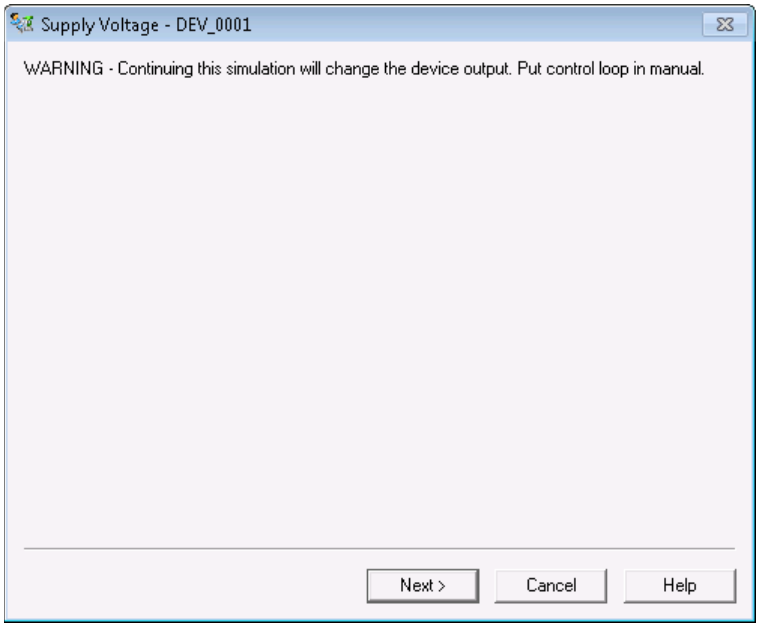
4. Arrange the views in the Container to show both the views in *Figures 3-36* and *3-37*.

3.8.3 Starting the Simulation

To assist in the simulation process, the system provides a software wizard. Start simulating a Supply Voltage Alert using the HART device.

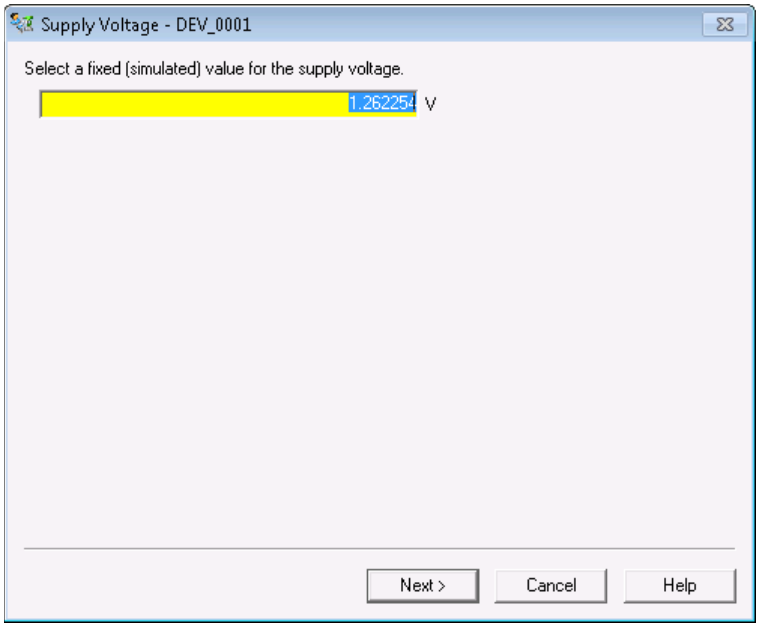
1. Click **Next** on the Simulation Wizard Start page.

Figure 3-46. Simulation Wizard Start page



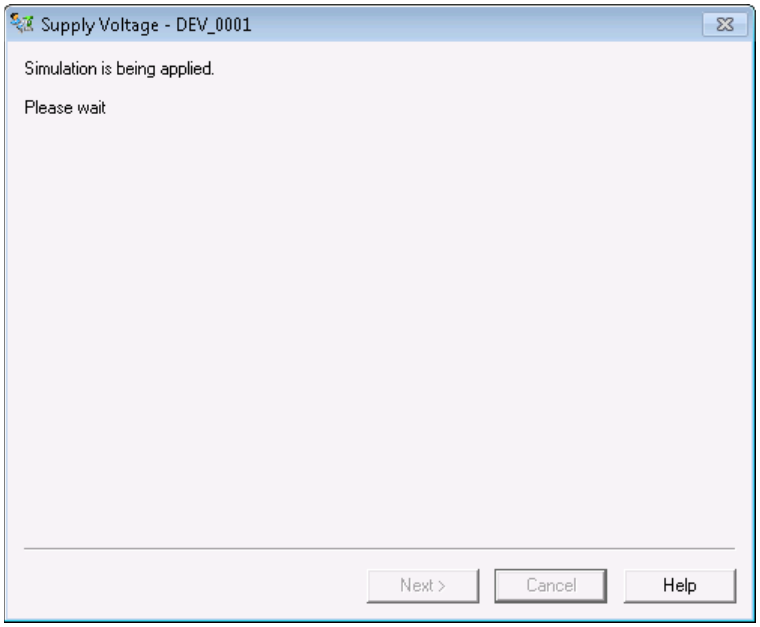
2. Enter a value for the supply voltage. This should be a value below the required value the device requires to operate (such as 1 volt) and click **Next**.

Figure 3-47. Simulation Wizard Voltage value



3. Wait for the simulation to be applied.

Figure 3-48. Simulation Wizard Simulation Being Applied



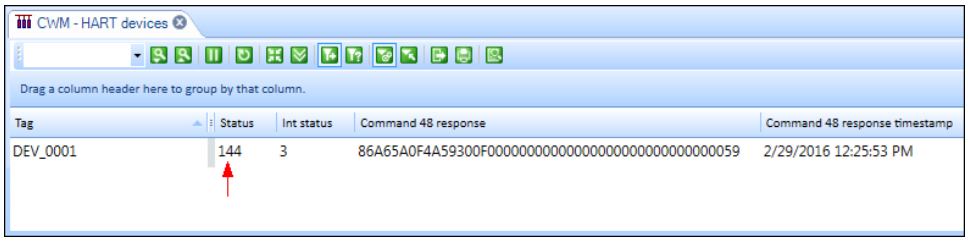
4. View the status change in OE. At this point, return to the OE Container.

3.8.4 The Command 48 Response

When the system sets the More Status Available bit in a HART device its status value shows the sum of 16 "More Status Available" and another value or values as in the example below 128 "Device Malfunction". For more information see the HART device status values table in *Section 3.4.2*.

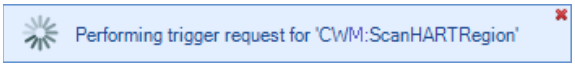
1. The simulation changes the HART device status value to **144** (16 + 128).

Figure 3-49. RTU HART Devices View



2. Select **Trigger Request** on the ControlWave List or ROC/FloBoss collection request to initiate a Command 48 request for the RTU.

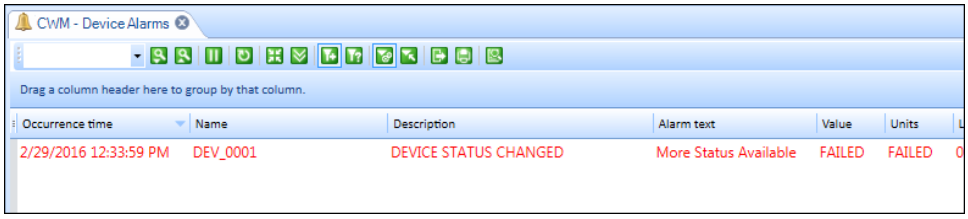
   The Command 48 response cycles through the request process for each *Wireless*HART device:



   The request completes the Command 48 response:

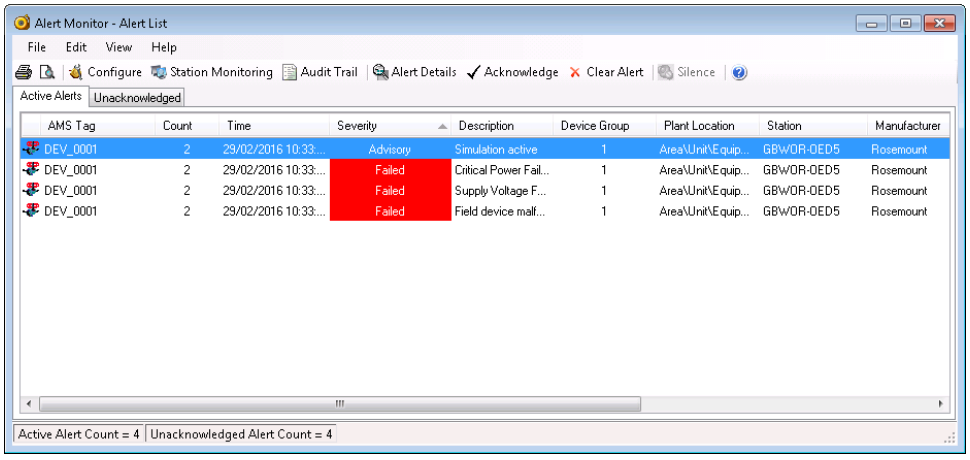
3. This creates an alarm in OE, which shows in the Alarm text (More Status Available) and Value (FAILED) columns for the DEVICE STATUS CHANGED Alarm.

Figure 3-50. RTU HART Devices View



4. Any alerts generated in monitored HART devices will be collected by AMS Device Manager as per the configured polling rate.

Figure 3-51. AMS Device Manager Alert Monitor



Proceed to the next section to complete the simulation on the AMS server.

