

# Rosemount 3420

## Fieldbus Interface Module



CE



# Rosemount 3420 Fieldbus Interface Module (FIM)

Physical Device Revision 2.1

Web Server Revision 2.3.19

## NOTICE

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

Within the United States, Emerson Process Management has two toll-free assistance numbers:

**Customer Central**

Technical support, quoting, and order-related questions.

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1-800-654-7768 (24 hours—includes Canada)

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# Section 1 Introduction

## OVERVIEW

This manual provides installation and troubleshooting instructions for the Rosemount 3420 Fieldbus Interface Module (FIM).

## Using this Manual

The sections in this manual provide information on installing, operating, and maintaining the Rosemount 3420 Fieldbus Interface Module.

- Section 2: Installation contains mechanical and electrical installation instructions.
- Section 3: Configuration provides instruction on commissioning and operating the Rosemount 3420 Fieldbus Interface Module. Information on software functions, configuration parameters, and online variables are also included.
- Section 4: Operation and Maintenance contains operation and maintenance techniques.
- Section 5: Troubleshooting provides troubleshooting techniques for the most common operations.
- Appendix A: Reference Data supplies reference and specification data, as well as ordering information.
- Appendix B: Approval Information contains intrinsic safety approval information, European ATEX directive information, and approval.
- Appendix C: Fieldbus Status Values contains fieldbus function block output status codes.
- Appendix D: Modbus Configuration in Honeywell® TDC APM/HPM
- Appendix E: Integer Scaling contains information on configuring and scaling integers.
- Appendix F: AMS™ Suite: Intelligent Device Manager with Rosemount 3420
- Appendix G: CSI 9120 Machinery Health Transmitter

## Service and Support

To expedite the return process outside of the United States, contact the nearest Rosemount representative.

Within the United States, call the Rosemount National Response Center using the 1-800-654-RSMT (7768) toll-free number. This center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

Rosemount National Response Center representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substance can avoid injury if they are informed of and understand the hazard. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

## Section 2 Installation

|                              |          |
|------------------------------|----------|
| Overview .....               | page 2-1 |
| Installation Procedure ..... | page 2-3 |

### OVERVIEW

Dimensional drawings are included in Appendix A: Reference Data. A PC with an Ethernet port is required to perform the initial configuration of the device.

### Safety Messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

### Warnings

#### ⚠ WARNING

Explosions could result in death or serious injury:

- Do not remove the transmitter from its mounting enclosure in explosive atmospheres when the circuit is live.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury. If the device is installed in a high-voltage environment and a fault condition or installation error occurs, high voltage may be present on transmitter leads and terminals.

- Use extreme caution when making contact with the leads and terminals.

Failure to follow these installation guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.

### General Considerations

The Rosemount 3420 may be mounted in any General Purpose location. Be sure the covers are secured tightly to prevent exposure of the electronics to moisture and contamination.

#### CONFIGURATION NOTE

Before connecting the fieldbus segments to the Rosemount 3420, you must first connect a PC and configure the Rosemount 3420. Once the Plug and Play features have been set up you can then make the final connection of the segments to the Rosemount 3420 terminal strip.

## System Requirements

### Operating System:

- Windows 2000, service pack 4
  - Windows XP (Home or Professional), service pack 1
  - Windows 2003
  - Windows Vista
- (or newer)

If the operating system requirement is not met, the setup will display a message and stop.

### Applications:

- Internet Explorer 6.0
  - Sun Microsystems™ Java™ Runtime 1.4.1
- (or newer)

If the user manual is being installed, the following application is also required:

- Adobe® Acrobat® 5.0
- (or newer)

If the Network Assistant or OPC Proxy Setup utilities are being installed, the following application is also required:

- .NET Framework 1.1

If any of the above requirements are not met, the setup disc will install the following:

- Internet Explorer 6.0 service pack 1
- Sun Microsystems™ Java™ Runtime 1.5.0\_04
- Adobe® Acrobat Reader® 7.0
- .NET Framework 1.1

### Hard disk space:

- Maximum installation (including all upgrades performed by the setup disc): 250 mb
- Typical installation (all features, but none of the above installed): 35 mb

INSTALLATION  
PROCEDURE

Software Installation

To prepare a PC to communicate with the 3420, insert the Setup Assistant & Support Files CD that came with your 3420. Follow the directions in the installation windows to install the desired components.

At the **Setup Type** screen, select **Complete** or **Custom** depending on your specific needs. Custom setup allows you to choose whether to install the following options:

|                              |  |
|------------------------------|--|
| <b>3420 User Interface</b>   | When this feature is selected, setup will install any additional software required to use this PC as a user interface for the 3420. This may include installing Microsoft Internet Explorer and Sun Microsystems Java Runtime. |
| <b>3420 Reference Manual</b> | When this feature is selected, setup will install an electronic copy of the Rosemount 3420 Reference Manual (this manual) on the PC. This may include installing Adobe Acrobat Reader.   |
| <b>Network Assistant</b>     | When this feature is selected, setup will install Network Assistant, a program that automates network configuration changes to support 3420 configuration.   |
| <b>OPC Client Runtime</b>    | When this feature is selected, setup will install software that will allow OPC clients running on this PC to access the 3420.  |
| <b>OPC Proxy Setup</b>       | When this feature is selected, setup will install the OPC Proxy Setup program to configure which 3420s will be accessed by OPC clients running on this PC  |

Once you have selected the desired options, continue with installation by clicking **Next**. Other selectable optional features include a desktop icon for the network assistant, a desktop icon for OPC Proxy Setup, and whether to start OPC deviceCOM server automatically.

OPC Installation

While using an OPC client (such as Matrikon OPC Explorer), install the OPC Proxy Setup application. This will allow OPC Client users to define the IP address of the 3420 OPC Server to access.

**NOTE:**

If you need access to more than one 3420 OPC Server, all IP addresses should be defined in the OPC Proxy Setup application.

When the OPC Proxy Setup is completed, the OPC Client will list the available OPC Servers. You may then choose and connect to the desired server(s).

Once connected, add groups and tags for OPC Client access.

Physical Installation

For dimensional drawing information refer to Appendix A: Reference Data on page A-4.

The cast aluminum housing encloses the electronics circuitry of the FIM. The front of the enclosure has two covers; an upper cover and a junction box cover.

The upper cover provides access to the electronics assembly which includes the microprocessor, fieldbus interface boards, fieldbus power conditioners/terminators, and the power supply board.

The junction box cover provides access to the terminal block. To open either cover of the enclosure, use a 1/4 inch blade screwdriver to remove the appropriate screw on the unhinged side of the enclosure.

## Mounting Procedure

The FIM can be mounted to a support bracket on a wall or to a pipe.

### Mounting the FIM to a Support Bracket

The following hardware and tools are needed:

- Four  $1\frac{5}{16}$  inch bolts
- Mounting support
- $\frac{3}{8}$  inch drill
- $\frac{1}{2}$  inch socket-head wrench

Mount the FIM by doing the following:

1. Drill four  $\frac{3}{8}$  inch (9.525 mm) holes in the support bracket to which the FIM will be mounted.
2. Using a  $\frac{1}{2}$  inch socket-head wrench, attach the FIM to the support bracket with four  $1\frac{5}{16}$  inch bolts.

### Mounting the FIM to a Pipe

The following hardware tools are needed:

- Pipe mount with holes spaced 2.81 inch (71 mm) apart horizontally and 11.15 inch (283 mm) apart vertically.
- Two  $\frac{5}{16}$  inch U-bolts
- $\frac{1}{2}$  inch socket-head wrench

Mount the FIM by doing the following:

1. Insert one U-bolt around the pipe and through the top mounting holes of the pipe mount and the FIM and another U-bolt through the bottom mounting holes of the pipe mount and the FIM.
2. Using a  $\frac{1}{2}$  inch socket-head wrench, fasten nuts to the U-bolts.

## Grounding the FIM

If mounting the Rosemount 3420 in the field, ground the FIM with a connection of 1  $\Omega$  or less leading from the external grounding lug to earth ground. If mounting the FIM in the control room, a cabinet ground is sufficient. In either location, follow local or plant electrical codes.

## Wiring the FIM

FIM wiring is done in the terminal block. For access to the terminal block, open the junction box cover following the instruction "Installation Procedure" on page 2-3. The terminal block label is located on the inside of the FIM junction box cover.

At the bottom of the junction box in  $\frac{1}{2}$  inch NPT conduit entries are four plastic plugs that were placed there at the factory. Four metal plugs were shipped with the FIM and are used to seal any unused ports.

The FIM case should always be grounded in accordance with national and local electrical codes. The most effective grounding method is direct connection to earth ground with minimal impedance.

The internal Ground Connection located with the supply terminals is the Internal Ground Connection screw. This screw is identified by the following symbol:

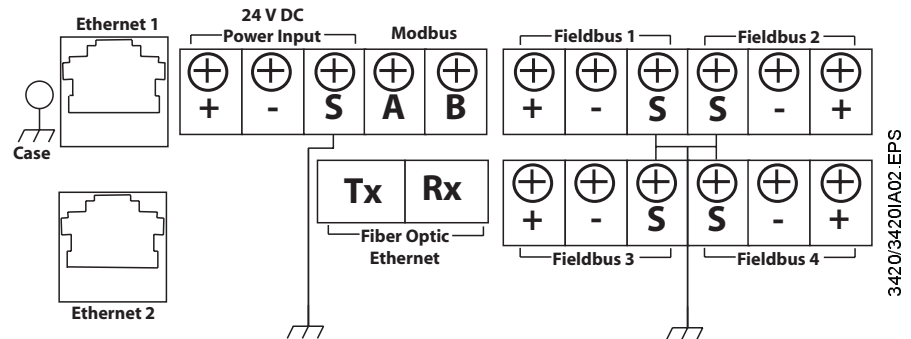


## NOTE

Grounding the FIM case via threaded conduit connection may not provide sufficient ground.

The wiring should include an external power shut-off switch or an external circuit breaker. This device should be located near the FIM.

Figure 2-1. Terminal Wiring Diagram



## FIM Input Power Connection

The FIM is designed to be powered by 24 V dc power. Use a power supply suitable for 185°F with sufficient capacity to power both the FIM and all of the fieldbus devices that are connected to it. The Rosemount 3420 requires 500 mA. About 300 mA of additional current should be allocated for each H1 segment if the unit is configured with internal power conditioners. The positive and negative power terminals are found on the left side of the terminal block. A case ground is also found on the left hand side of the compartment.

## Connecting the Devices

### Ethernet

The 3420 is equipped with one or two 10/100 Base-T Ethernet interface receptacles on the left side of the terminal block. Connect the FIM to the PC that will be used for configuration, using the crossover cable provided with the 3420. You may also connect the 3420 to an existing Ethernet Hub, Switch or Router.

The second Ethernet port on the 3420 terminal block is an optional factory-configured redundant Ethernet port. (ordering option Output Code 2)

### Fieldbus

The fieldbus terminals are found on the right side of the terminal block in 4 sets of three terminals for the positive and negative conductors and a shield. Although the FIM is not polarity sensitive, other components in the segment such as junction blocks may require correct polarity.

### Modbus

The Modbus interface terminals are located in the upper-middle of the wiring block next to the power input. The Modbus interface is polarity sensitive. Connect the negative to the right most terminal (B) and the positive to the left terminal (A).



## Modbus Termination Setup

### NOTE:

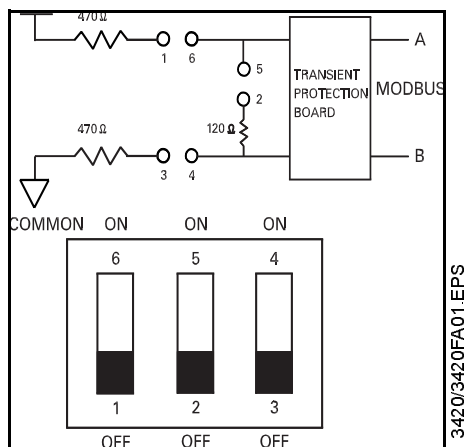
Do not open the 3420 electronics housing in an explosive atmosphere.



Modbus RTU is transmitted on an RS485 physical layer. Three dip-switches are provided to enable the RS485 circuitry with a network terminator. The switches are found inside the electronics housing on the RS485 communication board located in the top center of the housing. Switch 2 places a 120 ohm terminator on the bus. This would be used to match cable impedance if needed to dampen reflections on long cable runs. Its use will depend on the baud rate and cable length of the Modbus network.

Switches 1 and 3 are connected to pull-up and pull-down resistors on the Modbus network. These resistors are used to prevent noise from being interpreted as valid communications during periods when no communications are occurring on the network. Only one set is required on an RS485 network.

Figure 2-2. Modbus Setup

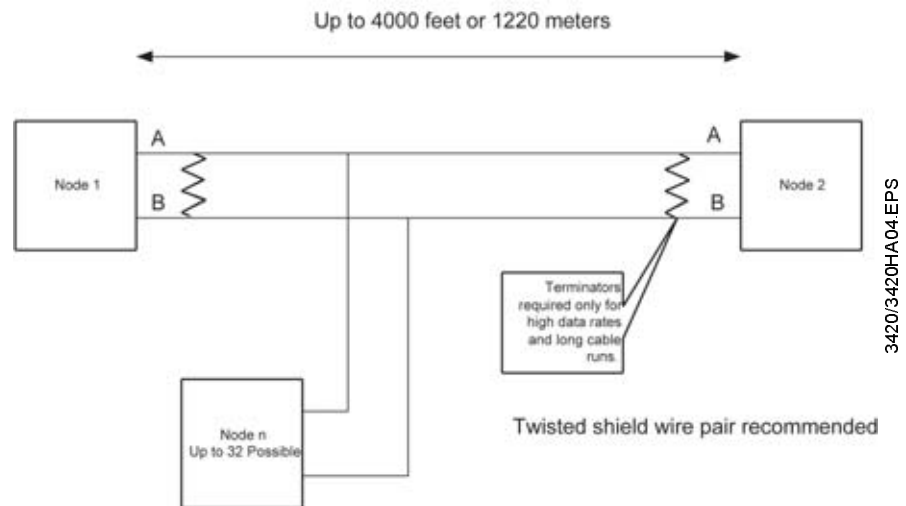


## RS485 Serial Interface

The RS485 standard describes a balanced transmission line operating in a shared or multi-drop model. As many as 32 driver/receiver pairs can share a single network.

Figure 2-3 shows a typical two-wire multi-drop network such as used with the Rosemount 3420. The RS485 specifications indicate that the transmission line should be terminated at both ends of the network. However termination should only be used with high data rates above 115kb and long cable runs so it should not be necessary with the transmission rates used by the Rosemount 3420.

Figure 2-3. Typical two-wire multi-drop network.



## Section 3 Configuration

|                              |           |
|------------------------------|-----------|
| Fieldbus Field Devices ..... | page 3-9  |
| Modbus .....                 | page 3-15 |
| Snapshot Files .....         | page 3-21 |
| Trend Collection .....       | page 3-23 |

### ⚠ WARNING

#### Explosions could result in death or serious injury:

- In an Explosion-Proof and Flame-Proof environment, do not open the Rosemount 3420 electronic housing in an explosive atmosphere.
- Cover must be fully engaged to meet Explosion-Proof requirements.

### Private Networks

To configure the Rosemount 3420, a private network between a PC and the Rosemount 3420 must first be established. This can be done with a PC dedicated to the Rosemount 3420 or a PC used for another purpose can be temporarily configured for the task. If a PC from another network is used, carefully record the current IP address and other settings so the PC can be returned to its original network when configuration of the Rosemount 3420 is finished. If using a PC attached to another network, shut down the PC and remove it from the network before proceeding to set up the Rosemount 3420 private network.

#### Configure from the CD

The simplest way to configure the PC for use with the 3420 is to use the Network Assistant installed from the CD included with the 3420.

Configuration of the FIM is done through its web interface. To access the device, you must create a private LAN with a subnet of 192.168.1.XX. The FIM will appear on this LAN at the IP address 192.168.1.10.

1. Using the cross-over Ethernet cable, attach your PC to the Rosemount 3420.
2. Launch the network assistant on your PC by double-clicking on its desktop icon or by selecting it from the start menu.
3. If prompted, select the network adapter that you connected to the 3420.
4. Click on the "Direct" button to establish a direct connection to the 3420.

When you are ready to remove the PC from the 3420 first open the Network Assistant and select **Normal** to return the settings of the PC to their original values. To check the connection, proceed to step 5 below.

**The PC address and host settings can also be changed manually using the following procedure for Windows XP. The procedure for other operating systems may vary slightly:**

1. On your PC, install the Java Plug-in found on the CD provided with the 3420. You can also find the Java Plug-in at:  
<http://java.com/>
2. Download the Java software and install it on your computer.
3. Under **Network Connections** in your **Control Panel**:
  - a. Select **Local Area Connection**
  - b. Right click to select **Properties**, select **Internet Protocol (TCP/IP)**, then click the **Properties** button
  - c. Select the **Use the following IP address** button and set your IP address to **192.168.1.12**
  - d. Set your Network address to 255.255.255.0
  - e. Select **OK** or **Close** for each of the settings windows that have been opened.
4. Using the crossover ethernet cable, attach your PC to the Rosemount 3420. Add an entry in your hosts for the fim3420.
5. Check the Network connection by typing: PING fim3420 in the Command Prompt. If you see replies you know you have the hosts file setup properly.
6. Open your Internet Explorer browser.
7. In your browser address bar type: <http://fim3420>.
8. Press **Enter**. (You should get a message displayed that you are being redirected to the 3420 home page.)
9. At the **Enter Network Password** box:
  - a. LogOn as User: **admin**
  - b. Password of: **fieveladmin**

---

#### **NOTE**

Before leaving any web page that you make changes to, click **Submit**, or all your changes will be lost.

---

## **3420 Network**

Click **Setup>Network>Address** on the left menu tree to enter network parameters. If the FIM is connected to a LAN or if more than one FIM will be used on a private network, the unit will need to be given a new IP address and a new hostname. A new entry will need to be added to your host file with the new IP address and Host name using the Network Assistant or the manual procedure described above.

#### **Address**

If you will be attaching the 3420 to an internal Intranet, you may select to have the device attain an IP address via DHCP or be statically assigned an IP address (Figure 3-1). Contact your network administrator if you are not sure which selection is appropriate.

#### NOTE

If you accidentally misconfigure the network settings and can not reach the device at the new IP address, return the device to the private LAN you used for initial configuration with only the one 3420 connected. You can still access the FIM by its default IP address (192.168.1.10) in this environment.

Figure 3-1. Network Address

ROSEMOUNT 3420 Fieldbus Interface Module EMERSON Process Management

Network Address admin

☐ Obtain an IP address from a DHCP server  
☐ Obtain Domain Name from DHCP server

☒ Specify an IP address

|             |                |
|-------------|----------------|
| Hostname    | xmt-web        |
| Domain Name | ep.fco.com     |
| IP Address  | 155.177.145.30 |
| Netmask     | 255.255.255.0  |
| Gateway     | 155.177.145.1  |

Submit

© Emerson, 2005 Feedback Terms Of Use 3420 FIM 2.3.5

3420/REV CAN/NETWORKADDRESS.TIF

#### Backup Address

This address should only need to be changed if your internal corporate network uses non-routable IP addresses for its internal use and they use the 192.168.1.xxx subnet. If this is the case, you will want to change the default IP address to an address that does not conflict with an address that is in use. Please consult your network administrator if you can not make that determination yourself.

Click **Setup>Network>Backup Address** to configure the backup IP Address settings.

Be very careful when changing these settings. The device can be rendered unusable if these values are modified incorrectly.

## Redundant Ethernet Configuration

If the 3420 has been ordered with a redundant network interface, the network setup page (**Setup>Network>Address**) will display a secondary interface as shown below.

**ROSEMOUNT 3420 Fieldbus Interface Module** EMERSON Process Management

**Network Address**

**Primary Interface**

☐ Obtain an IP address from a DHCP server  
☐ Obtain Domain Name from DHCP server

☒ Specify an IP address:

|             |               |
|-------------|---------------|
| Hostname    | fm3420        |
| Domain Name |               |
| IP Address  | 192.168.1.10  |
| Netmask     | 255.255.255.0 |
| Gateway     | 192.168.1.1   |

**Secondary Interface**

☐ Obtain an IP address from a DHCP server  
☐ Obtain Domain Name from DHCP server

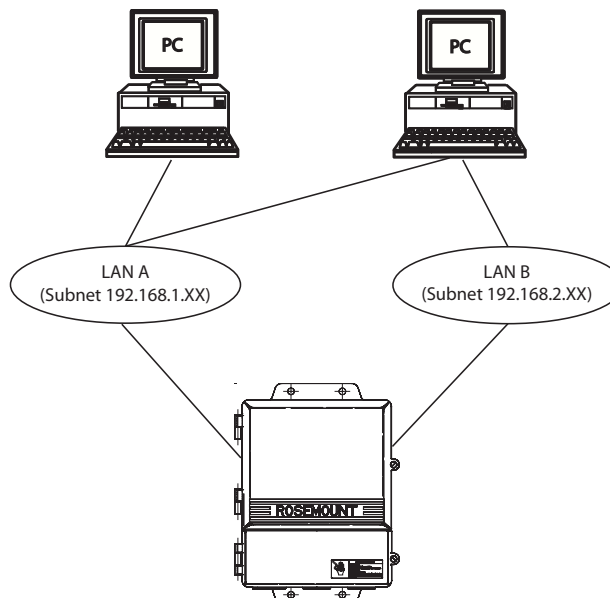
☒ Specify an IP address:

|             |               |
|-------------|---------------|
| Hostname    |               |
| Domain Name |               |
| IP Address  | 192.168.2.10  |
| Netmask     | 255.255.255.0 |

3420 File 2.3.12

3420/SCREENSHOTS/REDUNDANT.TIF

The second network interface allows the 3420 to be accessed with two separate network addresses. The redundant interfaces provide the 3420 with a degree of fault tolerance to network failures. The following network topology is supported:



**NOTE**  
The subnet numbers listed in the diagram are an example. Any valid network subnets are acceptable.

If you will be using the redundant ethernet feature, you may select to have the device obtain an IP address via DHCP or be statically assigned an IP for the secondary interface. Contact your network administrator if you are not sure which selection is appropriate.

Security

Click **Setup>Security** to change the passwords. These passwords allow for varying levels of application access. The administrator can modify any system or field device setting. In contrast, the operator is only able to modify some Fieldbus parameters. Use caution when changing the administrator password. If the administrator password is lost, you will not be able to set up the Rosemount 3420. The FIM is shipped with the following default passwords:

Table 3-1. Default Passwords

| ID                    | PASSWORD     |
|-----------------------|--------------|
| Executive (exec)      | showme       |
| Operator (oper)       | runit        |
| Maintenance (maint)   | keepitgoing  |
| Administrator (admin) | fielveladmin |

Table 3-2. Access Table

| Role                  | HTML Access   | Explorer view Access   |
|-----------------------|---|--|
| Executive (exec)      | With the exception of factory settings (Setup/factory.html), can get any page (Read-Only access).   | Read-only access to AI and MAI blocks. (VFDs and other blocks are not visible. |
| Operator (oper)       | No additional privileges  | Same values as executive, but with read-write access.                          |
| Maintenance (maint)   | <ul style="list-style-type: none"><li>• Can set device PD tags</li><li>• Can set block tags</li><li>• Can configure Modbus communications</li><li>• Can configure Modbus register map</li><li>• Can configure snapshots</li><li>• Can configure Plug and Play and Operating Modes</li></ul> | All parameters of all blocks (Read-Write).                                     |
| Administrator (admin) | <ul style="list-style-type: none"><li>• Can configure network settings (address, default).</li><li>• Can set passwords</li><li>• Can set time settings</li><li>• Can set home page options</li><li>• Can restart applications</li></ul>   | No additional privileges   |

System Time Setup

Click **Setup>Time** to configure the system time. If your Rosemount 3420 is connected to a network and you want to use this feature, you should select a timeserver at your facility or one near you geographically to insure accurate time adjustments. The device will function properly with this feature disabled but data time stamps will be less accurate and time updates must be entered for each Rosemount 3420.

To use a network time server, check the box **Enable Network Time Protocol**, enter the IP address of the time server and select the appropriate NTP packet version.

Alternately you can set the time manually. This is accomplished by unchecking the “Enable Network Time Protocol” check box. This will enable you to enter information into the “Date” and “Time” fields.

## Page Options

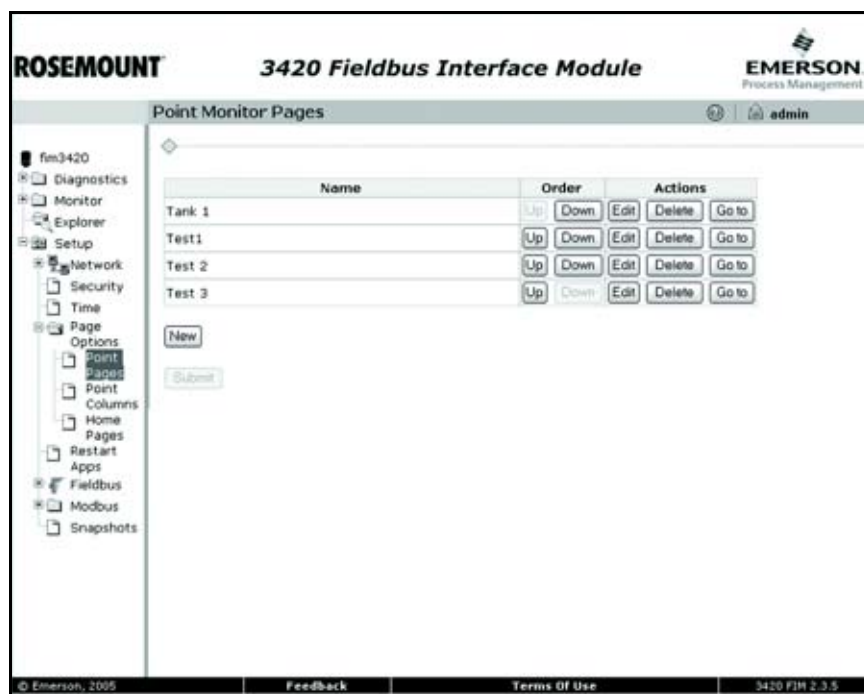
Click **Setup>Page Options** to configure the point monitor and application monitor pages. You can also select which page you wish to use as the 3420 home page.

## Point Monitoring Pages

Point Monitor Pages provide a means to view the PV or Output of a Function Block and its status on one or more web pages. Multiple pages can be configured to fit the application.

Click **Setup>Page Options>Point Pages** to display the current list of Point Monitor Pages.

Figure 3-2. Point Monitor Page



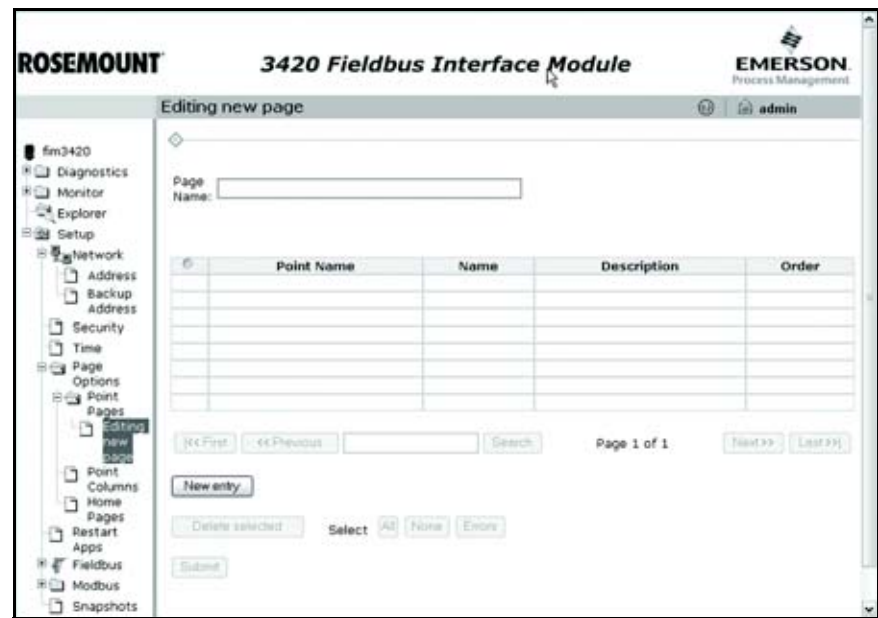
3420/REV CA/POINTPAGES.TIF

To create a new Page click **New**. To edit an existing page click on **Edit** to the right of the page name.

The editing screen provides a means of selecting the system tags that you wish to include on the page.



Figure 3-3. Editing a new page



To add a new tag, click on **New Entry** and a blank line will be added to the page. Then select the icon to the right of Point Name to select one of the tags connected to the system.

Figure 3-4. Choose a Value



Continue the same process until all of the tags are entered. Then click **Submit** at the bottom of the page.

**NOTE**  
Only enabled blocks will appear in the menu. To enable blocks, see Blocks on page 3-9.

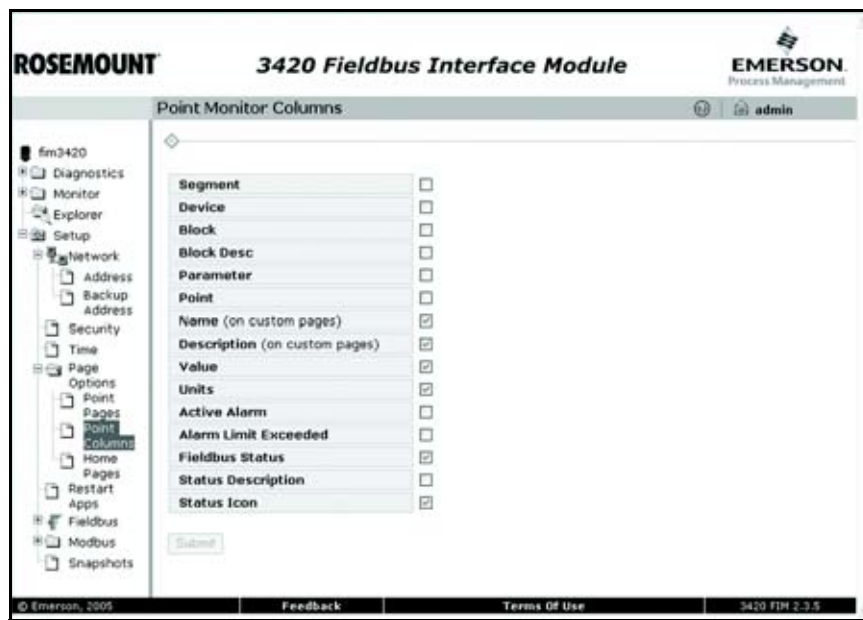
3420/REV CA/EDITINGPAGE.TIF

3420/REV CA/CHOOSEVALUE.TIF

## Setting Up the Page Columns

When you are finished setting up the point pages, click on **Setup>Page Options>Point Columns** on the left menu. This page allows you to select which columns you want displayed on the Point Monitoring Pages.

Figure 3-5. Point Monitor Columns



3420/REV CA/COLUMNS.TIF

Check the columns you wish displayed and click on **Submit**. To view a Point Monitoring Page see Monitor on page 4-5.

## Application Data Configuration

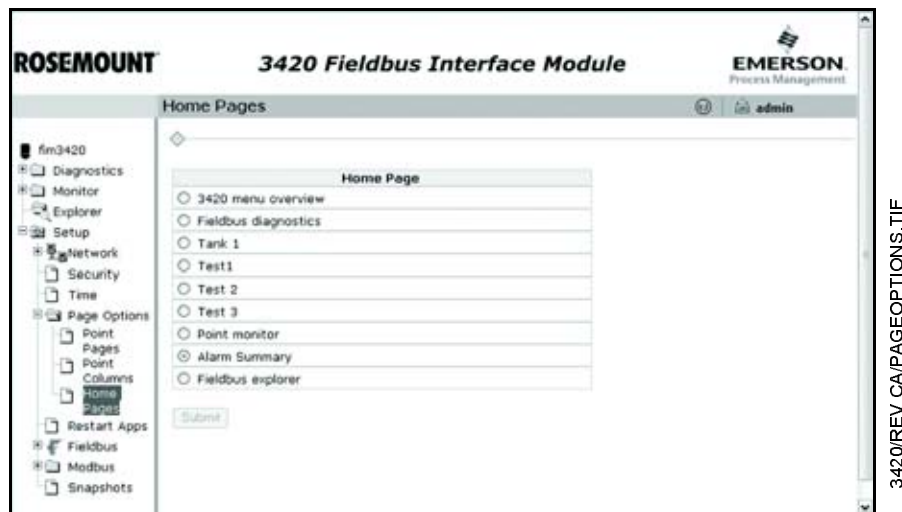
To configure the data for the monitor application, click **Setup>Page Options>App Data**.

A monitoring page is automatically created for each application that is configured on the 3420 Fieldbus segments. Check the fields that you wish to display and then click **Submit**.

## Setting Up the Home Page

To select the first screen seen on the startup of the web interface click **Setup>Page Options>Home Pages**. Check either the Menu Page (default), Fieldbus Diagnostics, or one of the Point Monitoring Pages. Then click **Submit**.

Figure 3-6. Home Page



3420/REV CA/PAGEOPTIONS.TIF

## Restart App

Click **Setup>Restart Apps** to restart the Rosemount 3420 application software. This is not needed during normal operation but may be required when adding a device description or during troubleshooting of a system issue. Simply select **Yes** to restart or **No** to abort. The restart will take about 1-5 minutes, after which the FIM displays the message "Finished restart of the 3420 software."

## FIELDBUS FIELD DEVICES

The FIM collects data based on the tag of the function blocks in the devices. If the devices are not pre-configured with this information it can be edited using the FIM web interface.

### Devices

Click **Setup>Fieldbus>Devices** to rename the Physical Devices (PD) tags for individual devices. If the device is not already identified with a PD tag you can use this display to enter them into the device. Tag names may be 32 characters in length and are case sensitive. Once all of the device PD tags have been entered, click **Submit**. Allow 2 minutes for the update to take effect if several tags are changed at once.

### Blocks

Click **Setup>Fieldbus>Blocks** to set up your fieldbus blocks. If the device's function blocks are not already identified with a tag then you can use this display to enter them into the device. This tag information is used to assign Modbus registers, OPC Connections and other functions in the FIM. Block names (tags) may be 32 characters in length and are case sensitive. Normally not all function blocks will be used in an application. This display allows only those blocks in actual use to be scheduled to optimize the performance of the Rosemount 3420. Also, each block's alarm handling can be individually enabled so alarms are automatically reported and logged.

### Enable Blocks

To enable a block, locate the device on the Block Setup page using the **Previous** and **Next** buttons. When you find the block you want to enable, simply check the box under **Enable Block**, then click **Submit**.

### Enable Alarms

To enable an alarm, locate the device on the Block Setup page using the **Previous** and **Next** buttons. When you find the device you want to add an alarm to, check the box under **Alarms**. You may then click the **Limits** button to choose which type of alarms to enable, the limit, and an optional alarm message for each type. When you are finished, click **Submit**.

---

### NOTE

To optimize performance of the 3420, disable any unused blocks.

---

Once all the changes have been made, click **Submit**. Allow 2 minutes for the update to take effect if several tags are changed at once.

---

### NOTE

All function block tags must be unique on any Rosemount 3420.

---

## Application

Click **Setup>Fieldbus>Application** to set up the links between functions for each segment. FOUNDATION™ Fieldbus technology allows the output of function blocks to be linked to the input of other function blocks to facilitate advanced calculations and control strategies.

### Overview

Click **Setup>Fieldbus>Application>Overview** to show the name, segment, status and whether the application is active. Click **New Application** to set up additional applications.

### New Applications

Each application is the collection of all function blocks linked on an individual segment and must be given a name to identify it. Then each function block that will be included in the application is added. Select the function block by its tag from the drop down list and then select **add**. After the function blocks have been added to the application, the individual links can be set up. Select **New Entry** to add a link to the application. From the drop down list of the first column select the function block output you wish to link to another block. Then in the second column select the function block input you wish to connect to the output. Continue adding links and click **submit** when all links have been added.

### Download

Click **Setup>Fieldbus>Application>Download** to show a list of segments and their status. The Overview page will show all available applications and their current status. While multiple applications can exist for a segment, only one may be active at any one time. Check the **Active** box on the application you wish to use and then **submit** to initiate the download process.