3.8.5 Finish the Simulation

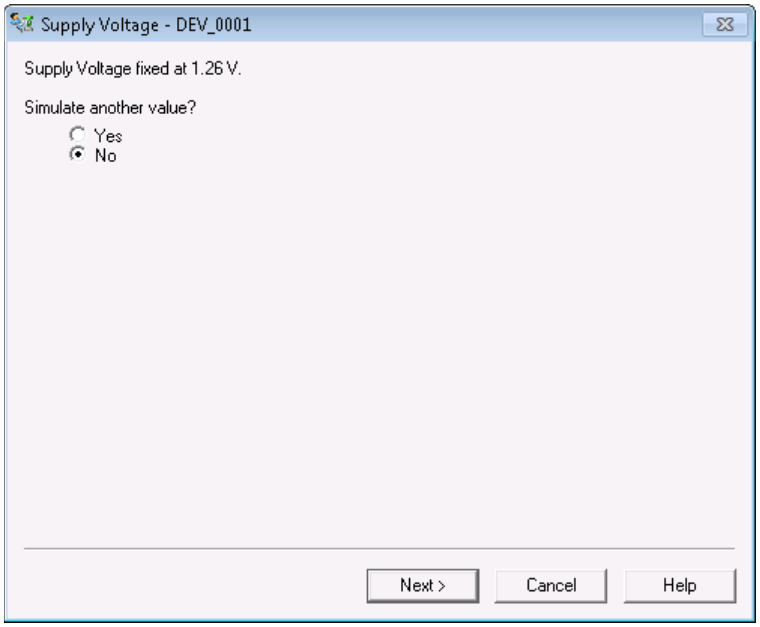
Note

You **must** use the following steps to close the simulation. **Do not leave the device in simulation mode**.

Return to the AMS Server to finish the simulation and return the HART device back to normal operation.

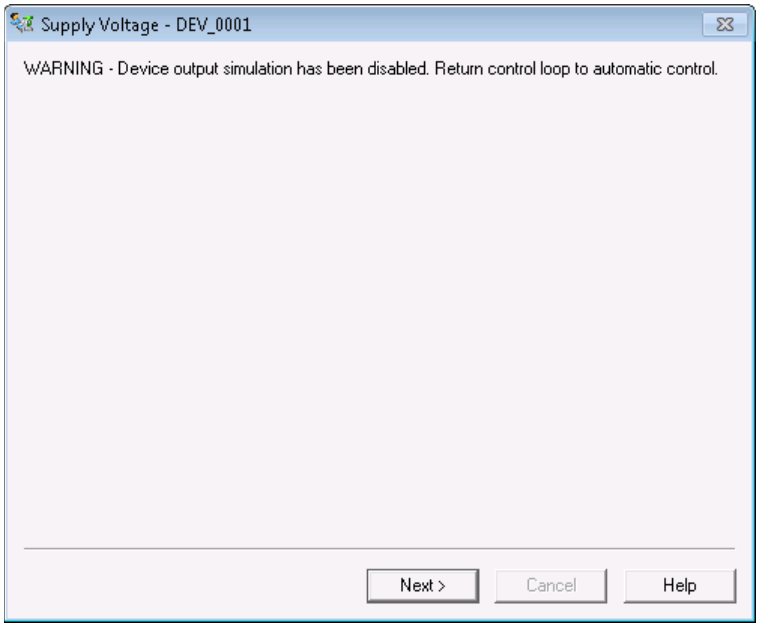
1. Select **No** for the Simulate another value? prompt and click **Next**.

Figure 3-52. Simulation Wizard – Close page



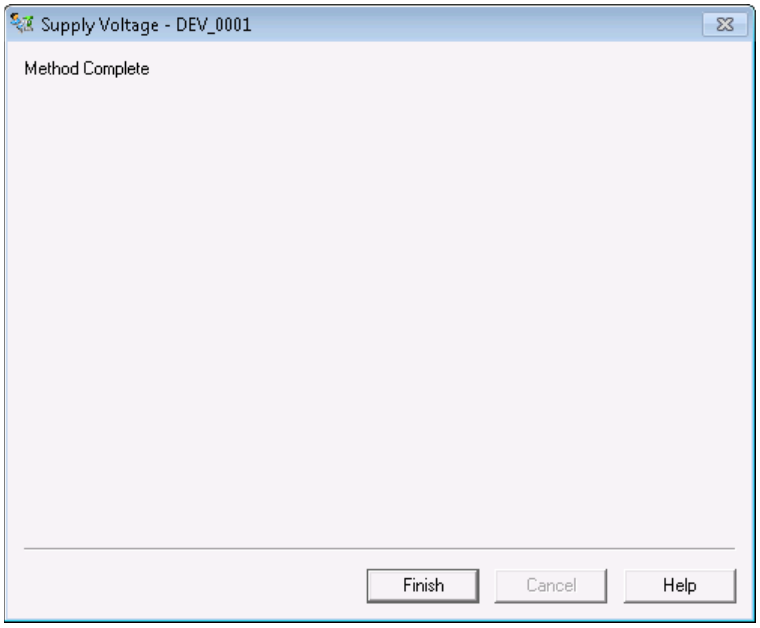
2. Wait for the simulation to stop and click **Next**.

Figure 3-53. Simulation Wizard – Warning page



3. Click **Finish** to close the simulation wizard.

Figure 3-54. Simulation Wizard – Warning page



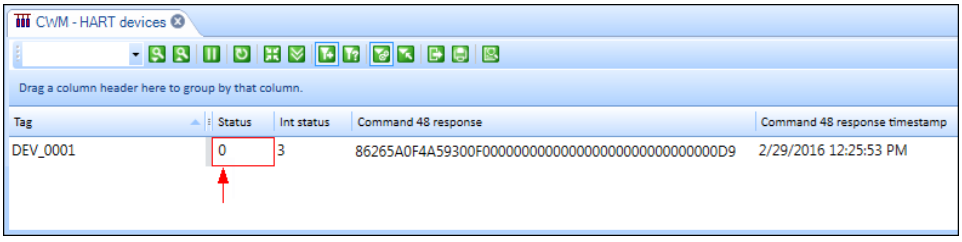
4. View the status change in OE. Return to the OE Container page at this point in the simulation.

3.8.6 Repeat the Command 48 Response

When the simulation finishes, the HART device status value returns to OK. For more information see the HART device status values table in *Section 3.4.2*.

1. The simulation changes the HART device value to **0**:

Figure 3-55. RTU HART Device View

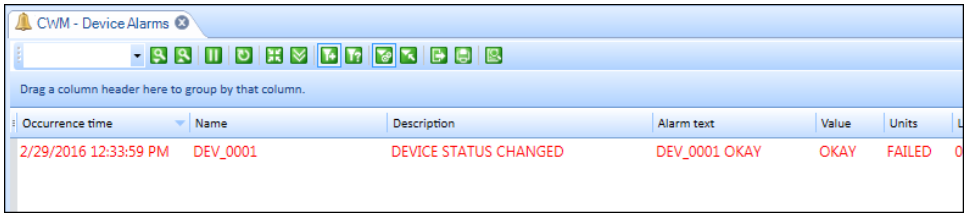


2. Select **Trigger Request** on the ControlWave List or ROC/FloBoss collection request to initiate a Command 48 request for the RTU.

   The Command 48 response cycles through the request process for each *Wireless*HART device.

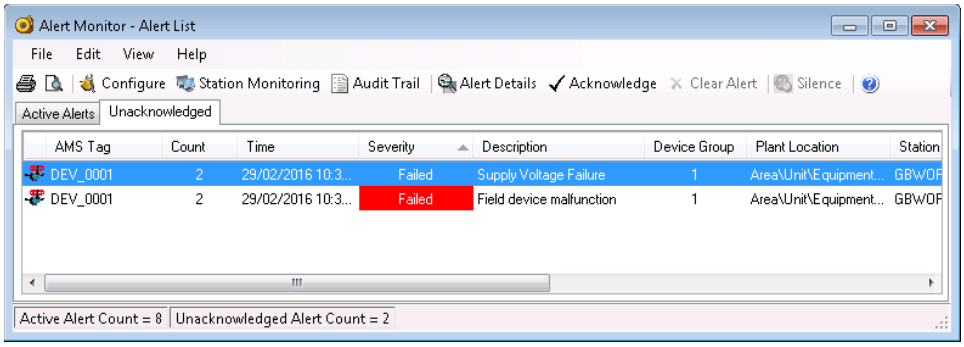
3. This clears the OE alarm and changes the Value to **OKAY**:

Figure 3-56. RTU Device Alarms View



4. At this stage, AMS alert monitor will also move the alert to the Unacknowledged tab of the Alert Monitor.

Figure 3-57. AMS Device Manager Alert Monitor

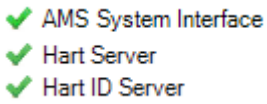


3.9 AMS HART Pass-Through Session Tasks

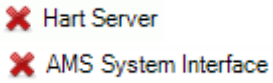
AMS HART Pass-Through has three OE Session tasks.

- The **HART server** is the parent task for all the AMS HART Pass-Through tasks. It starts a TCP/IP server on a configurable port and handles the HART-over-IP communication.
- The **HART ID Server** handles the hierarchy.
- The **AMS System Interface** handles OE alarms (alerts).

The three AMS HART Pass-Through tasks are shown below in their running state:



If any task is not running, it has a red cross, as shown below:



Notes

- You may need to add the above tasks to the Session to use the AMS HART Pass-Through.
- When upgrading from OE 3.1 to OE 3.2, you need to modify the CommManager.config file by adding *GetCmd48RespTimeout='21000"* to the RasArmGatewaySetting section at the end of the file. This file is located in *C:/ProgramData/Emerson OpenEnterprise/Application Data* folder. Without this modification OE defaults to using either 6000 or 6 seconds for the timeout value.

  ```
  <RasAmsGatewaySettings HartTransport="Tcp" HartPort="5094"
  IdentifyDevicesCmdTimeout="300" GetCmd48RespTimeout="21000"/>
  ```

  You must restart the OE Session for changes to this configuration file to take effect.

3.9.1 Starting AMS HART Pass-Through Tasks

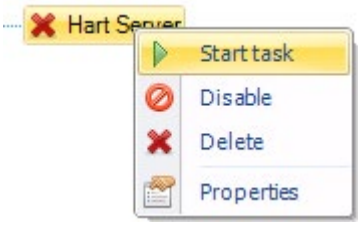
Note

Before starting the tasks, ensure the dependency properties are set correctly.

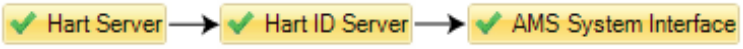
If the AMS HART Pass-Through tasks are not running, use the following steps to start the tasks.

1. From the OE Container open the Sessions pane.
2. Right-click the **Hart Server** task and select **Start task**.

Figure 3-58. Sessions pane task menu



The **HART Server** is the parent dependency for all the AMS HART Pass-Through tasks, starting this task automatically starts the **Hart ID Server** and **AMS System Interface** tasks in the following order.



3.9.2 Adding the Tasks to OE

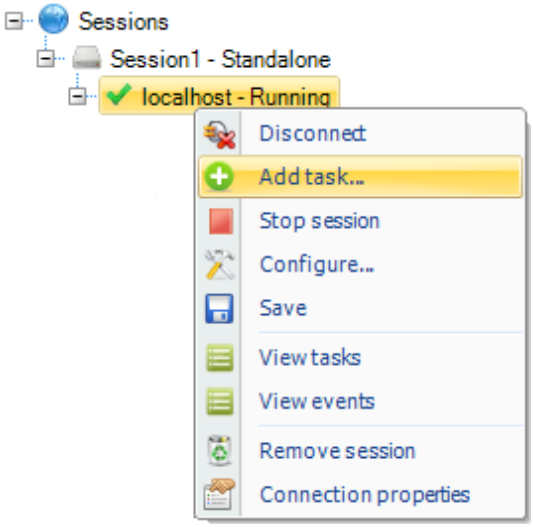
You may need to add the three AMS Hart Pass-Through tasks to the Session. Use the following instructions to add these tasks.

3.9.2.1 Adding the HART Server Task

To add the HART Server task to a session:

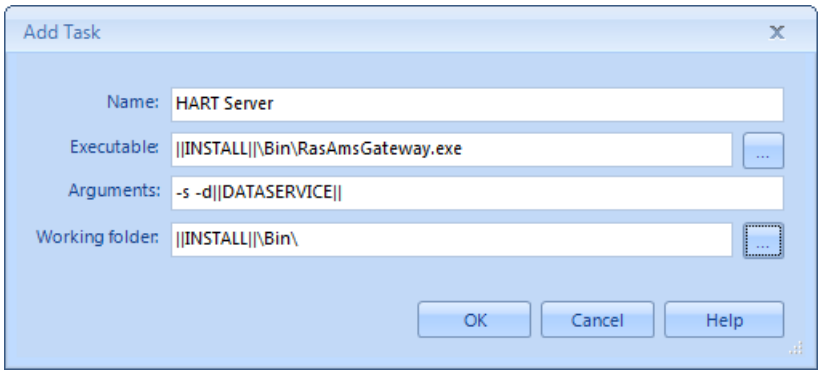
1. From the Sessions pane right-click the relevant machine (server) node and click **Add task.**

Figure 3-59. Session machine node – Add task



2. Use the Add Task dialog to configure the session task's Name, Executable, Working folder, define any arguments that must be passed to the session when it starts, and identify the task's working folder. Click **OK** when finished.

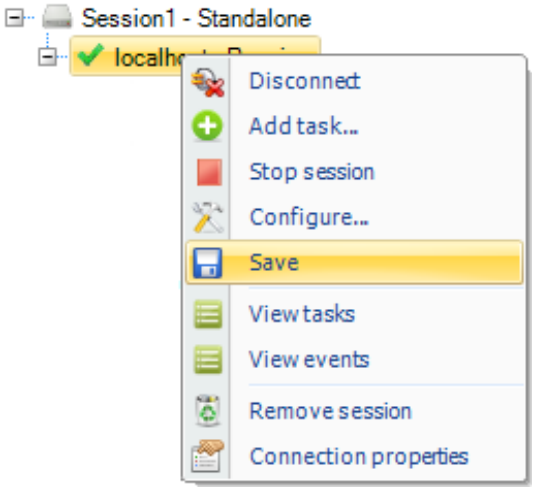
Figure 3-60. Add Task dialog- HART Server



Field	Description
Name	HART Server
Executable	Click … and browse to the OE bin folder (*C:\Program Files\Emerson\OpenEnterprise\Bin*). Select the RasAmsGateway.exe file.  **Do not** select the RasAmsOEGateway.exe file.
Arguments	-s -d||DATASERVICE||
Working folder	Click … and browse to select the OE Bin folder (*C:\Program Files\Emerson\OpenEnterprise\Bin).*

3. Right-click on the Sessions machine node and click **Save** to save the session.

Figure 3-61. Session machine node – Save

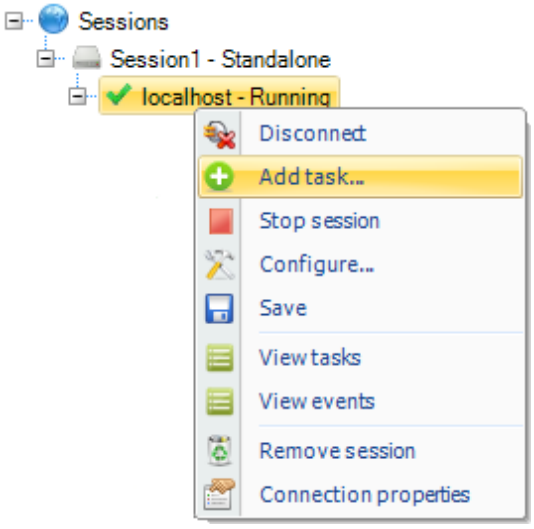


3.9.2.2 Adding the HART ID Server Task

To add the HART ID Server task to a session:

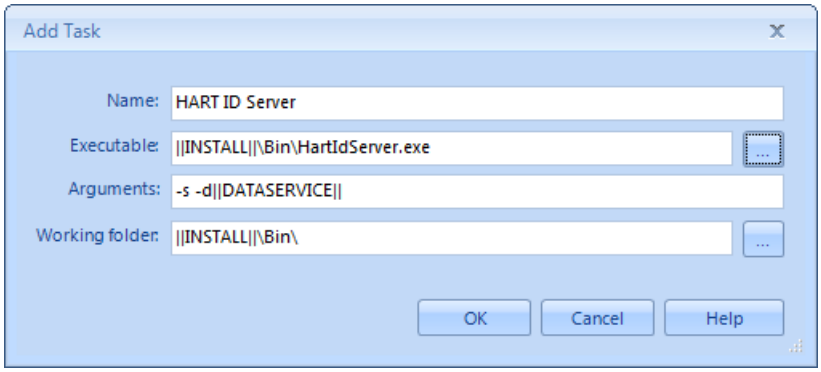
1. From the Sessions pane right-click the relevant machine (server) node and click **Add task.**

Figure 3-62. Session machine node – Save



2. Use the Add Task dialog to configure the session task's Name, Executable, Working folder, define any arguments that must be passed to the session when it starts, and identify the task's working folder. Click **OK** when finished.

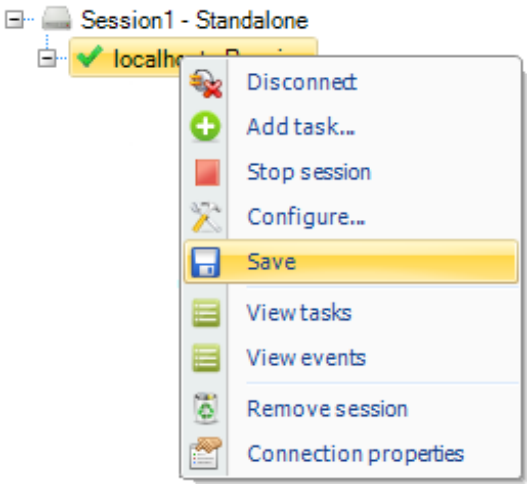
Figure 3-63. Add Task dialog- HART ID Server



Field	Description
Name	HART ID Server
Executable	Click … and browse to the OE bin folder (*C:\Program Files\Emerson\OpenEnterprise\Bin*) and select the HartIdServer.exe file.
Arguments	-s -d||DATASERVICE||
Working folder	Click … and browse to select the OE Bin folder (*C:\Program Files\Emerson\OpenEnterprise\Bin).*

3. Right-click on the Sessions machine node and click **Save** to save the session.

Figure 3-64. Session machine node - Save

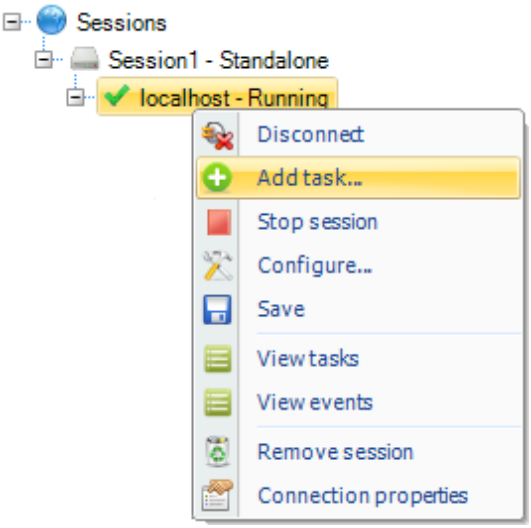


3.9.2.3 Adding the AMS System Interface Task

To add the AMS System Interface task to a session:

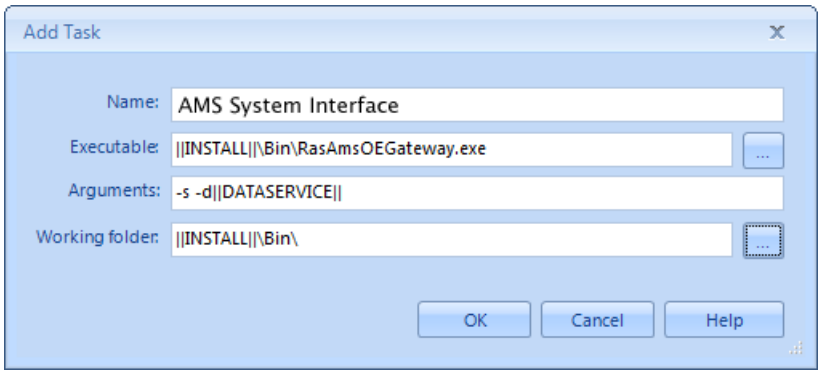
1. From the Sessions pane right-click the relevant machine (server) node and click **Add task**.