Click on **Setup>Fieldbus>Application>Download** to see the status of each Fieldbus segment. Check the box on the left and click Submit to initialize a download for that segment. A status button will show amber while the download is in process and turn green when complete. If the status button turns red it indicates an unsuccessful download. See the Troubleshooting section for more information.

Advanced

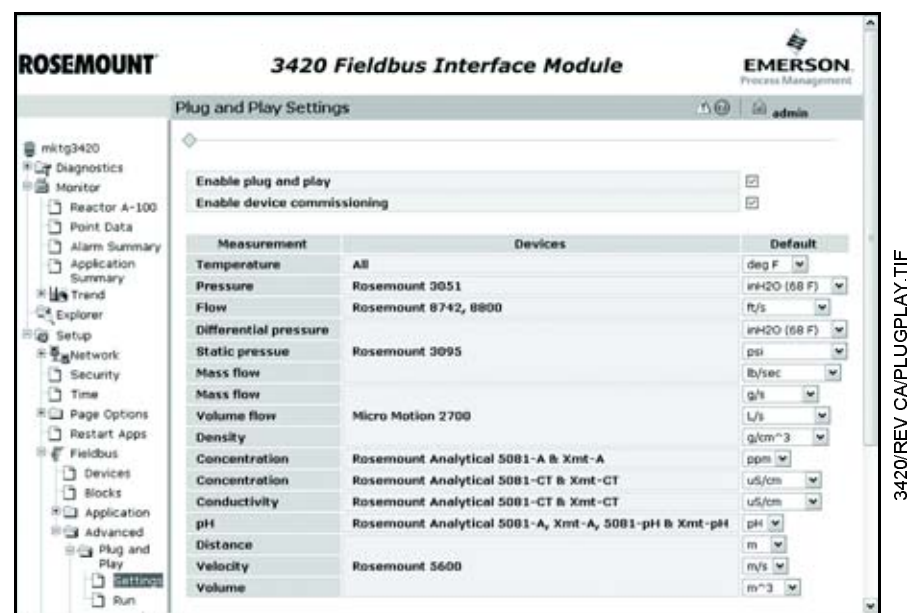
Click **Setup>Fieldbus>Advanced** to access the advanced fieldbus setup features.

Plug and Play

Plug and Play configures devices for monitoring applications automatically the first time the devices are connected to the 3420. Click **Setup>Fieldbus>Advanced>Plug and Play>Settings** to initialize your fieldbus blocks. This screen will also allow you to change any of the default values.

A portion of the plug and play is device specific. For example, a Rosemount 3144P device channel configuration is set so that the first analog input block is set for sensor 1, and the second analog input block is set for sensor 2. For the Rosemount 3051, the first analog input block is set up for pressure. .

Figure 3-7. Plug and Play



When the Rosemount 3420 and all of the fieldbus devices have been set up the way you want them, click **submit**. Be sure the blocks are enabled in **Setup>Fieldbus>Blocks**.

Table 3-3. Plug and Play Default Settings

| Description               | Default Setting          |
|---------------------------|--------------------------|
| Enable Plug and Play      | check                    |
| Default Temperature Units | deg C                    |
| Default Pressure Units    | in H <sub>2</sub> O 68°F |
| Default Flow Units        | ft/s                     |

| Description   | Default Setting          |
|---|--------------------------|
| Differential Pressure                                     | in H <sub>2</sub> O 68°F |
| Static Pressure   | psi                      |
| Mass Flow (Rosemount 3095)                                | lb/sec                   |
| Mass Flow (Micro Motion 2700)                             | g/s                      |
| Volume Flow (Micro Motion 2700)                           | L/s                      |
| Density (Micro Motion 2700)                               | g/cm <sup>3</sup>        |
| Concentration (Rosemount Analytical 5081-A & Xmt-A)       | ppm                      |
| Concentration (Rosemount Analytical 5081-CT & Xmt-CT)     | uS/cm                    |
| Conductivity (Rosemount Analytical 5081-CT & Xmt-CT)      | uS/cm                    |
| pH (Rosemount Analytical 5081-A, Xmt-A, 5081-pH & Xmt-pH) | pH                       |
| Distance (Rosemount 5600)                                 | m                        |
| Velocity (Rosemount 5600)                                 | m/s                      |
| Volume (Rosemount 5600)                                   | m <sup>3</sup>           |

The Rosemount 848T temperature transmitter provides 8 AI blocks and 1 MAI block. An MAI block processes all eight inputs at once. The speed at which the Rosemount 3420 scans all of the measurements from the devices on the fieldbus segments is dependent on the number of AI, MAI, and other function blocks being polled. For example if 13 Rosemount 848T's were polled with MAI blocks the scan time would be approximately 1 second for all 104 values. If the same 13 devices were polled with the AI blocks the scan time would be about 9 seconds (See Table 3-4 on page 3-12).

Table 3-4. Scan Rate

| Number of Blocks scanned on each segment | Scan rate    |
|--|--------------|
| 1  | 0.3 seconds  |
| 2  | 0.4 seconds  |
| 4  | 0.7 seconds  |
| 8  | 1.2 seconds  |
| 16                                       | 3.6 seconds  |
| 32                                       | 4.3 seconds  |
| 64                                       | 6.0 seconds  |
| 128                                      | 11.1 seconds |

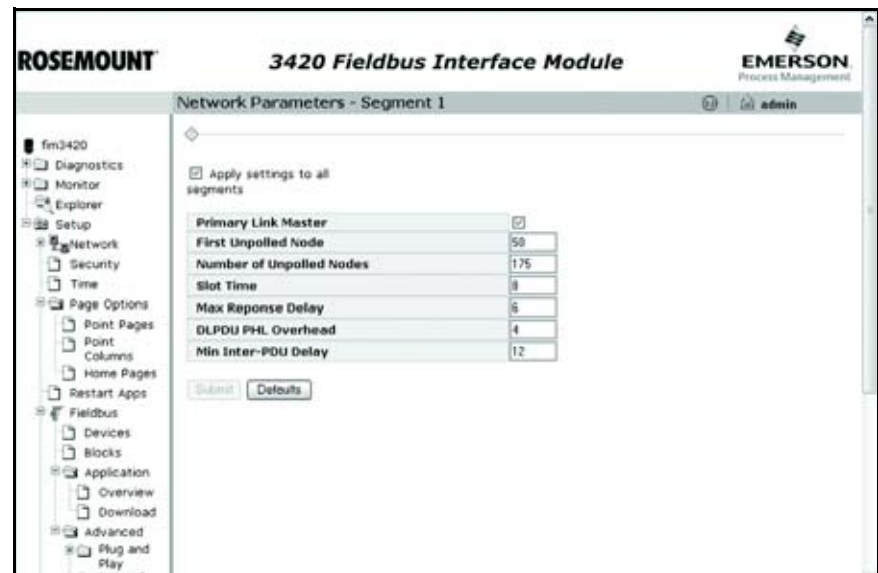
### Run Plug and Play

Click **Setup>Fieldbus>Advanced>Plug and Play>Run** to display Run Plug and Play settings. This page allows you to run (and re-run) plug and play devices by selecting the **Run** box on the right for each device that you wish to re-initialize with the Plug and Play settings and clicking **submit**. It also shows the segment, device and its current status.

### Network Parameters

Click **Setup>Fieldbus>Advanced>Network Params** to display the fieldbus network parameters. Under normal circumstances these values should not have to be changed. However if a new device is added to a segment with significantly different communication capabilities, it may require that these values be adjusted. Contact Rosemount technical support before making any changes.

Figure 3-8. Network Parameters

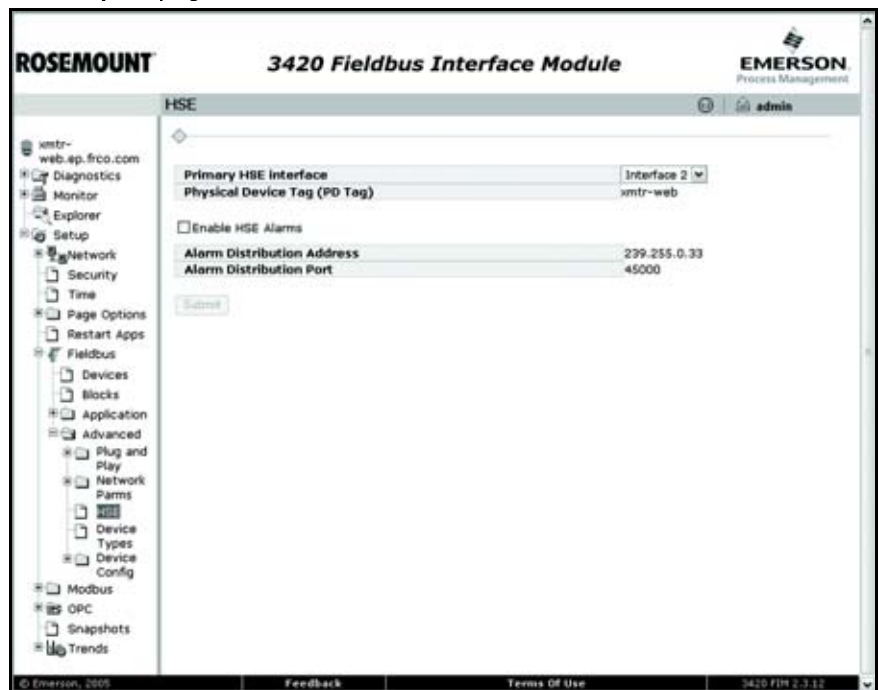


3420/REV CA/NETPARAMETERS.TIF

High Speed Ethernet (HSE) Alarms

Click **Setup>Fieldbus>Advanced>HSE** to enable or disable HSE Alarms, and display the Alarm Distribution Address and Alarm Distribution Port. Alerts are generated by devices and then alarms are propagated through the Rosemount 3420 to the Asset Management System (AMS) software. If your 3420 is equipped with a second Ethernet port, you will need to select the one to be used for the HSE connection of the AMS software.

The Rosemount 3420 also supports PlantWeb Alerts (PW Alerts). See Alarm Summary on page 4-7 for more on alarms.



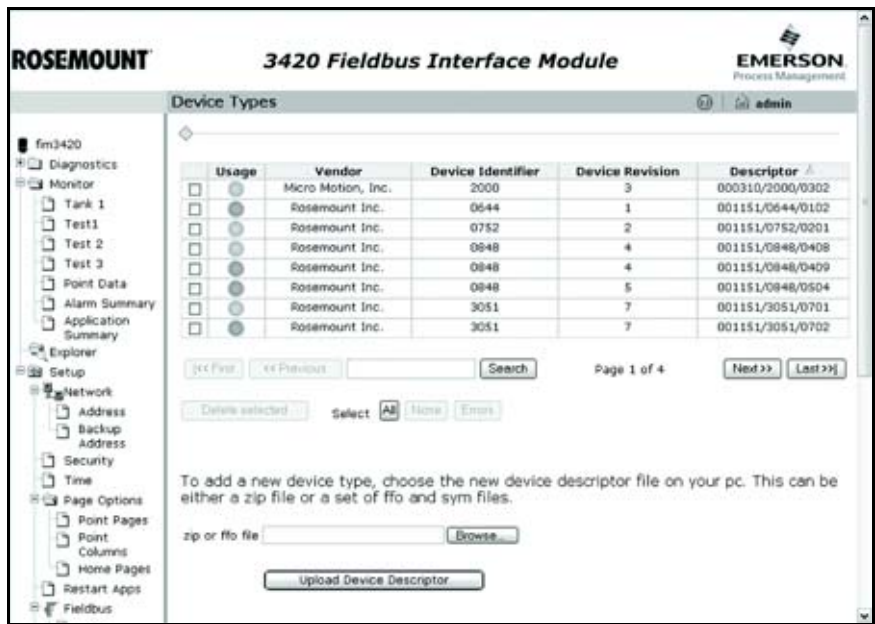
3420/REV CA/HSE.TIF

Device Types

Click **Setup>Fieldbus>Advanced>Device Types** to display all your Rosemount 3420 supported device types that are currently loaded and supported by the Rosemount 3420. To add a device description for a new device or new revision of a device, use the **BROWSE** button to locate either the zip file or ffo file on the PC. Add the file and then select the corresponding sym file.

The Usage indicator will be green if the Device Descriptor (DD) is in use by a device connected to the 3420, orange if the DD is loaded but not used, and red if there is a device connected but a DD is not available in the 3420. There are DDs on the CD ROM that came with the 3420. Otherwise, you can obtain DDs from the device vendor or the Fieldbus Foundation at <http://www.fieldbus.org>.

Figure 3-9. Example of Supported Device Types



Device Configuration

The configuration of each device attached to the Rosemount 3420 can be saved and restored at a later time. This also allows device configurations that are similar to be copied repeatedly to other devices that are connected to the Rosemount 3420. Click **Setup>Fieldbus>Advanced>Device Config** to save, load or manage your device configurations. You can also view which configurations are supported and the details of the configurations.

Device configurations are automatically saved for each device connected to the 3420. Click on **Setup>Fieldbus>Advanced>Device Config>Save** to view a list of all devices. Auto-saved configurations use the PDDtag as the configuration name. A device's configuration can also be saved manually by selecting the device and providing a name for the configuration. Check the **Show auto-saved offline devices** to see a device that is no longer connected to the 3420, but has a saved configuration.



To load a saved configuration into a device, click on **Setup>Fieldbus>Advanced>Device Config>Load**. Select either the saved configuration or the device into which the configuration will be loaded. All compatible devices and configurations will be highlighted. If the device is a replacement, check the **Load device PD tag** and **Load block names** boxes to replicate all of the tag names. If you are copying configurations to other devices, leave these boxes unchecked. Check the **Show auto-save configurations** box to see a complete list of all manual and auto-saved configurations.

To delete or rename a manually saved configuration, click **Setup>Fieldbus>Advanced>Device Config>Manage**. Select the configuration and then either type a new name and click **Rename**, or just click **Delete** to permanently remove the configuration from memory.

To view a list of all devices that support the save/load feature, click on **Setup>Fieldbus>Advanced>Device Config>Supported**. Saved configurations can be loaded into a device with any supported revision. However, not all revisions will support the same features and a warning message will appear whenever you load a configuration into a device with a different revision than the saved configuration.

## MODBUS

The Rosemount 3420 supports both Modbus RTU over the RS485 serial port and Modbus TCP/IP over the Ethernet interface. Click **Setup>Modbus** to configure the Modbus Interface. This page is automatically redirected to **Setup>Modbus>Communication**. Most of these settings are self-explanatory and are related to configuring the serial port to match the settings used by the Modbus Master. If you are using Modbus TCP/IP over the Ethernet then the communication settings (baud rate, parity, stop bits) can be ignored.

## Communication

Click **Setup>Modbus>Communication** to configure the Modbus Communication settings. The measured values can be represented as either a single register integer number, a scaled integer or a two-register (standard or swapped) floating point number. One common difference in Modbus masters is the representation of a floating point number. The default used by the FIM3420 is a Standard Floating Point but this configuration page also allows you to use Swapped Floating Point which reverses the order in which the data in the floating point registers is sent. For more on scaled integers, see Appendix E: Integer Scaling.

The "Response delay time" entry allows you to have the Rosemount 3420 wait for a specified amount of time before it outputs its response to the master request. Some master devices may not be able to immediately receive the response due to receiver setup time. This setting accommodates those master devices.

The unmapped register response setting allows the selection of the value entered into a register if no tag is assigned to it.

As an option you may elect to have a specified value replace the actual reading from the field device in the event of an error. This will allow a host to recognize an error condition without the need to read a separate set of registers containing the status indicators.

The Scaled Floating Point option allows the user to return values as a scaled integer rather than the direct integer. Using Gain and Offset, the values can show positive values, negative values or both.

For more on integer scaling, see Section E: Integer Scaling on page E-1.

Figure 3-10. Modbus Communication

The screenshot shows the 'Modbus Communication' configuration page for the Rosemount 3420 Fieldbus Interface Module. The page is titled 'ROSEMOUNT 3420 Fieldbus Interface Module' and 'EMERSON Process Management'. The left sidebar shows a navigation tree with options like Diagnostics, Monitor, Explorer, Setup, Network, Security, Time, Page Options, Restart apps, Fieldbus, Modbus, Mapping, and Snapshots. The main content area is titled 'Modbus Communication' and contains several configuration fields:

- Enable Modbus:** A checkbox that is currently checked.
- Modbus TCP Port:** A text field with the value '502'.
- Modbus Slave Address (1-247):** A text field with the value '8'.
- Baud Rate:** A dropdown menu with the value '11500'.
- Parity:** Radio buttons for 'None', 'Even', and 'Odd'. 'None' is selected.
- Stop Bits:** Radio buttons for '1' and '2'. '1' is selected.
- Response delay time (ms):** A text field with the value '0'.
- Unmapped register response?:** Radio buttons for 'Zero' and 'Illegal data'. 'Zero' is selected.
- Floating point representation:** Radio buttons for 'Float', 'Round', and 'Scale'. 'Scale' is selected.
- Use swapped floating point format?:** Radio buttons for 'Yes' and 'No'. 'No' is selected.
- Incorporate value's associated status as error?:** Radio buttons for 'Yes' and 'No'. 'No' is selected.
- Value reported for error (floating point):** A text field with the value 'Null'.
- Value reported for error (rounded and native integer):** A text field with the value '22767'.
- Scaled floating point maximum integer value:** A text field with the value '85534'.
- Use global scale gain and offset?:** Radio buttons for 'Yes' and 'No'. 'No' is selected.
- Global scale gain:** A text field with the value '1.0'.
- Global scale offset:** A text field with the value '0.0'.