Figure 3-65. Sessions machine node menu –Add task



2. Use the Add Task dialog to configure the session task's Name, Executable, Working folder, define any arguments that must be passed to the session when it starts, and identify the task's working folder. Click **OK** when finished.

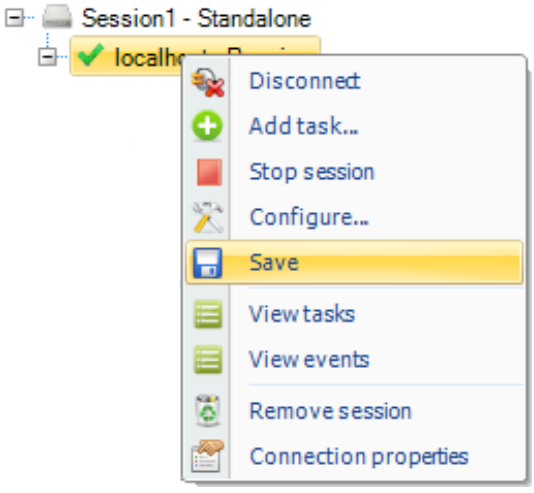
Figure 3-66. Add Task dialog – AMS System Interface



Field	Description
Name	AMS System Interface
Executable	Click … and browse to the OE bin folder (*C:\Program Files\Emerson\OpenEnterprise\Bin*). Select the RasAmsOEGateway.exe file.  **Do not** select the RasAmsGateway.exe file.
Arguments	-s -d||DATASERVICE||
Working folder	Click … and browse to select the OE Bin folder (*C:\Program Files\Emerson\OpenEnterprise\Bin).*

3. Right-click on the Sessions machine node and click **Save** to save the session.

Figure 3-67. Session machine node - Save



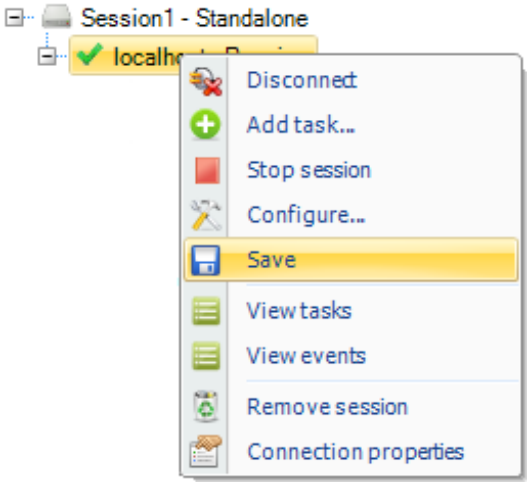
3.9.2.4 Setting the Tasks' Dependency Data

To complete the task properties for the AMS HART Pass-Through you need make changes to the DependencyData for **each** task. These instructions assume you have already added the tasks to the session.

Note
Ensure you have saved any session changes.

1. From the Sessions pane right-click the relevant machine (server) node.

Figure 3-68. Session machine node - Save



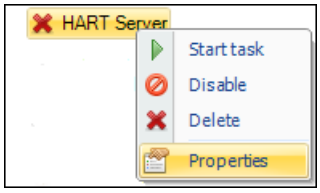
2. Click **Save** from the drop-down menu.

3.9.2.4.1 Setting the HART Server Dependency Data

To set the dependency data for the HART Server:

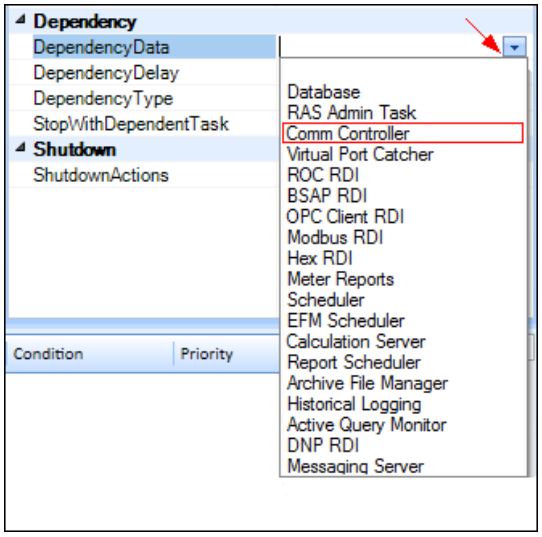
1. Right-click on the **HART Server** task and select **Properties**.

Figure 3-69. HART Server sessions properties menu



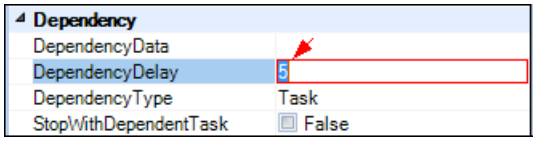
2. Click the **DependencyData** row in the Properties pane and select **Comm Controller** from the drop-down menu.

Figure 3-70. Task properties pane – DependencyData menu



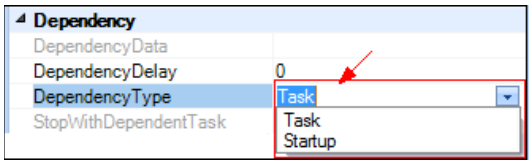
3. Click the **DependencyDelay** row in the Properties pane and change the value to **5**.

Figure 3-71. Task properties pane – DependencyDelay



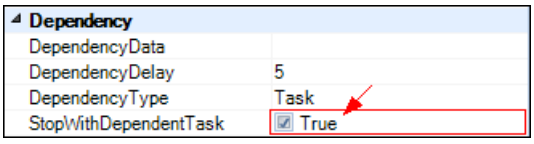
4. Click the **DependencyType** row in the Properties pane and select **Task** from the drop- down menu.

Figure 3-72. Task properties pane – DependencyType



5. Click the **StopWithDependentTask** row in the Properties pane and set the value to **True**.

Figure 3-73. Task properties pane – StopWithDependentTask



6. Confirm that the settings for DependencyData, DependencyDelay, DependencyType, and StopWithDependentTask match these values:

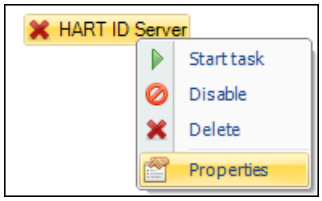
HART Server	Setting
DependencyData	Comm Controller
DependencyDelay	5
DependencyType	Task
StopWithDependencyTask	True

3.9.2.4.2 Setting the HART ID Server Task Dependency Data

To set the dependency data for the HART ID Server task:

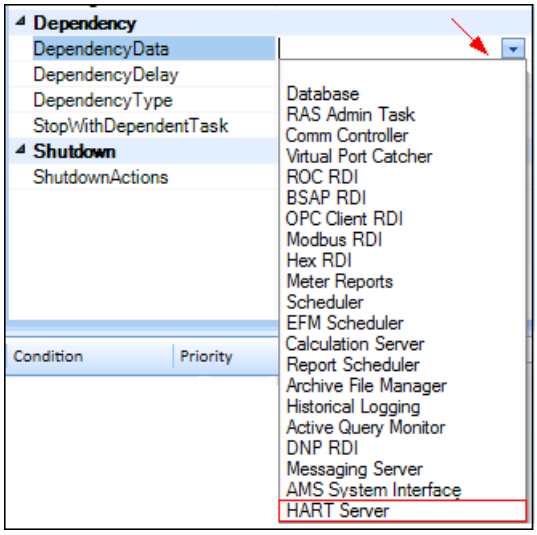
1. Right-click on the **HART ID Server** task and select **Properties**.

Figure 3-74. HART Server sessions properties menu



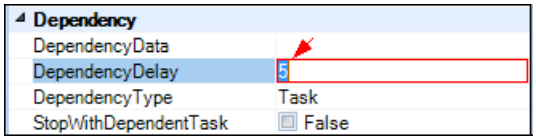
2. Click the **DependencyData** row in the Properties pane and select **HART Server** from the drop-down menu.

Figure 3-75. Task properties pane – DependencyData menu



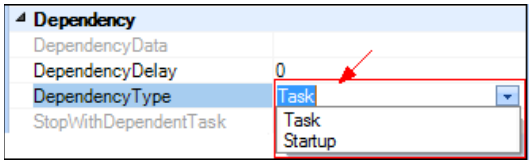
3. Click the **DependencyDelay** row in the Properties pane and change the value to **5**.

Figure 3-76. Task properties pane – DependencyDelay



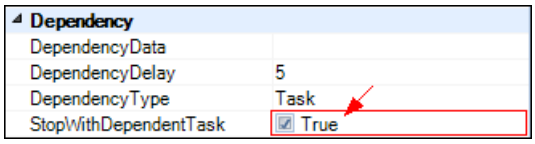
4. Click the **DependencyType** row in the Properties pane and select **Task** from the drop- down menu.