3420/REV CA/MODBUSCOMM.TIF

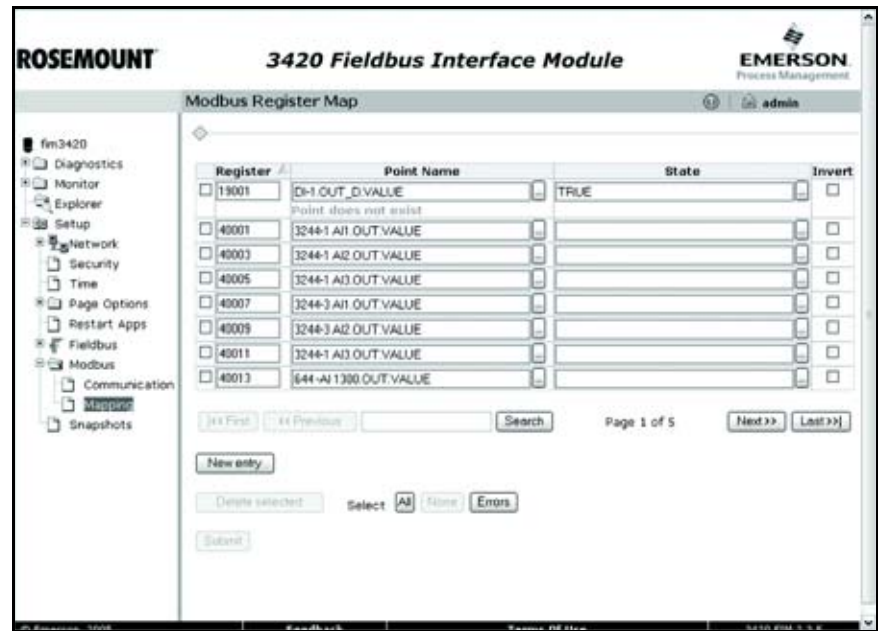
## Mapping Fieldbus Tags to Modbus Registers (Web Interface)

Click **Setup>Modbus>Mapping** to map Fieldbus tags to Modbus Registers. This allows a Modbus master to read a given register on the FIM and effectively be reading a parameter from a device on the Fieldbus. The mapping webpage provides the ability to assign a register number to any function block output by selecting the block tag from a drop down list (see Modbus Columns on page 3-18). If the value is a binary state, the State column is used to select which state will be mapped to the register. Binary values may also be inverted if desired by checking the Invert checkbox. The information available for mapping is not limited to what is shown on the menu. Additional device information, if the devices are present and connected, may be obtained by viewing the complete block and parameter list using the Explorer. Type the complete tag.parameter.subparameter string into the **point name** field to map that parameter to a register.

Click the column header to sort the data by register number or point name. If there is a device with duplicate Block Names, only the block for the first device found will be displayed. Check the Fieldbus/Block Setup display to verify that there are no duplicate Function block tags.

The FIM3420 includes a column for choosing the State of the register (True, False, etc.), and an additional column which allows the user to invert the state.

Figure 3-11. Register Mapping



3420/REV CAMODBUSMAP.TIF

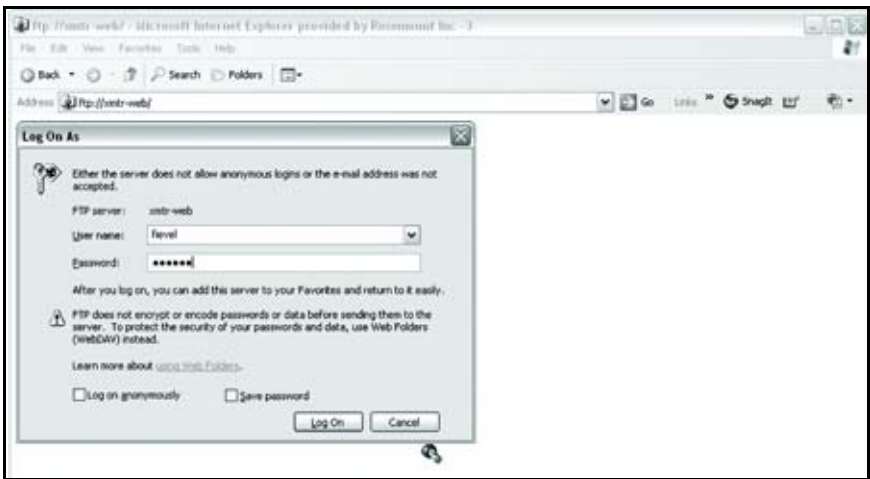
Mapping Fieldbus Tags  
to Modbus Registers  
(FTP)

This mapping is contained in comma-separated-value (or csv) file on the FIM. As an alternative to using the mapping webpage, this file can be read, modified, and re-written to the FIM. This file is named modbus.csv and is located on the FIM at the path:

/home/fievel/config/modbus.csv

To get the configuration file:

1. Open a new Internet Explorer window.
2. Enter ftp://fim3420 in the navigation field (where “fim3420” is the name of the Rosemount 3420 you are configuring).
3. At the user prompt, enter **fievel**
4. At the password prompt, enter **fievel**



3420/REV CA/FTP\_LOGIN.TIF

5. Open the **config** folder.
6. Open **modbus.csv**

7. Choose **Open** or **Save**
8. You may be prompted to re-enter the username and password.

Use Excel to modify the file.

To send the file back to the Rosemount 3420:

1. Save your changes.
2. When finished, simply close the windows.

After the download has been completed, the FIM will detect the changes and will start using the new mappings within 20 seconds. The modbus.csv file may contain multiple columns based on the type of input, and the use of state, invert or global scales.

Here is an example of a small modbus.csv file:

|    | A           | B     | C | D     | E | F | G | H | I | J | K | L |
|----|-------------|-------|---|-------|---|---|---|---|---|---|---|---|
| 1  | 3244-1 AI1  | 40001 |   | FALSE |   |   |   |   |   |   |   |   |
| 2  | 3244-1 AI2  | 40003 |   | FALSE |   |   |   |   |   |   |   |   |
| 3  | 3244-1 AI3  | 40005 |   | FALSE |   |   |   |   |   |   |   |   |
| 4  | 3244-3 AI1  | 40007 |   | FALSE |   |   |   |   |   |   |   |   |
| 5  | 3244-3 AI2  | 40009 |   | FALSE |   |   |   |   |   |   |   |   |
| 6  | 3244-1 AI3  | 40011 |   | FALSE |   |   |   |   |   |   |   |   |
| 7  | 644 -AI 13I | 40013 |   | FALSE |   |   |   |   |   |   |   |   |
| 8  | 644-1 AI1 I | 40015 |   | FALSE |   |   |   |   |   |   |   |   |
| 9  | 644-3 AI1 I | 40017 |   | FALSE |   |   |   |   |   |   |   |   |
| 10 | AI1-3144Y   | 40019 |   | FALSE |   |   |   |   |   |   |   |   |
| 11 | 644-AI 140  | 40021 |   | FALSE |   |   |   |   |   |   |   |   |
| 12 | AI1-8742 C  | 40023 |   | FALSE |   |   |   |   |   |   |   |   |
| 13 | AI1-Dx317E  | 40025 |   | FALSE |   |   |   |   |   |   |   |   |
| 14 | FT002 OU    | 40027 |   | FALSE |   |   |   |   |   |   |   |   |
| 15 | FT004 OU    | 40029 |   | FALSE |   |   |   |   |   |   |   |   |
| 16 | FT005 OU    | 40031 |   | FALSE |   |   |   |   |   |   |   |   |
| 17 | FT007 OU    | 40033 |   | FALSE |   |   |   |   |   |   |   |   |
| 18 | FT008A/B    | 40035 |   | FALSE |   |   |   |   |   |   |   |   |
| 19 | FT008C DI   | 40037 |   | FALSE |   |   |   |   |   |   |   |   |
| 20 | FT015 OU    | 40039 |   | FALSE |   |   |   |   |   |   |   |   |
| 21 | PT150 OU    | 40041 |   | FALSE |   |   |   |   |   |   |   |   |
| 22 | TI-500S DI  | 40043 |   | FALSE |   |   |   |   |   |   |   |   |
| 23 | TI-501 OU   | 40045 |   | FALSE |   |   |   |   |   |   |   |   |
| 24 | TI-502 DI   | 40047 |   | FALSE |   |   |   |   |   |   |   |   |

3420REV CA/FTP\_CSV.TIF

### Modbus Columns

The columns used in the Modbus CSV file are the following:

- 1 **Point Name**
- 2 **Register**
- 3 **State**
- 4 **Invert**
- 5 **Gain**
- 6 **Offset**

### NOTE

State and Invert are only used for discrete values. Gain and Offset are only meaningful when scaling is used without global scale values. If not used, they can be left empty.

### Modbus Register Rules

The small example file above is compliant with some rules that you must follow when changing the mappings. These rules are:

- When the Function Block Output data is in floating point format it requires two registers. Therefore nothing may be mapped into the next register specified for a floating point measurement value.
- Status information uses one register and can be located in adjacent registers of the status information of other tags.
- Contiguous registers must all be of the same type.
- Do not use registers 49001 through 49011 (see Predefined Diagnostic Registers on page 3-19).

**Modbus Register Guidelines**

The Modbus protocol allows for reading contiguous registers of the same datatype in one read request from the Modbus Master (up to 127 registers can be communicated in one read request). To take advantage of efficiently reading registers, the following guidelines are suggested:

- Fieldbus output STATUS tags should be mapped to registers in one contiguous block starting at register 40001. Each tag requires one register.
- Fieldbus output VALUE tags should be mapped to registers in one contiguous block starting at register 45001. Each tag requires two registers. Some Modbus hosts use specific register numbers for different types of data. Use the register numbers suggested by your Modbus host.
- Fieldbus COIL tags should be mapped to registers in one contiguous block starting at register 19001. Each tag requires one register.

**Predefined Diagnostic Registers**

The following is a table of predefined diagnostic registers. Do not use any of these registers in the Modbus register map file (modbus.csv).

Table 3-5. Predefined Diagnostic Registers

| Description                                       | Register |
|---|----------|
| Current Year <sup>(1)</sup>                       | 49001    |
| Current Month <sup>(1)</sup>                      | 49002    |
| Current Day <sup>(1)</sup>                        | 49003    |
| Current Hour <sup>(1)</sup>                       | 49004    |
| Current Minute <sup>(1)</sup>                     | 49005    |
| Current Second <sup>(1)</sup>                     | 49006    |
| Messages Received                                 | 49007    |
| Corrupt Messages Received                         | 49008    |
| Messages Sent with Exception (error responses)    | 49009    |
| Messages Sent Count                               | 49010    |
| Valid Messages Ignored (when in listen only mode) | 49011    |

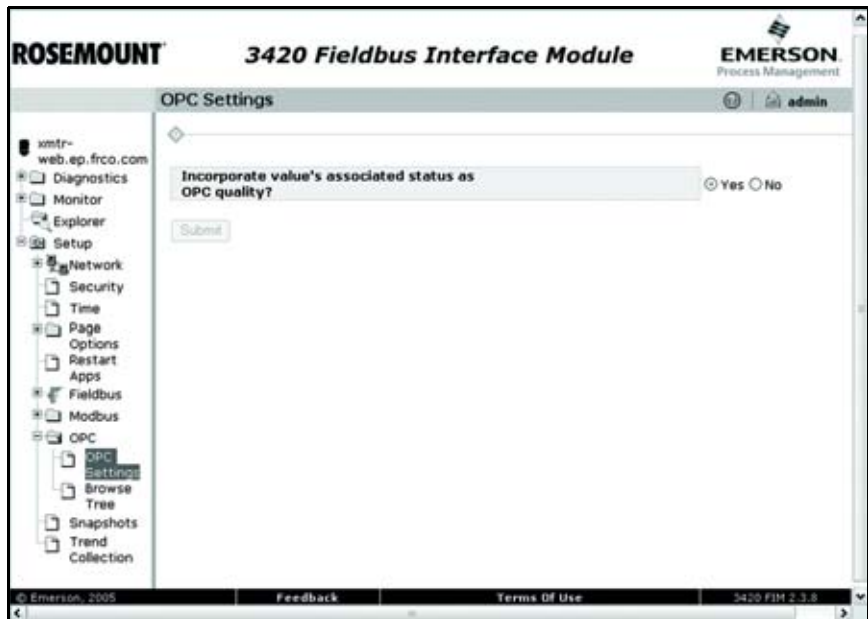
*(1) Time is reported in GMT.*

The Message Sent Count is the most useful data for determining if the Modbus slave is finding errors in the messages or is rejecting the messages. The messages received and messages sent count should be the same if no errors are encountered.

OLE FOR PROCESS  
CONTROL

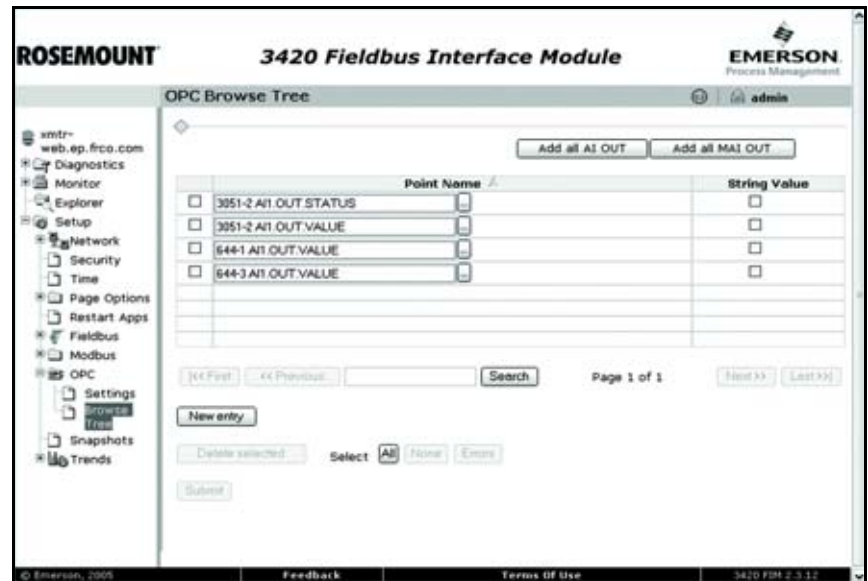
The OPC menu selections will only be seen on 3420 FIMs ordered with the OPC option.

**NOTE**  
OPC pages will only be available if your Rosemount 3420 was ordered using the OPC option codes (option codes 1 and 4 under **Ethernet Communication**).



3420/REV CA/OPC\_SETTINGS.TIS

The **Browse Tree** displays the point values that are currently active in OPC. This page also allows you to add and remove measurement points.



3420/REV CA/OPC\_BROWSE.TIS

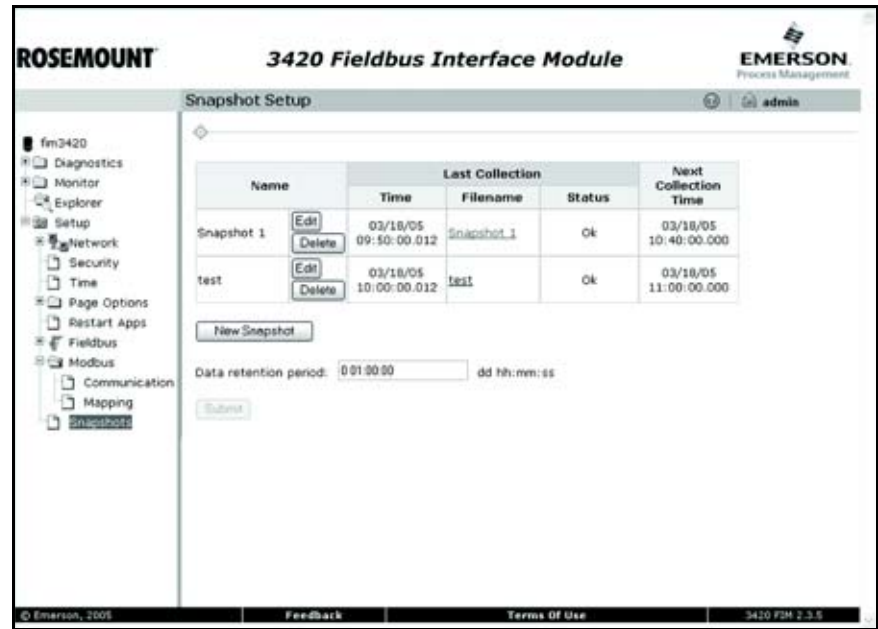
When configured, the OPC Statistics will be visible under **Diagnostics>Advanced>OPC Statistics**. See OPC Statistics on page 4-4

SNAPSHOT FILES

Snapshot File Setup

Click **Setup>Snapshots** to display the current snapshot collection information. Snapshots are files in the specified format (CSV or XML) that contain periodically captured data and the optional time stamp of selected device values.

Figure 3-12. Snapshot Setup



3420/REV CA/SNAPSHOTSETUP.TIS

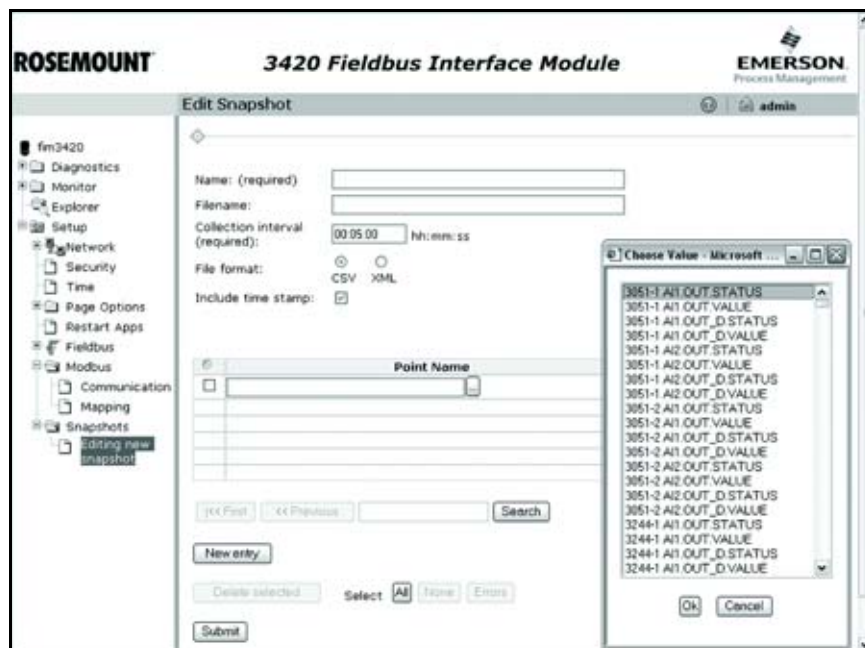
Data can be accessed by a host system by reading a file using FTP over Ethernet. The files are called Snapshot files.

New or Edit Snapshot Data

**New Snapshot** will take you to an edit screen that will allow you to select the name of the snapshot, the interval of collection, the file format, an optional timestamp and selected device values. Add values to be collected by selecting **New Entry** and then selecting the tag from the drop down menu. Tags are not limited to what is shown on the menu. Additional device tags may be obtained by entering the complete tag.parameter information.

Once the file has been set up you can click on the file name to display the current contents of the file.

Figure 3-13. New or Edit Snapshot Data



## Snapshot File Format

The file is in Comma Separated Value (CSV) or XML format as follows:

- The file consists of a series of lines that contain two fields: the label for the value and the value itself.
- The first record which contains the data timestamp is optional. If enabled, it is always the first value reported. Time values are reported in GMT time.
- Function blocks may be selected from the list, but are not limited to that list.
- The label for each value is the fully qualified name of the value. This is: <block tag>. <parameter name>.<subparameter name>

Example: TT-800-1.OUT.STATUS

- The label is user definable.
- The value is a textual representation of the point being collected. If the point cannot be collected (the device is offline, etc.), a value of the form: "error: <descriptive message>" is written.

The following is an example of the records for reading information:

### Example of Readings

Timestamp,07/05/01 18:00:00.009

TT-800X.FB VFD.TT-800-1.OUT.STATUS,Good\_NonCascade: NonSpecific:NotLimited

TT-800-1.OUT.VALUE,27.66525

TT-800-1.MODE\_BLK.ACTUAL,Auto

TT-800-1.OUT\_SCALE.UNITS\_INDEX,%

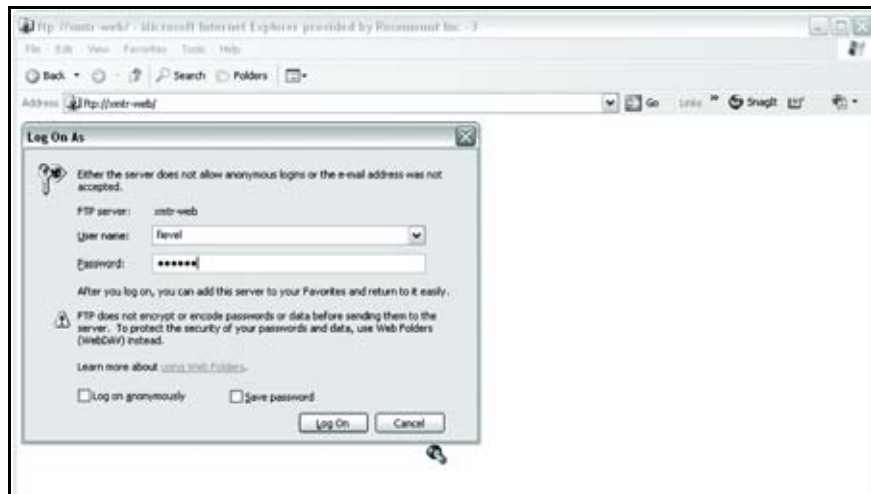
- If a label is specified it will be used to label the value in the file. If a label is not specified, the file will report the block tag name.



## Retrieving Snapshot File

To get a file manually using the ftp client on Windows®, perform the following steps:

1. Open a new Internet Explorer window.
2. Enter `ftp://fim3420` in the navigation field (where “fim3420” is the name of the Rosemount 3420 you are configuring).
3. At the user prompt, enter **fievel**
4. At the password prompt, enter **fievel**



3420/REV CA/FTP\_LOGIN.TIF

5. Open the folder called **snapshot**
6. Double click the icon for the snapshot file.

## TREND COLLECTION

The Trend Setup page is located at **Setup>Trends**. This page allows the user to add or remove trends. It also displays information about the active trends, including time and status. For monitoring trends, see Trend on page 4-8 of this manual.

### Trend Settings

#### Setup>Trends>Settings

This page allows the user to configure the maximum number of series displayed, the maximum initial samples and the retained data duration. To change any of these values, click in the field, enter the new numerical value and click submit when finished. A trend collection can contain several data points which are accessible when a trend report is requested. The field **Maximum series displayed** will limit the number of data points displayed on the graphical trend page.

The **Maximum initial samples** limits the number of data points initially displayed on the graphical trend page. The **Retained data duration** specifies the time period that the data is saved while a trend graph is being displayed. Some data may be lost once the page is closed if this duration is longer than the duration set up for the collection. The **View Port Interval** specifies the time period visible in the graphical trend page.

## Trend Collections

### Setup>Trends>Collections

This page shows the trends currently active. It also includes overview data on the last collection and next collection times. The collection interval specifies how frequently the data is updated. The Data retention period specifies the length of time the data is saved in the 3420. More points can be added to a collection than the number defined as **Maximum series displayed**. The additional points not available on the graphical trend page will be available in the trend report.

#### Create a New Trend

1. Click **New Trend**
2. Enter the name of the trend, collection interval and data retention period in the appropriate text fields.
3. Click **New Entry** to add a data point.
4. Click the button to the right of the **Point Name** field (or enter the name of the point value if you know it).

---

#### NOTE

Only enabled points will appear in the data point list.

---

5. Enter a label for the data point. This will appear on the graph when monitoring the trend.
6. Repeat Steps 3 - 5 for all the desired data points.
7. Click **Submit** when finished.

#### Edit a Trend

1. Click **Edit**
2. Change or add desired values.
3. Click **Submit** when finished.

#### Delete a Trend

1. Click **Delete**.
2. Click **OK** in the pop-up window.

## View Trend

To view the graph of a trend, select **Monitor>Trend>Graph**, then choose the trend you wish to see. See Trend on page 4-8 for graph functions and controls.

To view a report of the trend, select **Monitor>Trend>Report**. Then choose the desired times and format of your report. Click **Generate Report** to view the report.

---

## Section 4      Operation and Maintenance

---

|                   |          |
|-------------------|----------|
| Overview .....    | page 4-1 |
| Diagnostics ..... | page 4-2 |
| Monitor .....     | page 4-5 |
| Trend .....       | page 4-8 |
| Explorer .....    | page 4-9 |

---

### OVERVIEW

On power up, the FIM will determine what devices are attached to each of the fieldbus segments. If Plug and Play has been selected in the Setup, each device will be interrogated and any unscheduled function blocks will be initialized as specified on the **Setup>Fieldbus>Advanced>PlugandPlay** page. The first time the unit is powered up it is recommended that no devices be connected so that the Plug and Play settings can be configured. The FIM will poll and update the values at a frequency depending on the number of function blocks being polled on each segment according to Table 3-4 on page 3-12.

DIAGNOSTICS

Click **Diagnostics** to view the status of your Fieldbus segments, Alarm Log and Advanced Diagnostics.

Fieldbus Segments

Fieldbus segment diagnostics are provided to give you a quick view of what is attached to the Rosemount 3420. It shows how many segments are active and how many devices are attached to each segment. It also shows the current state of plug and play.

Alarm Log

The alarm log displays a list of alarms that have been activated, their respective timestamps, the Block on which the alarm occurred, the alarm type, value, subcode, and event. For more on alarms, see “Alarm Notification” on page 4-6.

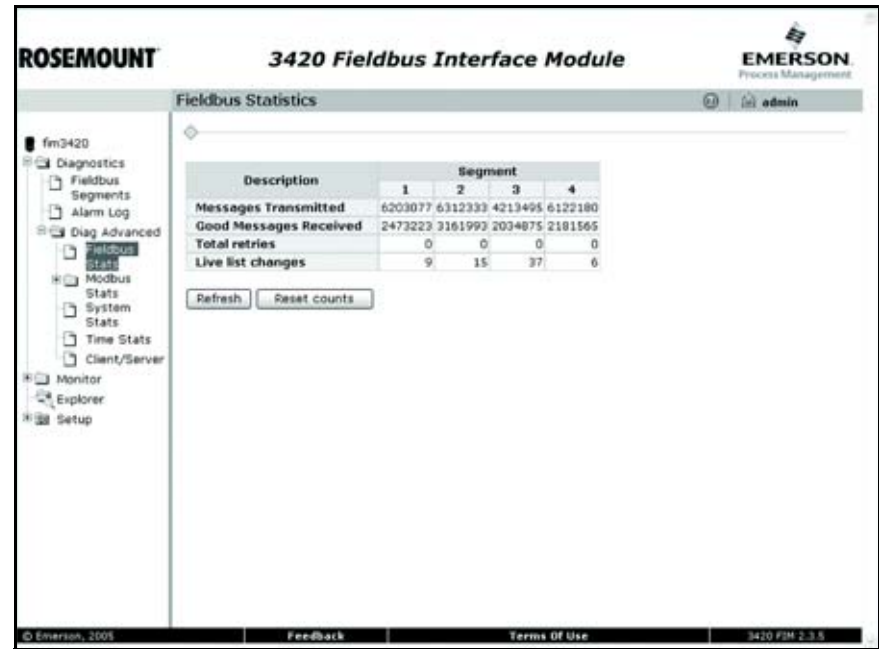
Advanced

Fieldbus Communication Statistics

The fieldbus communication statistics provide information on fieldbus packets and details on the status of the internal communication link between the 3420 CPU and the host stack card.

The **Messages Transmitted** and **Good Messages Received** should be incrementing steadily on segments that have devices installed. The **Total retries** should be a small number and should only increment rarely. The **Live list changes** should only change when devices are added and removed from the segment. Click **Refresh** periodically to view that the interface is communicating correctly.

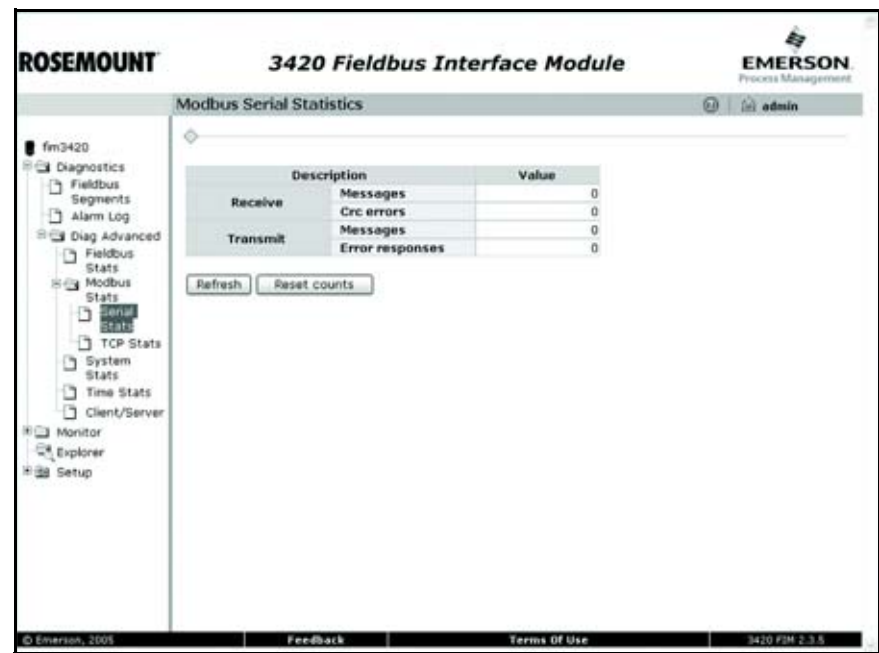
Figure 4-1. Fieldbus Statistics



3420/REV CA/FIELDBUSSTATS.TIF

Modbus Communication Statistics

Figure 4-2. Modbus Statistics



3420/REV CA/MODBUSSTATS.TIF

The modbus communications statistics provide information on the data and packets received and transmitted by the modbus slave interface. Select **Serial Stats** if you want to monitor the RS485 Modbus link or **TCP Stats** if you are monitoring the Modbus TCP/IP communications.

The following is a table of predefined diagnostic registers. Do not use any of these registers in the Modbus register map file (modbus.csv).

Table 4-1. Predefined Diagnostic Registers

| Description                                       | Register |
|---|----------|
| Current Year <sup>(1)</sup>                       | 49001    |
| Current Month <sup>(1)</sup>                      | 49002    |
| Current Day <sup>(1)</sup>                        | 49003    |
| Current Hour <sup>(1)</sup>                       | 49004    |
| Current Minute <sup>(1)</sup>                     | 49005    |
| Current Second <sup>(1)</sup>                     | 49006    |
| Messages Received                                 | 49007    |
| Corrupt Messages Received                         | 49008    |
| Messages Sent with Exception (error responses)    | 49009    |
| Messages Sent Count                               | 49010    |
| Valid Messages Ignored (when in listen only mode) | 49011    |

<sup>(1)</sup> Time is reported in GMT.

A Modbus host has access to digital information. The Message Sent Count is the most useful data for determining if the Modbus slave is finding errors in the messages or is rejecting the messages. The messages received and messages sent count should be the same if no errors are encountered.

## **OPC Statistics**

The OPC Statistics page contains a table showing the number of OPC items, how many are active and how many OPC items updates are available.

## **System Statistics**

The system statistics provide an overview of various internal CPU resources that are being used by the Rosemount 3420.

## **Time Statistics**

The time statistics display the device, segment, and PC times.

## **Client/Server**

The client server diagnostics provide detailed information about the Rosemount 3420 application server and the client browser that is being used to view the Rosemount 3420.

The information gathered about your PC is:

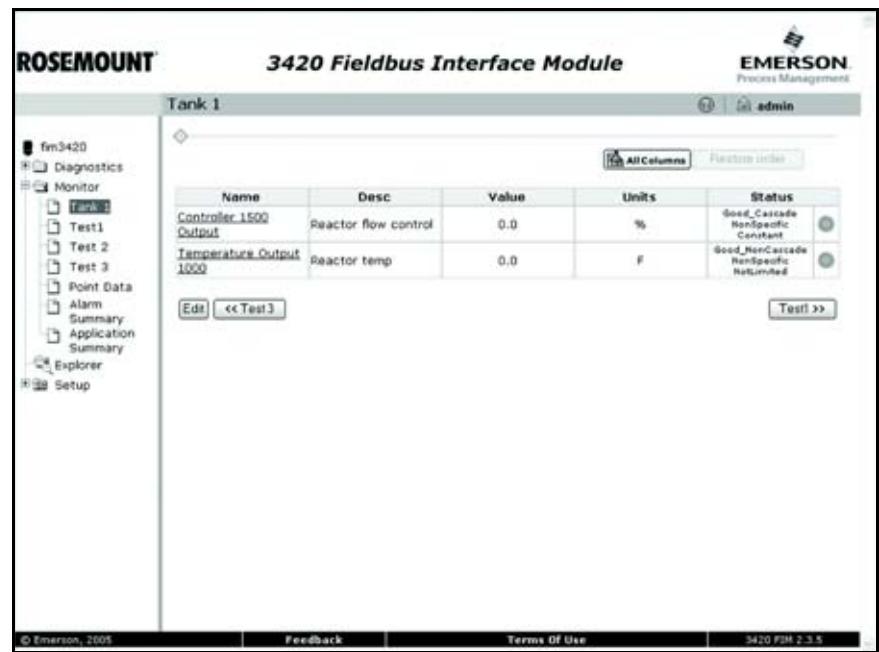
- Browser name
- Browser version
- Operating system platform
- Screen height
- Screen width
- Screen color depth
- User agent
- Java enabled flag

MONITOR

To view a Monitoring Page, click **Monitor** from the menu on the left side.

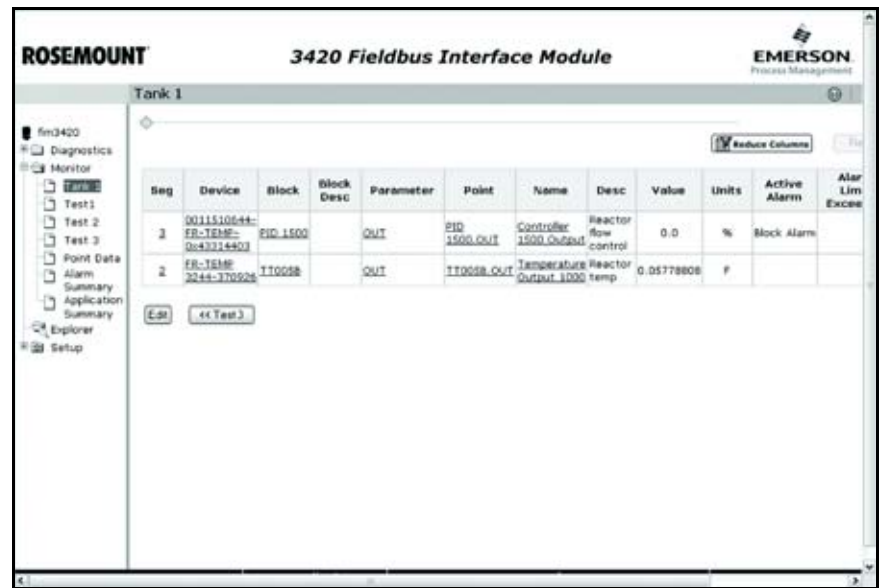
The menu items under the Monitor menu will show the point pages that have been configured as well as the Point Data page which contains all of the scheduled function blocks, the Alarm Summary, and the Application Summary.

Figure 4-3. To view all of the columns that are possible, click the **All Columns** button on the top of the page.



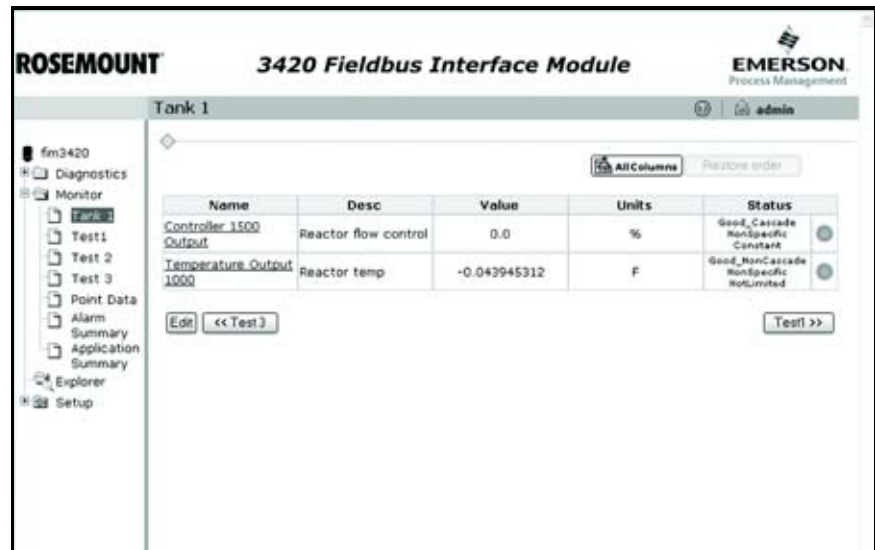
3420/REV CA/MONITORPROCESS.TIF

Figure 4-4. With all columns displayed you can return to the original display by clicking on **Reduce Columns** on the left menu.