Figure 3-77. Task properties pane – DependencyType



5. Click the **StopWithDependentTask** row in the Properties pane and set the value to **True**.

Figure 3-78. Task properties pane – StopWithDependentTask



6. Confirm that the settings for DependencyData, DependencyDelay, DependencyType, and StopWithDependentTask match these values:

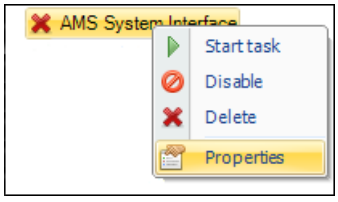
HART ID Server	Setting
DependencyData	HART Server
DependencyDelay	5
DependencyType	Task
StopWithDependencyTask	True

3.9.2.4.3 Setting the AMS System Interface Dependency Data

To set the dependency data for the AMS System Interface:

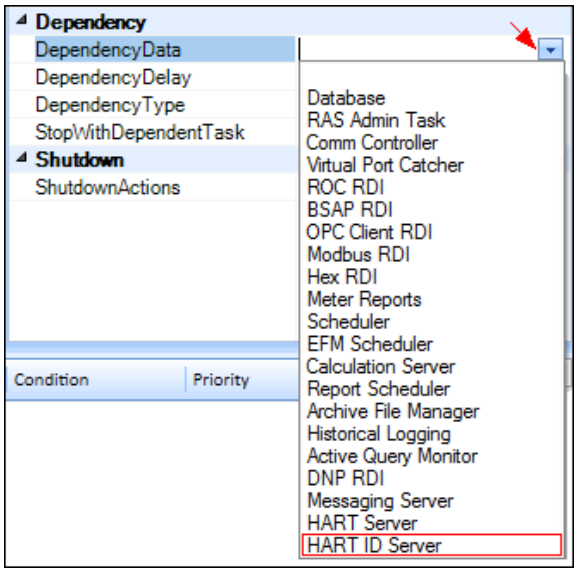
1. Right-click on the **AMS System Interface** task and select **Properties**.

Figure 3-79. AMS System Interface Properties menu



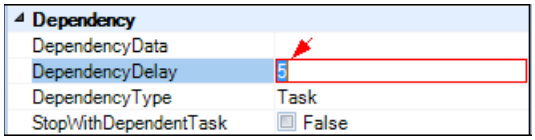
2. Click the **DependencyData** row in the Properties pane and select **HART ID Server** from the drop-down menu.

Figure 3-80. Task properties pane – DependencyData menu



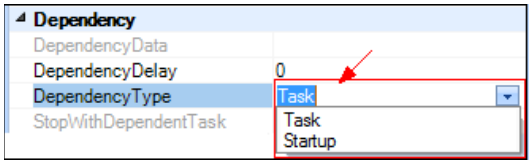
3. Click the **DependencyDelay** row in the Properties pane and change the value to **5**.

Figure 3-81. Task properties pane – DependencyDelay



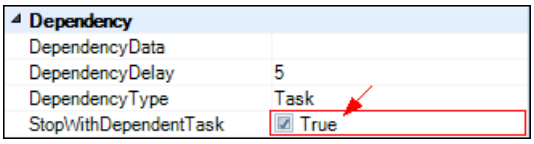
4. Click the **DependencyType** row in the Properties pane and select **Task** from the drop- down menu.

Figure 3-82. Task properties pane – DependencyType



5. Click the **StopWithDependentTask** row in the Properties pane and set the value to **True**.

Figure 3-83. Task properties pane – StopWithDependentTask



6. Confirm that the settings for DependencyData, DependencyDelay, DependencyType, and StopWithDependentTask match these values:

AMS System Interface	Setting
DependencyData	HART ID Server
DependencyDelay	5
DependencyType	Task
StopWithDependencyTask	True

4 Using AMS Device Manager Software

Topics covered in this chapter:

- Before You Begin
- Adding an OpenEnterprise Network
- Starting AMS Device Manager
- Using Rebuild Hierarchy in AMS Device Manager
- About HART Alerts

AMS Device Manager software works with both wired HART and *Wireless*HART devices.

This chapter is intended as an overview of the functions that work directly with OE. Please refer to the AMS Device Manager Books online help available on the help menu for more information.

4.1 Before You Begin

Before you start AMS Device Manager, you need to configure an OpenEnterprise network using the Network Configuration Utility.

4.1.1 Requirements

- You must be a member of the Windows administration group on the local machine to add an OE network.
- Ensure that the OE Server is running.
- From the AMS Device Manager machine ensure that AMS Device Manager is **not** running.

4.2 Adding an OpenEnterprise Network

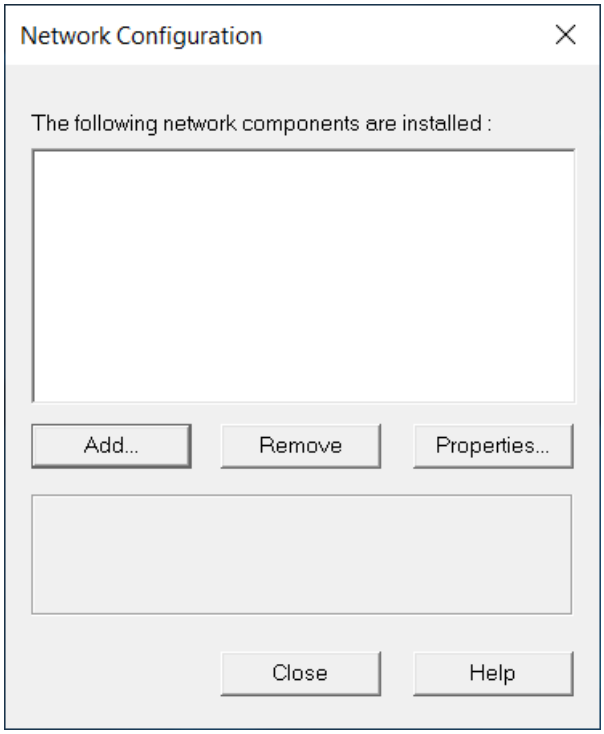
To enable AMS Device Manager to establish connectivity with the OE HART server you need to add an OE network:

1. Ensure the OpenEnterprise Server is running and from the AMS Device Manager machine ensure that AMS Device Manager is not running.

   Note
   You must be a member of the Windows administration group on the local machine to add an OE network.

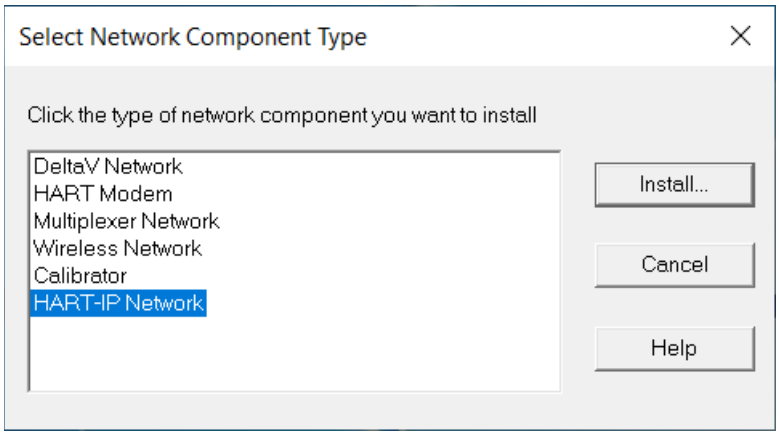
2. Start the Network Configuration utility. From the Start menu/page select **AMS Device Manager** > **Network Configuration**.

Figure 4-1. Network Configuration dialog



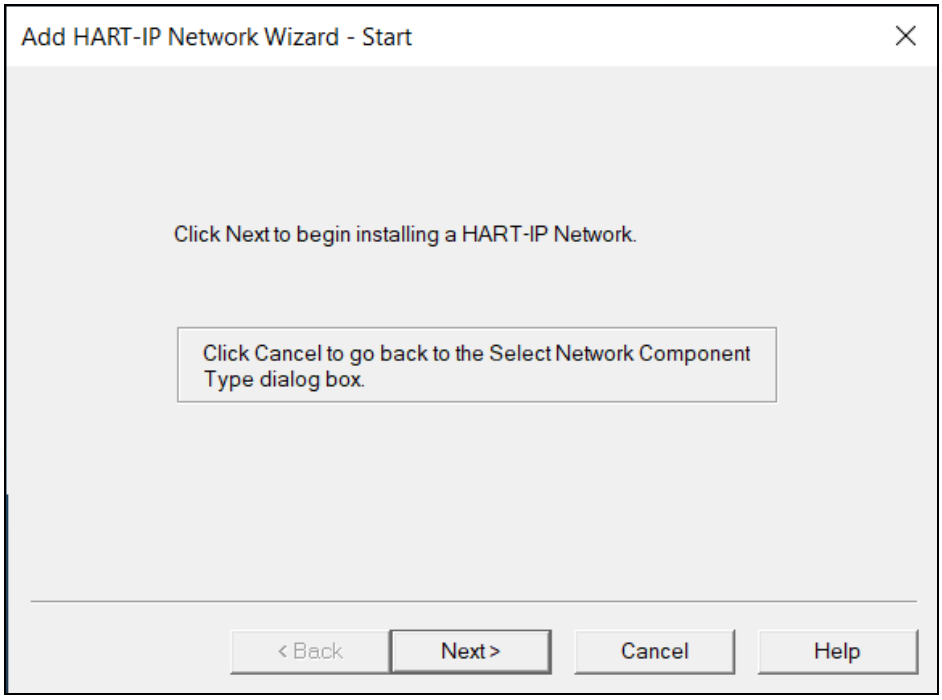
3. Click **Add**. The Select Network Component Type dialog displays.