3420/REV CA/PROCESS TANK.TIF






Figure 4-5. You can rearrange the page by clicking on one of the column headings. Click **Restore Order** on the left menu to get the display back to its originally configured order.



3420/REV CA/PROCESSSTORE.TIF

## Alarm Notification

When an alarm event occurs, it is visible in two places, the Alarm Summary page and in the header bar on all pages. In the header bar, there are five alarm states identified by the following icons:

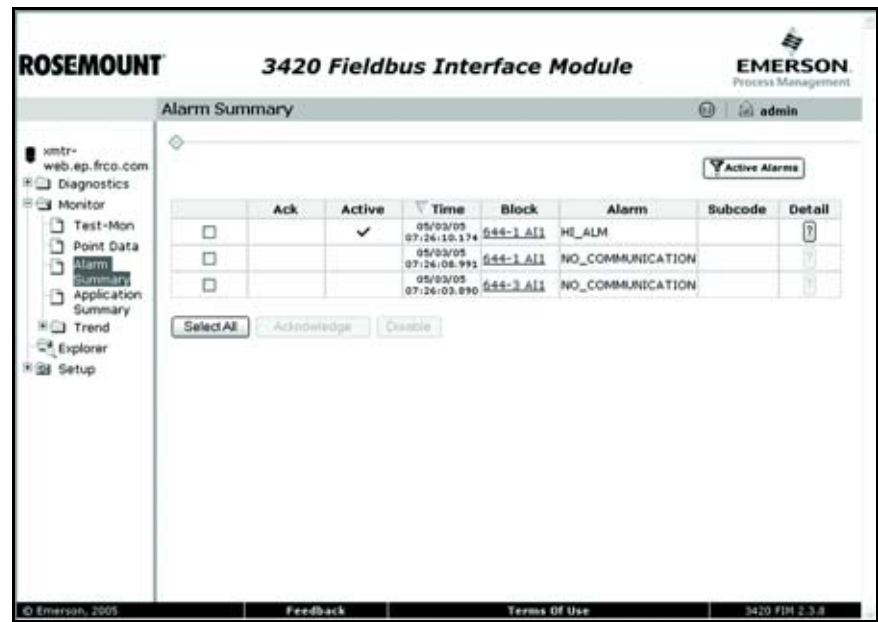
- No alarms 
- Unacknowledged alarms present (flashing) 
- Active alarms, none unacknowledged 
- Lost connection to 3420 (flashing) 
- Internal annunciation error 

Mousing over the alarm icon will display a tool tip related to the alarm notification. Clicking on the alarm icon will take you to the Alarm Summary page.



Alarm Summary

The alarm summary displays which alarms are active. Only blocks with alarms enabled will be shown. By clicking on **All Alarms**, you can see which alarms are no longer active but that have not been acknowledged. Click on the icon under the detail column to view more information about the alarm condition.



3420/REV CA/ALARM\_SUMMARY.TIF

Acknowledge an Alarm

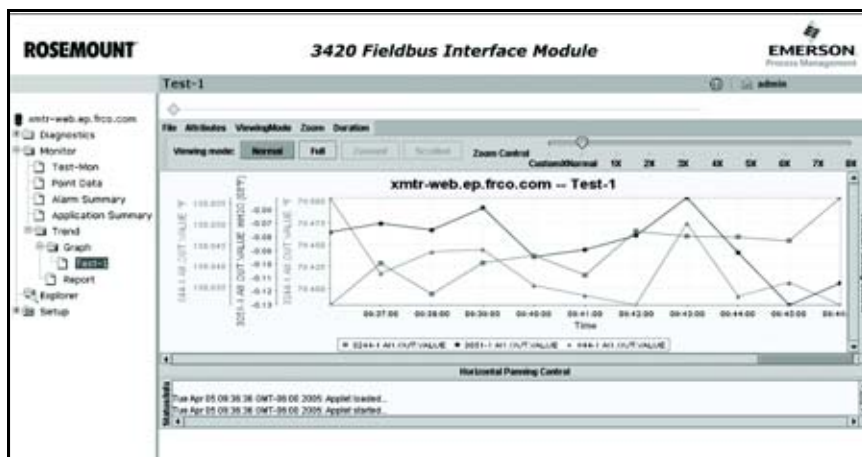
To acknowledge an alarm, click **Monitor>Alarm Summary**. Select the alarm(s) you wish to acknowledge and click **Acknowledge**.

Application Summary

FOUNDATION™ Fieldbus technology allows the output of function blocks to be linked to the input of other function blocks to facilitate advanced calculations and control strategies. The Application Summary page shows a list of applications. The Monitor button will open a display showing each link between a block output and block input for the application running on the Fieldbus segment.

## TREND

The trend pages (**Monitor>Trend**) allow the user to view either a graph of the outputs of the devices or generate a report. The report can be generated in one of three formats: Comma Separated Variable (CSV), Excel, or XML.



3420/REV CA/TREND\_GRAPH.TIF

## Graphs

### Monitor>Trend>Graph

This is where the user can graphically monitor the trends. If there are multiple trends, select the one you wish to view from the menu on the left under Graph.

## Reports

### Monitor>Trend>Report

The 3420 FIM software is capable of generating reports from the trend collections. To generate a report, select the trend from the list on the left, then enter start and end times. Finally, select the desired format and click Generate Report. The generated file will automatically open.

To set up Trends, see "Trend Collection" on page 3-23 of this manual.

## TearOff

TearOff is a Java Applet that allows the whole applet to be pulled off the browser page. This is done by grabbing the grey bar along the left edge and then dragging it off the browser window. Please note that this window (really a dialog box) is not resizable while it is torn off the browser page. The size of the window can be selected from the preselected sizes found in the **TearOffSize** menu.

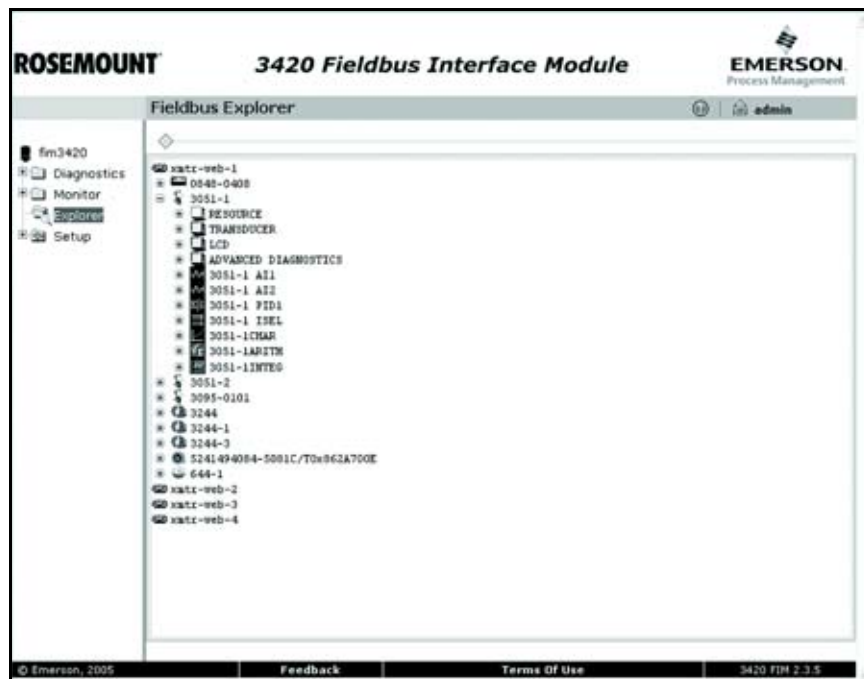
When the applet is torn off, closing the floating window will put it back into the browser.

## EXPLORER

Click on **Explorer** to view data from each of the field devices. The fieldbus explorer provides a tree view of:

- Fieldbus segments
- Devices on a segment
- Blocks in a device
- Parameters in a block


Figure 4-6. Tree View



To change a value of a parameter, select and click on the specific parameter. A dialog box will appear allowing you to either make a selection or to enter the data directly. Numerous parameters in a function block may not be changed while the block is running, in which case the MODE of the block must first be set to OOS (OUT OF SERVICE). Parameters that may be changed will be shown in **BOLD** font. Remember to change the MODE back to the original setting (Auto is usually the default) after making any changes.



## Section 5 Troubleshooting

Select the Help  menu in the top right of the web browser to view information on product installation, setup and configuration, diagnostics, and monitoring. In addition, Fieldbus, field device, and specific Rosemount 3420 facts are available.

To find the appropriate phone support contact, see the Rosemount Support web page at: <http://www.rosemount.com/support/support.html>

or email the tech specialists at:  
**Specialist-PlantWeb.EPM-RTC@EmersonProcess.com**

Contact your local representative for additional service support, see “Service Support” on page 1-1.

Table 5-1. General Troubleshooting

| Symptom <sup>(1)</sup>   | Cause   | Recommended Actions   |
|--|---|---|
| PC does not communicate with the Rosemount 3420                                    |   | <ul style="list-style-type: none"> <li>• Check to see if you are using a cross-over cable</li> <li>• Use the PING command described in Section 3: Configuration to verify the IP address and the FIM name</li> <li>• Check that the browser has the proxy server turned off</li> <li>• Check that the IP address of the PC is set as indicated in Section 3: Configuration</li> <li>• Use the backup address as indicated in Section 3: Configuration</li> </ul> <p>Restart the computer to be sure these changes have taken effect</p> |
| Fieldbus device is not detected  |   | <ul style="list-style-type: none"> <li>• Check your installation for correct wiring, grounding and that a field terminator is installed at each end of the segment.</li> </ul>  |
| Device does not show up on segment   | Unknown<br>No power to device<br><br>Segment problems<br>Electronics failing<br><br>Incompatible network settings | Recycle power to device<br>1. Ensure the device is connected to the segment.<br>2. Check voltage at terminals. There should be 9–32Vdc.<br>3. Check to ensure the device is drawing current. There should be approximately 17 mA.<br><br>1. Electronics board loose in housing.<br>2. Replace electronics.<br>Change host network parameters.<br>Refer to host documentation for procedure.   |
| Transducer Blocks not displayed on the Explorer view. Function blocks can be seen. | User is logged in as “Operator”   | Log in as “Administrator”   |
| Continued on Next Page   |   |   |

| Symptom <sup>(1)</sup>                                     | Cause  | Recommended Actions  |
|--|--|--|
| Device does not stay on segment <sup>(2)</sup>             | Incorrect signal levels.<br>Refer to host documentation for procedure. | 1. Check for two terminators.<br>2. Excess cable length.<br>3. Bad Power supply or conditioner   |
|  | Excess noise on segment.<br>Refer to host documentation for procedure. | 1. Check for incorrect grounding.<br>2. Check for correct shielded wire.<br>3. Tighten wire connections.<br>4. Check for corrosion or moisture on terminals.<br>5. Check for Bad power supply. |
|  | Electronics failing  | 1. Tighten electronics board.<br>2. Replace electronics.   |
|  | Other  | Check for water in the terminal housing.   |
| Can't log in to 3420 Web Site                              | Forgot username or password  | Rosemount must reset passwords Contact Rosemount Support..   |
| Can't find a specific page or functionality                | Using an older version of Firmware                                     | Purchase and install updated Firmware.   |
| Can see fieldbus device, but can't see the fieldbus blocks | Device not commissioned  | Wait for device to auto commission or enable commissioning and cycle power on device   |
| Can't expand any function blocks                           | DD not installed   | Install DD   |
|  | Block not enabled  | Enable block from 3420 block list  |
| Can see some fieldbus blocks, but not all fieldbus blocks  | User does not have sufficient privileges                               | Use higher level login and password  |

(1) The corrective actions should be done with consultation of your system integrator.

(2) Wiring and installation 31.25 kbit/s, voltage mode, wire medium application guide AG-140 available from the fieldbus Foundation.

Table 5-2. Fieldbus Status Troubleshooting

| Returned Value  | Action   |
|---|--|
| OUT.STATUS is Bad:: OutOfService                                | <ul style="list-style-type: none"> <li>Verify that the MODE.TARGET of the block in question is in Auto.</li> <li>Verify that the MODE.TARGET of the transducer block or function block that is connected to the block in question is in Auto.</li> <li>Verify that the MODE.TARGET of the resource block of the device containing the block is set to Auto.</li> <li>Go to <b>Setup&gt;Fieldbus&gt;Blocks</b> to schedule the block</li> </ul> |
| MODE.ACTUAL=OOS,<br>MODE.TARGET=AUTO, and<br>BLOCK_ERR=Power_up | <ul style="list-style-type: none"> <li>The block is not scheduled.</li> <li>The Rosemount 3420 will schedule AI and MAI blocks automatically but will not schedule other blocks.</li> <li>Go to <b>Setup&gt;Fieldbus&gt;Blocks</b> to schedule the block</li> </ul>  |
| Error Dialog on Parameter Write                                 | <p>Most parameters require the block be placed in OOS for the write to be accepted:</p> <ul style="list-style-type: none"> <li>Edit the MODE.TARGET to OOS</li> <li>Wait for the MODE.ACTUAL to transition to OOS</li> </ul> <p>Make desired parameter change:</p> <ul style="list-style-type: none"> <li>Edit the MODE.TARGET to Auto</li> <li>Wait for the MODE.ACTUAL to transition to Auto</li> </ul> <p>Parameter change is complete.</p> |
| OUT.STATUS=Bad::ConfigurationError                              | <p>For AI/MAI blocks:</p> <ul style="list-style-type: none"> <li>LTYPE must be set correctly for the application</li> <li>CHANNEL must be set to a valid transducer channel</li> <li>XD_SCALE and OUT_SCALE must have valid UNITS and EU_0 and EU_100 values for the application</li> </ul> <p>For transducer blocks:</p> <ul style="list-style-type: none"> <li>Sensor configuration must be valid</li> </ul>                                 |





## Appendix A      Reference Data

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|                            |          |
|----------------------------|----------|
| Specifications .....       | page A-1 |
| Dimensional Drawings ..... | page A-4 |
| Ordering Information ..... | page A-5 |

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### SPECIFICATIONS

#### Functional Specifications

##### Power Input Options

24 V dc

500 milliamps required to power the Rosemount 3420 module.

Additional current is required to power the field devices.

The 3420 will distribute power to the devices on the  
H1 segments.

##### Environmental

Operating Temperature Range:

-40 to 60°C (-40 to 140°F) with internal power conditioners

-40 to 70°C (-40 to 158°F) with power conditioners mounted externally

Operating Humidity Range:

0-95% relative humidity (non-condensing)

## Performance Specifications

The rate at which the individual inputs are scanned on each H1 segment depends on the number of Function Blocks that have been enabled according to the following table:

| Number of Function Blocks scanned on each segment | Scan rate   |
|---|-------------|
| 1   | 0.3 seconds |
| 2   | 0.4 seconds |
| 4   | 0.5 seconds |
| 8   | 0.7 seconds |
| 16  | 1.0 seconds |
| 32  | 2.7 seconds |
| 64  | 3.1 seconds |
| 128   | 7.0 seconds |

Example: A segment with 13 848T temperature transmitters using the MAI block will have all 104 inputs scanned every 1.0 seconds. If the individual AI blocks are scanned the update rate would be approximately 6 seconds.

The rate at which the host application accesses data in the 3420 will depend on the configuration of the serial communication link and the specific software being used.

## Physical Specifications

### Weight

10.7 lb (4.85 kg)

### Material of Construction

#### Housing

Low-copper aluminum, NEMA 4X and IP65 IEC 529

#### Pollution Degree 2

#### Paint

Polyurethane

#### Cover Gasket

Rubber

## **Communication Specifications**

### **RS485**

2-wire communication link for Modbus multidrop connections

Baud rate: 57600, 38400, 19200, or 9600

Protocol: Modbus RTU

Wiring: Single twisted shielded pair, 18 AWG. Wiring distance is approximately 5,000 ft. (1,524 m)

### **Ethernet**

Webserver and Modbus TCP/IP

OPC with Webserver and Modbus TCP/IP

HSE for AMS with Webserver and Modbus TCP/IP

HSE for AMS with OPC, Webserver and Modbus TCP/IP

### **Modbus**

- Supports Modbus RTU and TCP/IP with 32 bit floating point values, integers, and scaled integers.
- Modbus registers are assigned to measurement inputs by the TAG of the analog input block.
- Modbus register numbers are specified by the user.
- The status of each variable is available in a 16 bit register.
- The configuration of the Modbus interface is accomplished using web pages generated by the Rosemount 3420.

### **H1 Fieldbus**

Up to four H1 FOUNDATION fieldbus segments are supported.

Up to 16 fieldbus devices can be connected to each H1 segment. The number of devices will depend on the power consumption of each device and the type of cable used. The 3420 internal power conditioners supply each H1 segment with 288 milliamps of current. Temperature applications using the 848T 8-input temperature transmitter exclusively, can have up to 13 848T transmitters on each segment using the internal power conditioners.

Each segment optionally includes a power conditioner and terminator. The user is required to provide a second terminator for the field end of the segment. If external power conditioners are used the user is responsible for providing both terminators for each segment and their mounting and wiring to the Rosemount 3420.