Figure 4-2. Select Network Component Type dialog



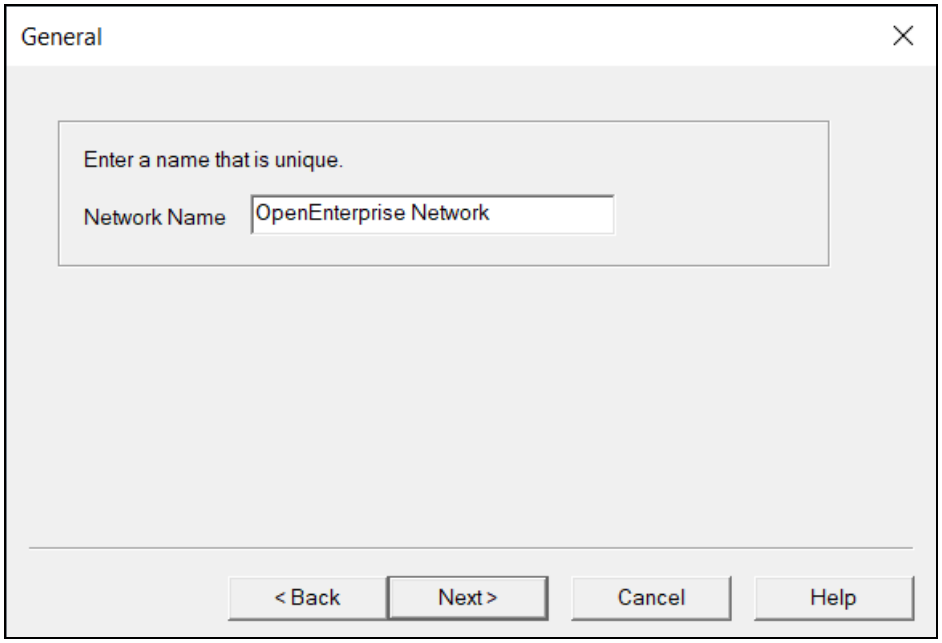
4. Select HART-IP Network. Click **Install**.

Figure 4-3. Add Network Wizard – Start page



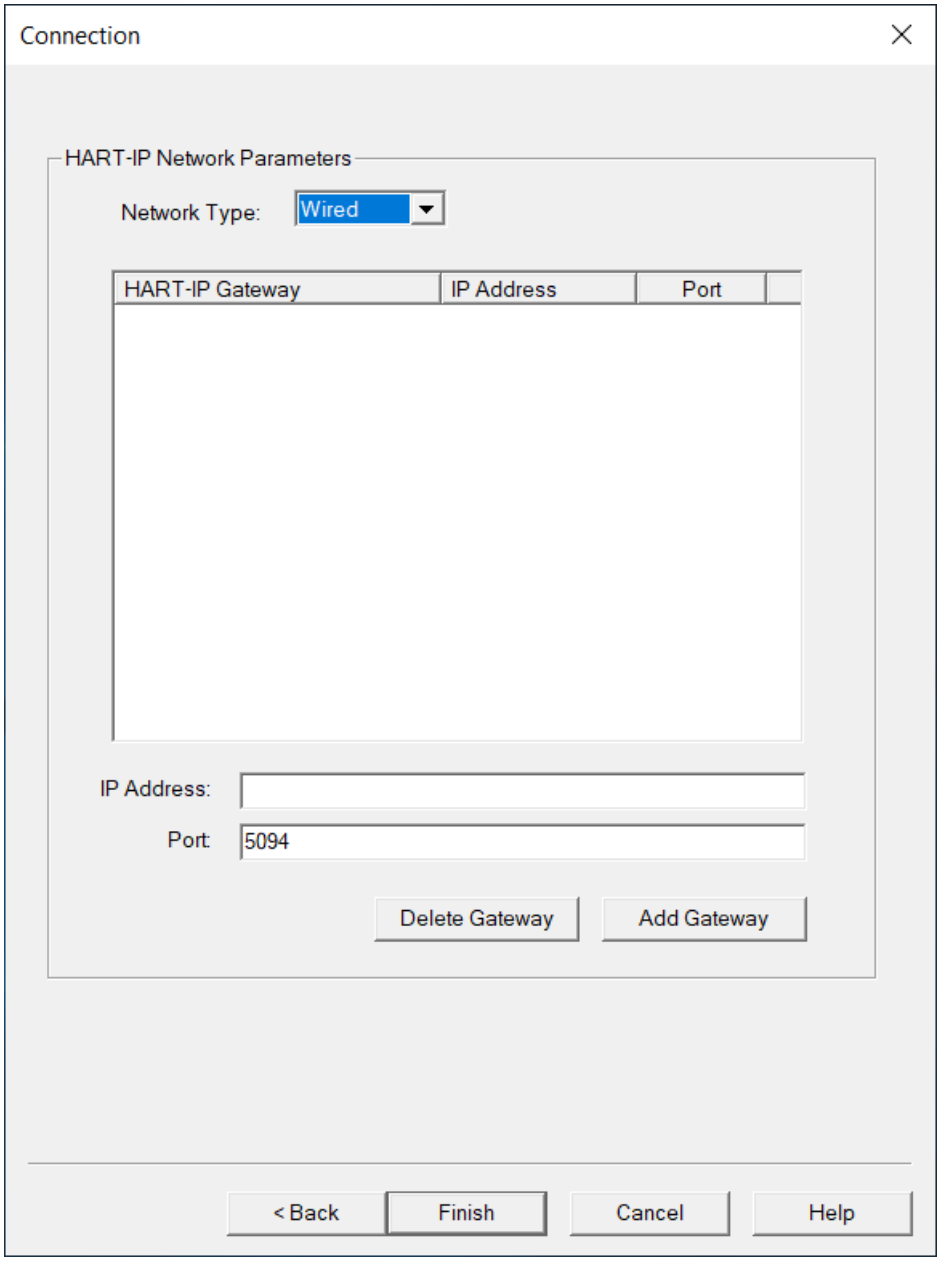
5. The Add Network wizard prompts you to confirm that you want to proceed. Click **Next**.

Figure 4-4. Add Network Wizard – General page



6. Enter the name of the OE network as you want to see it in the AMS Device Manager tree and click **Next**. The Connection page displays.

Figure 4-5. Add Network Wizard – Connection page



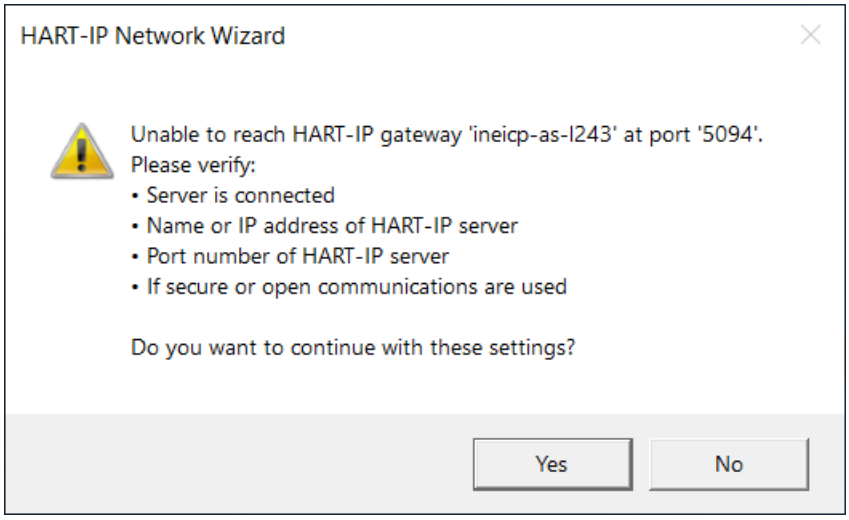
7. On the Connection page enter the connection information of the HART-IP Network.

   Network Type will be Wired.

   IP Address is the location of the main OpenEnterprise Server, which also provides access to the hierarchy and device communications. An IP address, computer name, or DNS name may be entered.

   If the connection cannot be made, the following message will be displayed.

Figure 4-6. HART-IP Network Wizard

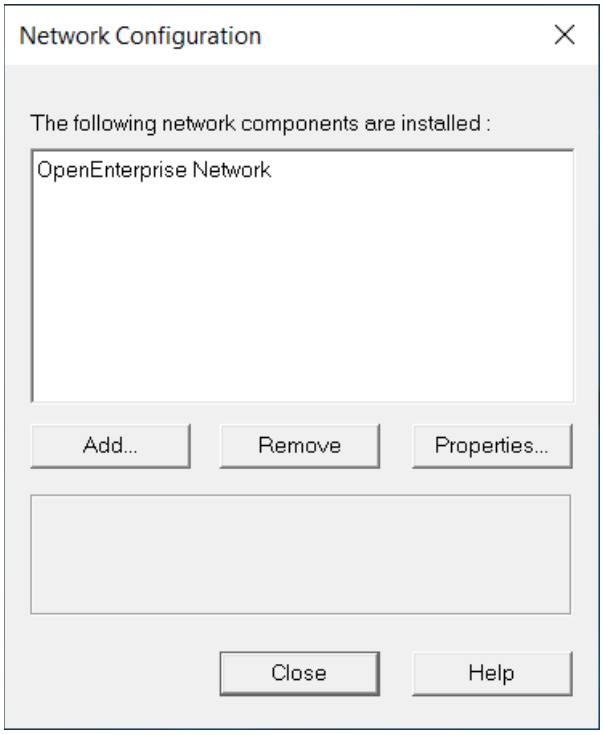


Select **Yes** to save the record.

Port is the TCP/IP port number of the OpenEnterprise HART-IP Server. The default value is 5094.