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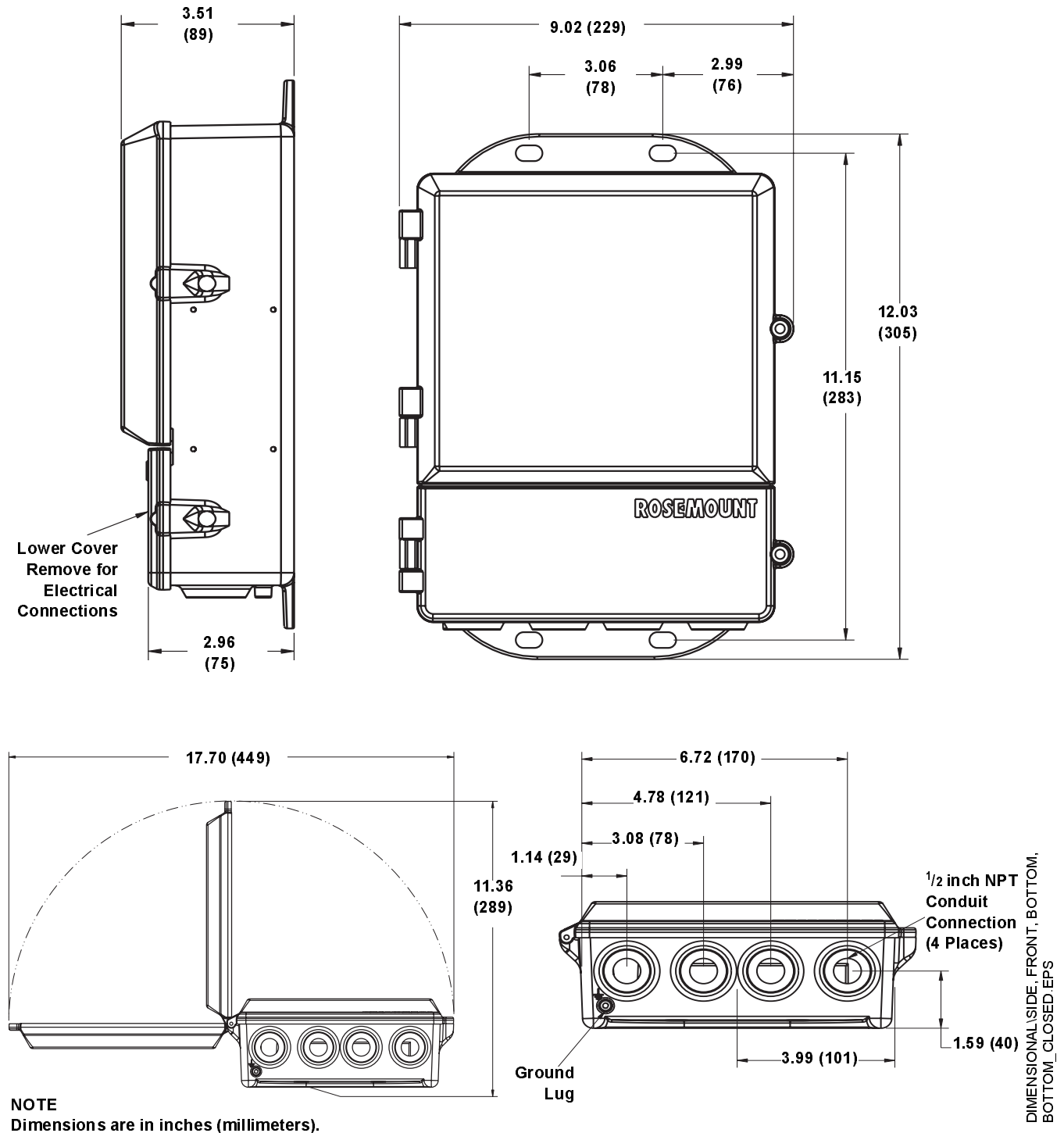
### **NOTE**

It is recommended that external power conditioners be used in any critical applications. This will allow the 3420 to be removed for maintenance and allow the fieldbus segments to continue functioning should the 3420 be unavailable.

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## DIMENSIONAL DRAWINGS

Figure A-1. Rosemount 3420  
Fieldbus Interface Module



## ORDERING INFORMATION

| Model   | Product Description   |
|---|---|
| 3420  | Fieldbus Interface Module   |
| Code  | Power Input   |
| A   | 24 VDC  |
| Code  | Output  |
| 1   | RS485 + Ethernet  |
| 2   | RS485 + Redundant Ethernet  |
| 3   | RS485 + Fiber Optic Ethernet  |
| Code  | Fieldbus Input  |
| A   | One H1 Fieldbus Segment   |
| B   | Two H1 Fieldbus Segments  |
| C   | Three H1 Fieldbus Segments  |
| D   | Four H1 Fieldbus Segments   |
| Code  | Power Conditioner + Terminator for each segment                     |
| 0   | No power conditioner or terminators (must be supplied by others)    |
| 1   | One power conditioner and terminator mounted in the 3420 housing    |
| 2   | Two power conditioner and terminators mounted in the 3420 housing   |
| 3   | Three power conditioner and terminators mounted in the 3420 housing |
| 4   | Four power conditioner and terminators mounted in the 3420 housing  |
| Code  | RS-485 Communication Options  |
| N   | No RS-485 Communication   |
| A   | Modbus RTU  |
| Code  | Ethernet Communication Options                                      |
| 0   | Webserver and Modbus TCP/IP   |
| 1   | OPC with Webserver and Modbus TCP/IP                                |
| 2   | HSE for AMS with Webserver and Modbus TCP/IP                        |
| 4   | HSE for AMS with OPC, Webserver and Modbus TCP/IP                   |
| Code  | Other Options   |
| <b>HTG Calculations</b>                       |   |
| HTG   | HTG and Hybrid Calculations <sup>(1)</sup>                          |
| <b>Product Certifications</b>                 |   |
| N1  | CENELEC Type n (ATEX)   |
| N5  | Factory Mutual (FM) Division 2 Approval (non-incendive)             |
| N6  | Canadian Standards Association (CSA) Division 2 Approval            |
| N7  | IECEX Type n  |
| <b>Adapters</b>                               |   |
| J1  | CM 20 Conduit Adapter   |
| J2  | PG 13.5 Conduit Adapter   |
| <b>Typical Model Number: 3420 A 1 A 1 N 0</b> |   |

<sup>(1)</sup> Consult factory for availability



## Appendix B Approval Information

### Approved Manufacturing Locations

Rosemount Inc. – Chanhassen, Minnesota, USA  
Rosemount Temperature GmbH – Germany  
Emerson Process Management Private Limited – Singapore

### European Union Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at [www.rosemount.com](http://www.rosemount.com). A hard copy may be obtained by contacting your local sales representative.

#### ATEX Directive (94/9/EC)

Rosemount Inc. complies with the ATEX Directive.

#### Electro Magnetic Compatibility (EMC) (89/336/EEC)

EN 50081-1: 1992; EN 50082-2: 1995;  
EN 61326-1: 1997 – Industrial

#### CE CE Marking

Compliance with European Union EMC

### Hazardous Location Certifications

#### North American Certifications

##### Factory Mutual (FM) Approvals

##### N5 FM Division 2 (Non-incendive)

Certificate Number: 2N7A0.AX  
Nonincendive for Class I, Division 2, Groups A,B,C, and D;  
Dust Ignitionproof for Class II,III, Division 1,  
Groups E,F, and G; Indoor/outdoor locations;  
NEMA Type 4X  
Temperature Code: T4 ( $T_{amb} = -40^{\circ}\text{C TO } +60^{\circ}\text{C}$ )

##### Canadian Standards Association (CSA)

##### N6 CSA Division 2 & Dust Ignitionproof

Certificate Number: 1489720  
Suitable for Class I, Division 2, Groups A,B,C,D;  
Dust Ignitionproof for Class II, Groups E,F, and G;  
Suitable for Class III Hazardous Locations.  
Install per Rosemount drawing 03420-1011.  
Temperature Code: T4 ( $-40^{\circ}\text{C} \leq T_a \leq 60^{\circ}\text{C}$ )  
CSA Enclosure Type 4X

## European Certification

### N1 CENELEC Type n (ATEX)

Certificate Number: Baseefa03ATEX0613X

ATEX Marking: Ⓔ II 3 G

EEx nA nL IIC T4 ( $-40^{\circ}\text{C} \leq T_a \leq 60^{\circ}\text{C}$ )

Rated Voltage: 28V

#### Conditions of Installation X:

1. The Apparatus is not capable of withstanding the 500V insulation test required by Clause 9.4 of EN 50021: 1999. This must be taken into account when installing the apparatus.

## IECEx Certification

### N7 IECEx Type n

Certificate Number: IECEx BAS 04.0013X

Ex nC IIC T4 ( $-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ )

Rated Voltage: 28V

#### Conditions of Installation X:

1. The Apparatus is not capable of withstanding the 500V insulation test required by Clause 8 of IEC 79-15: 1987. This must be taken into account when installing the apparatus.



## Appendix C Fieldbus Status Values

This section contains the list of possible values for the Fieldbus output STATUS along with their meaning and a possible reason the status may have this value. This is included as a convenience for interpreting the status from the Fieldbus.

| Status | Description                         | Possible Cause  |
|--------|-------------------------------------|---|
| 0      | Bad::NonSpecific:NotLimited         | <ul style="list-style-type: none"> <li>There is no specific reason why the value is bad</li> <li>Used for propagation</li> </ul>  |
| 1      | Bad::NonSpecific:LowLimited         | <ul style="list-style-type: none"> <li>There is no specific reason why the value is bad</li> <li>Used for propagation</li> </ul>  |
| 2      | Bad::NonSpecific:HighLimited        | <ul style="list-style-type: none"> <li>There is no specific reason why the value is bad</li> <li>Used for propagation</li> </ul>  |
| 3      | Bad::NonSpecific:Constant           | <ul style="list-style-type: none"> <li>There is no specific reason why the value is bad</li> <li>Used for propagation</li> </ul>  |
| 4      | Bad::ConfigurationError:NotLimited  | <ul style="list-style-type: none"> <li>Set if the value is not useful because there is some other problem with the block, depending on what a specific manufacturer can detect</li> </ul> |
| 5      | Bad::ConfigurationError:LowLimited  | <ul style="list-style-type: none"> <li>Set if the value is not useful because there is some other problem with the block, depending on what a specific manufacturer can detect</li> </ul> |
| 6      | Bad::ConfigurationError:HighLimited | <ul style="list-style-type: none"> <li>Set if the value is not useful because there is some other problem with the block, depending on what a specific manufacturer can detect</li> </ul> |
| 7      | Bad::ConfigurationError:Constant    | <ul style="list-style-type: none"> <li>Set if the value is not useful because there is some other problem with the block, depending on what a specific manufacturer can detect</li> </ul> |
| 8      | Bad::NotConnected:NotLimited        | <ul style="list-style-type: none"> <li>Set if the value is required to be connected and is not connected</li> </ul>   |
| 9      | Bad::NotConnected:LowLimited        | <ul style="list-style-type: none"> <li>Set if the value is required to be connected and is not connected</li> </ul>   |
| 10     | Bad::NotConnected:HighLimited       | <ul style="list-style-type: none"> <li>Set if the value is required to be connected and is not connected</li> </ul>   |
| 11     | Bad::NotConnected:Constant          | <ul style="list-style-type: none"> <li>Set if the value is required to be connected and is not connected</li> </ul>   |
| 12     | Bad::DeviceFailure:NotLimited       | <ul style="list-style-type: none"> <li>Set if the source of the value is affected by a device failure</li> </ul>  |
| 13     | Bad::DeviceFailure:LowLimited       | <ul style="list-style-type: none"> <li>Set if the source of the value is affected by a device failure</li> </ul>  |
| 14     | Bad::DeviceFailure:HighLimited      | <ul style="list-style-type: none"> <li>Set if the source of the value is affected by a device failure</li> </ul>  |
| 15     | Bad::DeviceFailure:Constant         | <ul style="list-style-type: none"> <li>Set if the source of the value is affected by a device failure</li> </ul>  |
| 16     | Bad::SensorFailure:NotLimited       | <ul style="list-style-type: none"> <li>Set if the device can determine this condition</li> <li>The Limits define which direction has been exceeded</li> </ul>                             |

| Status | Description                                 | Possible Cause  |
|--------|---|---|
| 17     | Bad::SensorFailure:LowLimited               | <ul style="list-style-type: none"> <li>Set if the device can determine this condition</li> <li>The Limits define which direction has been exceeded</li> </ul>   |
| 18     | Bad::SensorFailure:HighLimited              | <ul style="list-style-type: none"> <li>Set if the device can determine this condition</li> <li>The Limits define which direction has been exceeded</li> </ul>   |
| 19     | Bad::SensorFailure:Constant                 | <ul style="list-style-type: none"> <li>Set if the device can determine this condition</li> <li>The Limits define which direction has been exceeded</li> </ul>   |
| 20     | Bad::NoComm_WithLastUsableValue:NotLimited  | <ul style="list-style-type: none"> <li>Set if this value had been set by communication, which has now failed</li> </ul>   |
| 21     | Bad::NoComm_WithLastUsableValue:LowLimited  | <ul style="list-style-type: none"> <li>Set if this value had been set by communication, which has now failed</li> </ul>   |
| 22     | Bad::NoComm_WithLastUsableValue:HighLimited | <ul style="list-style-type: none"> <li>Set if this value had been set by communication, which has now failed</li> </ul>   |
| 23     | Bad::NoComm_WithLastUsableValue:Constant    | <ul style="list-style-type: none"> <li>Set if this value had been set by communication, which has now failed</li> </ul>   |
| 24     | Bad::NoComm_WithNoUsableValue:NotLimited    | <ul style="list-style-type: none"> <li>Set if there has never been any communication with this value since it was last Out of Service</li> </ul>  |
| 25     | Bad::NoComm_WithNoUsableValue:LowLimited    | <ul style="list-style-type: none"> <li>Set if there has never been any communication with this value since it was last Out of Service</li> </ul>  |
| 26     | Bad::NoComm_WithNoUsableValue:HighLimited   | <ul style="list-style-type: none"> <li>Set if there has never been any communication with this value since it was last Out of Service</li> </ul>  |
| 27     | Bad::NoComm_WithNoUsableValue:Constant      | <ul style="list-style-type: none"> <li>Set if there has never been any communication with this value since it was last Out of Service</li> </ul>  |
| 28     | Bad::OutOfService:NotLimited                | <ul style="list-style-type: none"> <li>The value is not reliable because the block is not being evaluated, and may be under construction by a configurer</li> <li>Set if the block mode is O/S</li> </ul> |
| 29     | Bad::OutOfService:LowLimited                | <ul style="list-style-type: none"> <li>The value is not reliable because the block is not being evaluated, and may be under construction by a configurer</li> <li>Set if the block mode is O/S</li> </ul> |
| 30     | Bad::OutOfService:HighLimited               | <ul style="list-style-type: none"> <li>The value is not reliable because the block is not being evaluated, and may be under construction by a configurer</li> <li>Set if the block mode is O/S</li> </ul> |
| 31     | Bad::OutOfService:Constant                  | <ul style="list-style-type: none"> <li>The value is not reliable because the block is not being evaluated, and may be under construction by a configurer</li> <li>Set if the block mode is O/S</li> </ul> |
| 64     | Uncertain::NonSpecific:NotLimited           | <ul style="list-style-type: none"> <li>There is no specific reason why the value is uncertain</li> <li>Used for propagation</li> </ul>  |
| 65     | Uncertain::NonSpecific:LowLimited           | <ul style="list-style-type: none"> <li>There is no specific reason why the value is uncertain</li> <li>Used for propagation</li> </ul>  |
| 66     | Uncertain::NonSpecific:HighLimited          | <ul style="list-style-type: none"> <li>There is no specific reason why the value is uncertain</li> <li>Used for propagation</li> </ul>  |
| 67     | Uncertain::NonSpecific:Constant             | <ul style="list-style-type: none"> <li>There is no specific reason why the value is uncertain</li> <li>Used for propagation</li> </ul>  |
| 68     | Uncertain::LastUsableValue:NotLimited       | <ul style="list-style-type: none"> <li>Whatever was writing this value has stopped doing so</li> </ul>  |
| 69     | Uncertain::LastUsableValue:LowLimited       | <ul style="list-style-type: none"> <li>Whatever was writing this value has stopped doing so</li> </ul>  |
| 70     | Uncertain::LastUsableValue:HighLimited      | <ul style="list-style-type: none"> <li>Whatever was writing this value has stopped doing so</li> </ul>  |
| 71     | Uncertain::LastUsableValue:Constant         | <ul style="list-style-type: none"> <li>Whatever was writing this value has stopped doing so</li> </ul>  |
| 72     | Uncertain::SubstituteValue:NotLimited       | <ul style="list-style-type: none"> <li>Set when the value is written when the block is not Out of Service</li> </ul>  |

| Status | Description  | Possible Cause  |
|--------|--|---|
| 73     | Uncertain::SubstituteValue:LowLimited              | <ul style="list-style-type: none"> <li>Set when the value is written when the block is not Out of Service</li> </ul>  |
| 74     | Uncertain::SubstituteValue:HighLimited             | <ul style="list-style-type: none"> <li>Set when the value is written when the block is not Out of Service</li> </ul>  |
| 75     | Uncertain::SubstituteValue:Constant                | <ul style="list-style-type: none"> <li>Set when the value is written when the block is not Out of Service</li> </ul>  |
| 76     | Uncertain::InitialValue:NotLimited                 | <ul style="list-style-type: none"> <li>Set when the value of an input parameter is written while the block is Out of Service</li> </ul>   |
| 77     | Uncertain::InitialValue:LowLimited                 | <ul style="list-style-type: none"> <li>Set when the value of an input parameter is written while the block is Out of Service</li> </ul>   |
| 78     | Uncertain::InitialValue:HighLimited                | <ul style="list-style-type: none"> <li>Set when the value of an input parameter is written while the block is Out of Service</li> </ul>   |
| 79     | Uncertain::InitialValue:Constant                   | <ul style="list-style-type: none"> <li>Set when the value of an input parameter is written while the block is Out of Service</li> </ul>   |
| 80     | Uncertain::SensorConversionNotAccurate:NotLimited  | <ul style="list-style-type: none"> <li>Set if the value is at one of the sensor limits</li> <li>The Limits define which direction has been exceeded</li> </ul>                                  |
| 81     | Uncertain::SensorConversionNotAccurate:LowLimited  | <ul style="list-style-type: none"> <li>Set if the value is at one of the sensor limits</li> <li>The Limits define which direction has been exceeded</li> </ul>                                  |
| 82     | Uncertain::SensorConversionNotAccurate:HighLimited | <ul style="list-style-type: none"> <li>Set if the value is at one of the sensor limits</li> <li>The Limits define which direction has been exceeded</li> </ul>                                  |
| 83     | Uncertain::SensorConversionNotAccurate:Constant    | <ul style="list-style-type: none"> <li>Set if the value is at one of the sensor limits</li> <li>The Limits define which direction has been exceeded</li> </ul>                                  |
| 84     | Uncertain::EngUnitRangeViolation:NotLimited        | <ul style="list-style-type: none"> <li>Set if the value lies outside of the range of values defined for this parameter</li> <li>The Limits define which direction has been exceeded</li> </ul>  |
| 85     | Uncertain::EngUnitRangeViolation:LowLimited        | <ul style="list-style-type: none"> <li>Set if the value lies outside of the range of values defined for this parameter</li> <li>The Limits define which direction has been exceeded.</li> </ul> |
| 86     | Uncertain::EngUnitRangeViolation:HighLimited       | <ul style="list-style-type: none"> <li>Set if the value lies outside of the range of values defined for this parameter</li> <li>The Limits define which direction has been exceeded</li> </ul>  |
| 87     | Uncertain::EngUnitRangeViolation:Constant          | <ul style="list-style-type: none"> <li>Set if the value lies outside of the range of values defined for this parameter</li> <li>The Limits define which direction has been exceeded</li> </ul>  |
| 88     | Uncertain::Subnormal:NotLimited                    | <ul style="list-style-type: none"> <li>Set if a value derived from multiple values has less than the required number of Good sources</li> </ul>   |
| 89     | Uncertain::Subnormal:LowLimited                    | <ul style="list-style-type: none"> <li>Set if a value derived from multiple values has less than the required number of Good sources.</li> </ul>  |
| 90     | Uncertain::Subnormal:HighLimited                   | <ul style="list-style-type: none"> <li>Set if a value derived from multiple values has less than the required number of Good sources</li> </ul>   |
| 91     | Uncertain::Subnormal:Constant                      | <ul style="list-style-type: none"> <li>Set if a value derived from multiple values has less than the required number of Good sources</li> </ul>   |
| 128    | Good_NonCascade::NonSpecific:NotLimited            | <ul style="list-style-type: none"> <li>There is no specific reason why the value is good</li> <li>No error or special condition is associated with this value</li> </ul>                        |
| 129    | Good_NonCascade::NonSpecific:NotLimited            | <ul style="list-style-type: none"> <li>There is no specific reason why the value is good</li> <li>No error or special condition is associated with this value</li> </ul>                        |
| 130    | Good_NonCascade::NonSpecific:HighLimited           | <ul style="list-style-type: none"> <li>There is no specific reason why the value is good</li> <li>No error or special condition is associated with this value</li> </ul>                        |