8. Click **Finish**.

Figure 4-7. Network Configuration dialog (installed components)



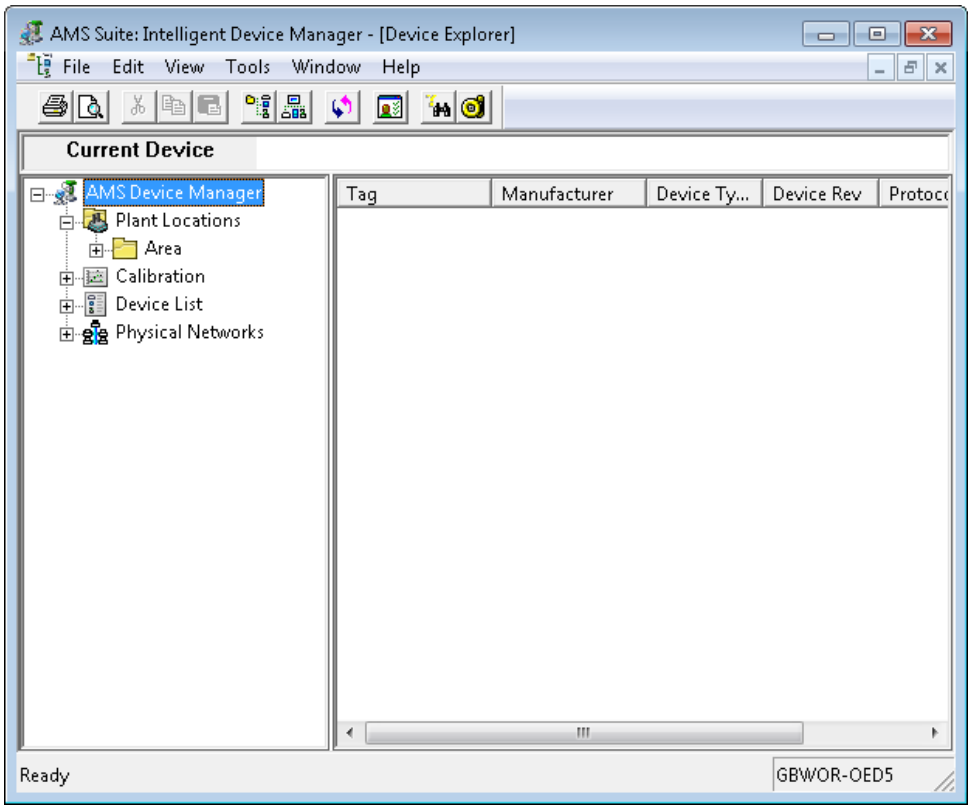
9. The HART-IP Network will now be displayed in the Network Configuration dialog. Click **Close** to complete this task.

4.3 Starting AMS Device Manager

To start the AMS Device Manager, either

- Click the desktop icon 
- Select **Start** > **AMS Device Manager** > **AMS Device Manager**

Figure 4-8. AMS Device Manager

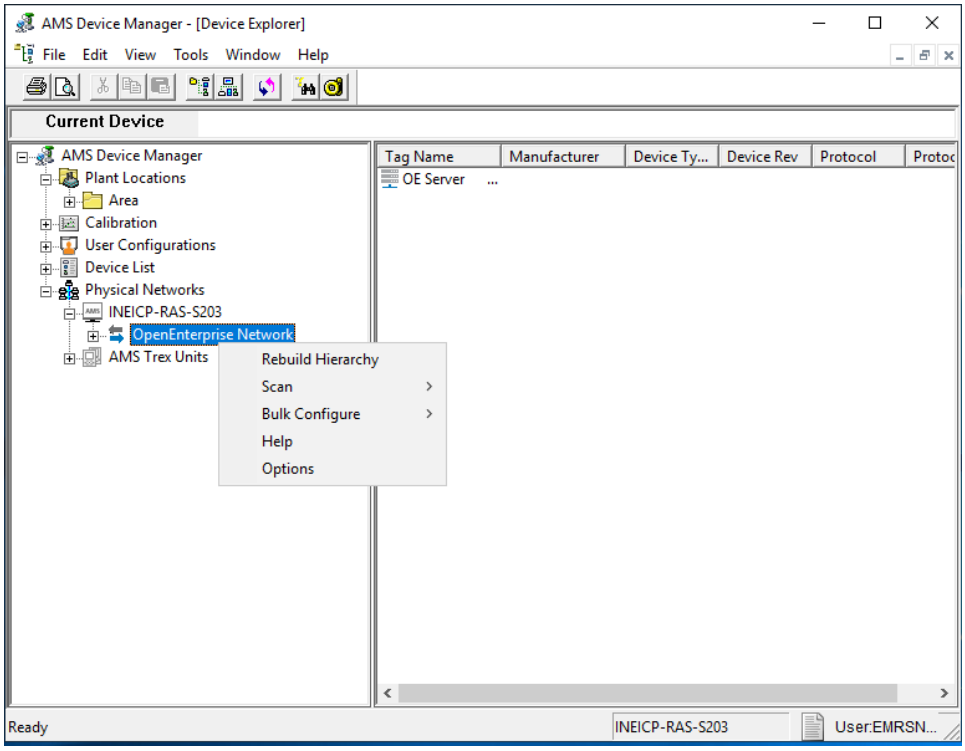


4.4 Using Rebuild Hierarchy in AMS Device Manager

The first time you use AMS Device Manager with an OE network, you must perform a **Rebuild Hierarchy**. This is also required whenever you add or remove or move a device or OpenEnterprise network component.

1. Right-click the OE network node in AMS Device Manager and select **Rebuild Hierarchy** in the drop-down menu.

Figure 4-9. AMS Device Manager

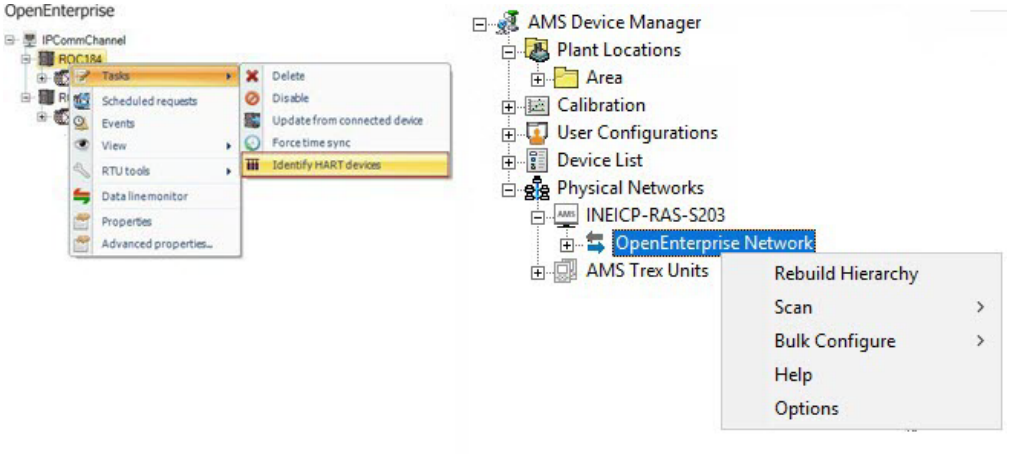


This rebuilds the RTU hierarchy in the AMS Device Manager.

Note

When adding or removing HART devices from an existing RTU, select **Update from connected device** from the RTU/Task menu in OE. Once the device is rebuilt in OE, select **Identify HART devices** from the same menu. In AMS Device Manager select **Rebuild Hierarchy** from the OpenEnterprise network node to reflect the change in the hierarchy.

Figure 4-10. Identify HART Devices and Rebuild Hierarchy



Appendix A. Glossary

A

ACCOL	ACCOL™ is an acronym for **A**dvanced **C**ommunications and **C**ontrol-**O**riented **L**anguage, the library of function blocks used in ControlWave Designer to program ControlWave and Bristol33xx devices.
Access Area	Every device, plant area and signal in the OpenEnterprise database belongs to an access area. Access Area security controls what objects within a table can be viewed by the User. Users must be granted the access area of an object in order to view it in the HMI. Access area security is configured using the Security Configuration tool.
Active Query	Type of query the OpenEnterprise database supports that reports changes in data back to the client as those changes occur (without polling) . This mechanism is very fast and efficient.
AMS Device Manager	An Emerson software component which allows interaction with HART devices in the RAS RTU network. The Device Manager uses the RAS host system interface (HIS) to display device hierarchy and HART device data using the static HART device description information (stored in DD files) and to communicate with HART devices.
API	**A**pplication **P**rogramming **I**nterface, the collection of protocols and associated tools used to build software applications.
Archive File Manager	A server-based software tool that enables you to manage the process of moving archive files online and offline.
Archive File Configuration tool	A software tool that enables you to quickly configure archive files.

B

Background Query	A background query is used to get specific values back from the database. You can configure calculations and workflows to run (“trigger”) when a database value changes. Background queries can also pre-query data (usually non-signal data) to be used in calculations.
Baud Rate	Unit of signaling speed derived from the number of events per second (normally bits per second). However if each event has more than one bit associated with it the baud rate and bits per second are not equal.
BSAP	**B**ristol **S**ynchronous/**A**synchronous Communication **P**rotocol; the protocol OE uses to communicate with ControlWave RTUs.

C

Calendar	A yearly time template.
CC	Communications Controller. A suite of software components that provides port sharing and protocol sharing for OE applications when communicating with RTUs.
CL	Control Language; a scripting language contained within the Polyhedra database.
CPU	Central Processing Unit.
CRC	Cyclical Redundancy Check error checking.

C

CW	ControlWave

D

DA	Data Access
Data Bits	Sets the number (typically 8) of data bits contained in an asynchronous byte, or character.
Data Cache	A “data cache” is a term for all the values held in memory that have been queried by background queries.
DD	**D**evice **D**escriptor. A DD for a HART-enabled field device provides AMS with all the parameters and capabilities of that device, as provided by the manufacturer, including the device icon that OE displays on the device tree graphic.
Deadband	A value that defines an inactive zone above the low limits and below the high limits. The deadband prevents a value (such as an alarm) from being set and cleared continuously when the input value oscillates around the specified limit. Defining a deadband also prevents the logs or data storage locations from being over-filled with non-significant data.
Device	A device in the OE database that maps to a physical RTU.
Device Template	A device in the OE database that can be used to create (“clone”) a new device.
Diagnostic Logging	If enabled, this allows logging of communications to and from wired HART® and *Wireless*HART® devices.
Diary	A time frame that may act as a “container” for a pattern. The diary has an assigned beginning and ending time. The Scheduler (which must be running in order for scheduled diaries to work) automatically starts the diary at the specified time. You can configure a diary to repeat continuously, to run for a specified number of times, or run just once.
DNP3	DNP3 is a robust protocol used in process control systems such as OE. Providing communication between control equipment and data acquisition devices, DNP3 was originally developed for use in electric and water utility SCADA systems.

E

EFM	Electronic Flow Metering or Measurement
ETS	**E**nergy and **T**ransportation **S**olutions (formerly Remote Automation Solutions), an affiliate of Emerson Electric Co. focused on serving the oil and gas industry.

F

FF	Foundation Fieldbus
Field device	An RTU which has been added to the OE database…

F

Field Tools™	A software product from Remote Automation Solutions. Technicians at the wellhead use Field Tools to connect with RTUs and HART transmitters in order to set up, tune, and perform field maintenance work for the SCADA network. Field Tools interfaces with the AMS HART Device Configurator (a limited release of AMS Device Manager that accesses device menus and icons, and launches the AMS Device Manager device screens from an external tool). Field Tools also provides an interface to the RAS network of HART devices.
FloBoss™ 107	A product of ETS, a microprocessor-based device that provides flow calculations, remote monitoring, and remote control. A FloBoss is a type of ROC.

H

HART®	**H**ighway **A**ddressable **R**emote **T**ransducer.
HART/IP	"HART over IP": a method to transport HART communications to an IP address that is running a HART server.
HCF	HART Communications Foundation, the standards development and support organization for the HART communication protocol.
HDA	**H**istorical **D**ata **A**ccess
Historian module	A software component that creates historical data.
HMI	**H**uman **M**achine **I**nterface. Basically, the data that is presented to the control room operator from the processing plant.
HSI	**H**ost **S**ystem **I**nterface. Specific software that allows AMS Device Manager to communicate with the OpenEnterprise system.

I

IBP	**I**nternet **B**ristol **P**rotocol over UD**P**
ICMP	**I**nternet **C**ontrol **M**essage **P**rotocol
IEC 62591	Standard from the International Electrotechnical Commission (IEC) that specifies an interoperable self-organizing mesh technology in which field devices form wireless networks that dynamically mitigate obstacles in the process environment. The Remote Automation Solutions' IEC62591 Interface module provides ROC, FloBoss, and ControlWave Micro devices with this functionality.

L

Lists	Collections of ACCOL signals. Each signal list is assigned a number from 1 to 255. Signals within the signal list are referenced by their position in the list. Each list can contain any mixture of analog, analog alarm, logical, logical alarm, or string signals.
List view	Part of the HMI that displays list content.
Local Alarm	Local alarms can be raised depending on numerical or digital attribute values in the database. **Note**: String and Date/Time attributes cannot generate alarms.

M

MIS	**M**anagement **I**nformation **S**ystem. A computer system, usually based on a mainframe or minicomputer, that provides management personnel with up-to-date information (such as sales and inventory) on an organisation's performance. MIS output information in a form that is useable by managers at all organisational levels (strategic, tactical, and operational).
Modbus	A popular device communications protocol developed by Gould Modicon.
MSD	Signal address. A two-byte numerical address for a signal within a ControlWave RTU. Also referred to as PDD.

N

Network Configuration Utility	The component of the AMS Device Manager software designed to maintain all parameters you can change for an OpenEnterprise network including communication settings.
nw3000	The Network3000 range of RTUs for which the BSAP RDI was first developed.
.NET	Microsoft technology that abstracts coding away from the operating system and provides a library of objects for use within an application. Also takes care of memory de-allocation. .NET is the technology of choice for OpenEnterprise Version 3.x applications

O

OE	**O**pen**E**nterprise™, the SCADA application from Emerson Process Management Remote Automation Solution.
OE Language Pack	A file that contains the translations for a particular language for a given build of OpenEnterprise. This can be installed via the Translation Manager.
OEStore	The application file store for Workstation views and other related files. OEStore is a substituted directory created during the installation of an OE Workstation. OE maps the folder *C:\ProgramData\Emerson\OpenEnterprise\OEStore* to the drive letter O. (This is the default location but can be changed using the SettingsEditor).
OPC	**O**bject linking and embedding for **P**rocess **C**ontrol applications; a set of seven open standards for connectivity and interoperability of industrial automation and the enterprise systems.

P

Pattern	Templates that OE uses to change the value of an analog or digital signal over a period of time.
PI	Suite of applications including Enterprise Historian, Asset Framework, Calculation Engine, Notification and Visualization manufactured by OSISoft Inc.
Polling	The act of collecting data from an RTU. This can occur either manually or automatically.

P

Product Translations	Translations required for customer-specific strings (such as the name of a pump or a well).
Project Translations	Translations required for customer-specific strings (such as the name of a pump or a well).
Protocol	A set of standards that enables communication or file transfers between two computers. Protocol parameters include baud rate, parity, data bits, stop bit, and the type of duplex.
Protocol Bridge Device	A HART device (such as the HART Multiplexer or 1420 Smart wireless gateway) that has other devices connected to it either wired or wirelessly.

R

RBE	**R**eport **B**y **E**xception
RCC	Remote Comm Controller, a machine running the Remote Comm Manager which allows the OE client server to manage the machine's devices and communications.
RDB	**R**emote **D**atabase **A**ccess
RDI	**R**emote **D**evice **I**nterface; a program that communicates with the control program in the device to obtain data.
Redundant device pair	The ControlWave/Bristol 33xx redundant control systems use communications redundancy and dual CPUs and power supplies. This redundant system monitors primary and hot standby CPUs, automatically detects failures, and triggers a switchover from the primary CPU to the hot standby CPU. The process also switches all communication channels and automatically transfers data, alarms, and historical information.
ROC	Remote Operations Controller, a microprocessor-based unit that provides remote monitoring and control.
ROCLINK 800	Microsoft® Windows®-based software used to configure functionality in ROC, DL8000, or FloBoss devices.
rtrdb1	The default database DATASERVICE name for the OpenEnterprise database.
RTU	**R**emote **T**erminal **U**nit. A device which interfaces objects in the physical world to a SCADA system by transmitting telemetry data to the system and/or altering the state of connected objects based on control messages received from the system.

S

SCADA	**S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition; a type of industrial control system (ICS). Industrial control systems are computer-controlled systems that monitor and control industrial processes that exist in the physical world. SCADA systems historically distinguish themselves from other ICS systems by being large-scale processes that can include multiple sites and large distances.
Signals	The data points placed in or collected from a device.

T

Template	In OE, a physical device which is used as a pattern to simplify the process of adding new physical devices to a network. You apply the template – and its associated data configurations – to the new device to quickly configure it. Additionally, you can configure the new device to reflect any changes you may make to the template device.
TLP	Type (of point), Logical (or point) number, and Parameter number. You reference data in the ROC800 or FloBoss by type, location or logical, and parameter (TLP). Type refers to the number of the point type. The location or logical number is a value based on physical input or output. A parameter is a numeric value assigned to each piece of data contained in a given point.
Tokens	Tokens determine workstation security. Specific Human Machine Interface (HMI) functionality is allowed or denied through tokens. Tokens are required for file access, OPC write access, built in application context menus and custom menus. Token security is configured using the Security Configuration tool.

U

Unicode	Computing industry standard for the consistent encoding, representation, and handling of text expressed in most of the world's writing systems. Storage of each character is stored in more than one byte and therefore characters from languages other than English are available. However, the wider characters mean that Unicode text needs to be treated differently in code from ASCII.
Update mask	A configuration tool that identifies specific portions of a device's configuration to address when updates occur. A mask can prevent or facilitate updates.
UTC	Coordinated Universal Time (UTC), a worldwide civil time standard.

W

WHA	*Wireless*HART® Adapter
Wizard	A series of software screens that guides you through a specific task.

Appendix B. AMS HART Pass-Through Tables

The following new tables have been added to OE for the AMS HART Pass-Through. Please see the OESchemaReference.chm file (in *C:Program Files(x86)\Emerson\OpenEnterprise\Bin*) for detailed information.

Tablename	Attributes	Description
hartdevices	See the OESchemaReference.chm	This table contains an entry for each type of HART device (Wired, Wireless, Gateway, Adapter, or WiredToAdapter). The View HART Devices in Network Communications RTU node is built from this table.
hartdevicesinalarm	See the OESchemaReference.chm	This table stores the alarms for HART RTU devices. The system generates an alarm when a ROC, CW, or FloBoss qualifying HART RTU device is added to or removed from the database. A HART Device Communication Error also generates an alarm.
hartdevicesinalarmalarmcondition	devicename	This table stores the alarmconditions for HART RTU devices. The system generates an alarm when you add or remove a ROC, CW, FloBoss qualifying HART RTU device from the database. A HART Device Communication error also generates an alarm.
hartpointfailalarmalarmcondition	devicename	This is the table for all hartpointfail alarmconditions relating to a HART device communication failure.
rtusalarmcondition	deviceid	Provides the device ID for HartDevicesInAlarm_table

Index

For customer service and technical support, visit *Emerson.com/SupportNet*.

Global Headquarters, North America, and Latin America:
Emerson Automation Solutions
Energy and Transportation Solutions
6005 Rogerdale Road
Houston, TX 77072 U.S.A.
T +1 281 879 2699 | F +1 281 988 4445
www.emerson.com/EnergyandTransportation

Europe:
Emerson Automation Solutions
Energy and Transportation Solutions
Unit 1, Waterfront Business Park
Dudley Road, Brierley Hill
Dudley DY5 1LX UK
T +44 1384 487200

Middle East/Africa:
Emerson Automation Solutions
Energy and Transportation Solutions
Emerson FZE
P.O. Box 17033
Jebel Ali Free Zone – South 2
Dubai U.A.E.
T +971 4 8118100 | F +971 4 8865465

Asia-Pacific:
Emerson Automation Solutions
Energy and Transportation Solutions
1 Pandan Crescent
Singapore 128461
T +65 6777 8211| F +65 6777 0947

EMERSON