| Status | Description  | Possible Cause  |
|--------|--|---|
| 131    | Good_NonCascade::NonSpecific:Constant                    | <ul style="list-style-type: none"> <li>There is no specific reason why the value is good</li> <li>No error or special condition is associated with this value.</li> </ul> |
| 132    | Good_NonCascade::ActiveBlockAlarm:NotLimited             | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Block Alarm</li> </ul>  |
| 133    | Good_NonCascade::ActiveBlockAlarm:LowLimited             | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Block Alarm.</li> </ul>   |
| 134    | Good_NonCascade::ActiveBlockAlarm:HighLimited            | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Block Alarm</li> </ul>  |
| 135    | Good_NonCascade::ActiveBlockAlarm:Constant               | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Block Alarm</li> </ul>  |
| 136    | Good_NonCascade::ActiveAdvisoryAlarm:NotLimited          | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority less than 8</li> </ul>                                  |
| 137    | Good_NonCascade::ActiveAdvisoryAlarm:LowLimited          | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority less than 8</li> </ul>                                  |
| 138    | Good_NonCascade::ActiveAdvisoryAlarm:HighLimited         | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority less than 8</li> </ul>                                  |
| 139    | Good_NonCascade::ActiveAdvisoryAlarm:Constant            | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority less than 8</li> </ul>                                  |
| 140    | Good_NonCascade::ActiveCriticalAlarm:NotLimited          | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority greater than or equal to 8</li> </ul>                   |
| 141    | Good_NonCascade::ActiveCriticalAlarm:LowLimited          | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority greater than or equal to 8</li> </ul>                   |
| 142    | Good_NonCascade::ActiveCriticalAlarm:HighLimited         | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority greater than or equal to 8</li> </ul>                   |
| 143    | Good_NonCascade::ActiveCriticalAlarm:Constant            | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an active Alarm with a priority greater than or equal to 8</li> </ul>                   |
| 144    | Good_NonCascade::UnacknowledgedBlockAlarm:NotLimited     | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Block Alarm</li> </ul>  |
| 145    | Good_NonCascade::UnacknowledgedBlockAlarm:LowLimited     | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Block Alarm</li> </ul>  |
| 146    | Good_NonCascade::UnacknowledgedBlockAlarm:High Limited   | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Block Alarm</li> </ul>  |
| 147    | Good_NonCascade::UnacknowledgedBlockAlarm:Constant       | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Block Alarm</li> </ul>  |
| 148    | Good_NonCascade::UnacknowledgedAdvisoryAlarm:NotLimited  | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority less than 8</li> </ul>                          |
| 149    | Good_NonCascade::UnacknowledgedAdvisoryAlarm:LowLimited  | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority less than 8</li> </ul>                          |
| 150    | Good_NonCascade::UnacknowledgedAdvisoryAlarm:HighLimited | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority less than 8</li> </ul>                          |
| 151    | Good_NonCascade::UnacknowledgedAdvisoryAlarm:Constant    | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority less than 8</li> </ul>                          |
| 152    | Good_NonCascade::UnacknowledgedCriticalAlarm:NotLimited  | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority greater than or equal to 8</li> </ul>           |
| 153    | Good_NonCascade::UnacknowledgedCriticalAlarm:LowLimited  | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority greater than or equal to 8</li> </ul>           |

| Status | Description  | Possible Cause   |
|--------|--|--|
| 154    | Good_NonCascade::UnacknowledgedCriticalAlarm:HighLimited | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority greater than or equal to 8</li> </ul>  |
| 155    | Good_NonCascade::UnacknowledgedCriticalAlarm:Constant    | <ul style="list-style-type: none"> <li>Set if the value is good and the block has an unacknowledged Alarm with a priority greater than or equal to 8</li> </ul>  |
| 192    | Good_Cascade::NonSpecific:NotLimited                     | <ul style="list-style-type: none"> <li>There is no reason why the value is good</li> <li>No error or special condition is associated with this value</li> </ul>  |
| 193    | Good_Cascade::NonSpecific:LowLimited                     | <ul style="list-style-type: none"> <li>There is no reason why the value is good</li> <li>No error or special condition is associated with this value</li> </ul>  |
| 194    | Good_Cascade::NonSpecific:HighLimited                    | <ul style="list-style-type: none"> <li>There is no reason why the value is good</li> <li>No error or special condition is associated with this value.</li> </ul>   |
| 195    | Good_Cascade::NonSpecific:Constant                       | <ul style="list-style-type: none"> <li>There is no reason why the value is good. No error or special condition is associated with this value</li> </ul>  |
| 196    | Good_Cascade::InitializationAcknowledge:NotLimited       | <ul style="list-style-type: none"> <li>The value is an initialized value from a source (cascade input, remote-cascade-in, and remote-output in parameters)</li> </ul>  |
| 197    | Good_Cascade::InitializationAcknowledge:LowLimited       | <ul style="list-style-type: none"> <li>The value is an initialized value from a source (cascade input, remote-cascade-in, and remote-output in parameters)</li> </ul>  |
| 198    | Good_Cascade::InitializationAcknowledge:HighLimited      | <ul style="list-style-type: none"> <li>The value is an initialized value from a source (cascade input, remote-cascade-in, and remote-output in parameters)</li> </ul>  |
| 199    | Good_Cascade::InitializationAcknowledge:Constant         | <ul style="list-style-type: none"> <li>The value is an initialized value from a source (cascade input, remote-cascade-in, and remote-output in parameters)</li> </ul>  |
| 200    | Good_Cascade::InitializationRequest:NotLimited           | <ul style="list-style-type: none"> <li>The value is an initialization value for a source (back calculation input parameter), because the lower loop is broken or in the wrong mode</li> </ul>                          |
| 201    | Good_Cascade::InitializationRequest:LowLimited           | <ul style="list-style-type: none"> <li>The value is an initialization value for a source (back calculation input parameter), because the lower loop is broken or in the wrong mode</li> </ul>                          |
| 202    | Good_Cascade::InitializationRequest:HighLimited          | <ul style="list-style-type: none"> <li>The value is an initialization value for a source (back calculation input parameter), because the lower loop is broken or in the wrong mode</li> </ul>                          |
| 203    | Good_Cascade::InitializationRequest:Constant             | <ul style="list-style-type: none"> <li>The value is an initialization value for a source (back calculation input parameter), because the lower loop is broken or in the wrong mode</li> </ul>                          |
| 204    | Good_Cascade::NotInvited:NotLimited                      | <ul style="list-style-type: none"> <li>The value is from a block which does not have a target mode that would use this input</li> </ul>  |
| 205    | Good_Cascade::NotInvited:LowLimited                      | <ul style="list-style-type: none"> <li>The value is from a block which does not have a target mode that would use this input</li> </ul>  |
| 206    | Good_Cascade::NotInvited:HighLimited                     | <ul style="list-style-type: none"> <li>The value is from a block which does not have a target mode that would use this input</li> </ul>  |
| 207    | Good_Cascade::NotInvited:Constant                        | <ul style="list-style-type: none"> <li>The value is from a block which does not have a target mode that would use this input</li> </ul>  |
| 208    | Good_Cascade::NotSelected:NotLimited                     | <ul style="list-style-type: none"> <li>The value is from a Control Selector which has not selected the corresponding input</li> <li>This tells the upper block to limit in one direction, not to initialize</li> </ul> |
| 209    | Good_Cascade::NotSelected:LowLimited                     | <ul style="list-style-type: none"> <li>The value is from a Control Selector which has not selected the corresponding input</li> <li>This tells the upper block to limit in one direction, not to initialize</li> </ul> |

| Status | Description                                  | Possible Cause   |
|--------|--|--|
| 210    | Good_Cascade::NotSelected:HighLimited        | <ul style="list-style-type: none"> <li>The value is from a Control Selector which has not selected the corresponding input</li> <li>This tells the upper block to limit in one direction, not to initialize</li> </ul> |
| 211    | Good_Cascade::NotSelected:Constant           | <ul style="list-style-type: none"> <li>The value is from a Control Selector which has not selected the corresponding input</li> <li>This tells the upper block to limit in one direction, not to initialize</li> </ul> |
| 212    | Good_Cascade::DoNotSelect:NotLimited         | <ul style="list-style-type: none"> <li>The value is from a block which should not be selected by a control selector block, due to conditions in or above the block</li> </ul>  |
| 213    | Good_Cascade::DoNotSelect:LowLimited         | <ul style="list-style-type: none"> <li>The value is from a block which should not be selected by a control selector block, due to conditions in or above the block</li> </ul>  |
| 214    | Good_Cascade::DoNotSelect:HighLimited        | <ul style="list-style-type: none"> <li>The value is from a block which should not be selected by a control selector block, due to conditions in or above the block</li> </ul>  |
| 215    | Good_Cascade::DoNotSelect:Constant           | <ul style="list-style-type: none"> <li>The value is from a block which should not be selected by a control selector block, due to conditions in or above the block</li> </ul>  |
| 216    | Good_Cascade::LocalOverride:NotLimited       | <ul style="list-style-type: none"> <li>The value is from a block that has been overridden by a local key switch</li> <li>This also implies Not Invited</li> </ul>  |
| 217    | Good_Cascade::LocalOverride:LowLimited       | <ul style="list-style-type: none"> <li>The value is from a block that has been overridden by a local key switch</li> <li>This also implies Not Invited</li> </ul>  |
| 218    | Good_Cascade::LocalOverride:HighLimited      | <ul style="list-style-type: none"> <li>The value is from a block that has been overridden by a local key switch</li> <li>This also implies Not Invited</li> </ul>  |
| 219    | Good_Cascade::LocalOverride:Constant         | <ul style="list-style-type: none"> <li>The value is from a block that has been overridden by a local key switch</li> <li>This also implies Not Invited</li> </ul>  |
| 220    | Good_Cascade::FaultStateActive:NotLimited    | <ul style="list-style-type: none"> <li>The value is from a block that has FAULT-STATE active</li> <li>This also implies Not Invited</li> </ul>   |
| 221    | Good_Cascade::FaultStateActive:LowLimited    | <ul style="list-style-type: none"> <li>The value is from a block that has FAULT-STATE active</li> <li>This also implies Not Invited</li> </ul>   |
| 222    | Good_Cascade::FaultStateActive:HighLimited   | <ul style="list-style-type: none"> <li>The value is from a block that has FAULT-STATE active</li> <li>This also implies Not Invited</li> </ul>   |
| 223    | Good_Cascade::FaultStateActive:Constant      | <ul style="list-style-type: none"> <li>The value is from a block that has FAULT-STATE active</li> <li>This also implies Not Invited</li> </ul>   |
| 224    | Good_Cascade::InitiateFaultState:NotLimited  | <ul style="list-style-type: none"> <li>The value is from a block that wants its downstream output block to go to Fault State</li> </ul>  |
| 225    | Good_Cascade::InitiateFaultState:LowLimited  | <ul style="list-style-type: none"> <li>The value is from a block that wants its downstream output block to go to Fault State</li> </ul>  |
| 226    | Good_Cascade::InitiateFaultState:HighLimited | <ul style="list-style-type: none"> <li>The value is from a block that wants its downstream output block to go to Fault State</li> </ul>  |
| 227    | Good_Cascade::InitiateFaultState:Constant    | <ul style="list-style-type: none"> <li>The value is from a block that wants its downstream output block to go to Fault State</li> </ul>  |

## Appendix D

# Modbus Configuration in Honeywell® TDC APM/HPM

Refer to the Honeywell Manual OP01-501 APM/HPM Serial Interface Options for information on Modbus Configuration.

The Rosemount 3420 can address registers up to 65535. TDC requires that you use specific register ranges to read floating point numbers. The Honeywell manual contains the following information:

*“Floating point format data for the address range 20001 to 29999 is returned in standard IEEE floating point format except that the low and high words are swapped. This format is appropriate for the Modicon 984 Programmable Logic Controller (PLC).”*

This requires setting the swapped floating point option in the Rosemount 3420 on the Modbus Setup Page.





## Appendix E Integer Scaling

---

|  |       |
|--|-------|
| Integer Scaling .....                              | E - 1 |
| Configuring Scaled Integers .....                  | E - 1 |
| Using Integer Scaling to Define Range Limits ..... | E - 3 |

---

### INTEGER SCALING

If you read process variables from integer registers, the 3420 ordinarily returns a rounded integer, such as 2712 to represent 2711.97 grams per minute, or 1 to indicate a density of 1.2534 grams per cubic centimeter.

Integer scaling causes the 3420 to return integers, accurate to one part in 65536, representing the measured value of the process variable, such as 50000 to represent a mass flow rate of 50 grams per second. Scaled integers amplify and linearize small changes in critical process variables.

You can implement integer scaling for the following purposes:

- To offset negative values such as subzero temperatures or reverse flow rates, so they can be read as positive integers.
- To increase output resolution of values such as density, temperature, pressure, or low flow rates.

### CONFIGURING SCALED INTEGERS

If you configure integer scaling for more than one process variable, the same maximum integer applies to all scaled process variables. Each scaled process variable can have its own offset and scale factor.

To determine a scaled integer proportional to the measured value of a process variable, the 3420 uses a variation of the linear equation. The equation represents a linear correction of the measured value:

$$y = Ax - (B - 32768)$$

Where:

y = Scaled integer returned by the 3420

A = Gain for scaled integer values

x = Measured value of the process variable

B = Offset for scaled integer values

To configure integer scaling of process variables, follow these steps:

1. Select a maximum integer and write its value in the appropriate field on the **Setup>Modbus>Communications** page. If you are using global scale factors and offsets enter these on the same page. Otherwise:
2. Derive a gain for each desired process variable and write the values to the appropriate I/O point.
3. Derive an offset for each desired process variable and write the values to the appropriate I/O point.

### Step 1: Determine Maximum Integer

A scaled integer is the value of  $y$  in the equation presented above. The maximum integer is the highest integer proportional to a measured value of a process variable. The default maximum integer is 65534.

#### KEY TO USING MAXIMUM INTEGERS

If integer scaling applies to more than one process variable, all scales must share the same maximum integer, but may have different offsets and scale factors.

You can program a maximum integer below the default maximum integer. The maximum integer selected may be determined by the Modbus host's capabilities. For example, the Honeywell control system allows transmission of integer values from 0 to 9999 or from 0 to 4096.

The overflow integer is defined as the maximum integer plus 1. Therefore, if the maximum integer is 1000, the overflow integer is 1001. If the default maximum integer is used (65534), the default overflow integer is 65535.

The 3420 returns the overflow integer if the measured value of a process variable derives an integer higher than the maximum integer. The transmitter also returns the overflow integer if any of the following alarm conditions exists:

- Sensor failure
- Input overrange
- Density outside sensor limits
- Temperature outside sensor limits
- Transmitter electronics failure

### Step 2: Determine the Gain (Slope)

The scale factor is the value of  $A$  in the equation above. The scale factor equals the linear slope of the integers, which are proportional to measured values of the process variable. The scale factor therefore is a ratio that compares the change in the measured value to the proportional change in value of the scaled integers.

### Step 3: Determine Offset

The offset for scaled integers is the value of  $B$  in the equation above. The intercept, or the offset minus 32768, equals the value of the process variable that is represented by a scaled integer value of 0. The offset enables scaled integers, which always have positive values, to represent negative values such as a subzero temperature or a reverse flow rate.

Since  $B$  (the offset) always has a value from 0 to 65534, the 3420 uses the following equation to derive a positive or negative intercept:

## USING INTEGER SCALING TO DEFINE RANGE LIMITS

Intercept = Offset - 32768

- The maximum negative intercept is -32768, where the offset = 0.
- The intercept is 0, where the offset = 32768
- The maximum positive intercept is 32767, where the offset = 65535

So, although you write the offset as an integer from 0 to 65535, the process variable can have a value less than, equal to, or greater than 0.

The maximum integer, offsets, and scale factors establish programmable limits on process variables. Establish an integer scale for programmable limits on process variables according to either of the two methods described below.

### Method 1

Follow these steps while referring to Example 1 and Example 2.

1. Use the following equations to set up scaled integer limits corresponding to lower and upper range values of the process variable.

$$\text{Offset} = (\text{Gain} \times x_1) - y_2 + 32768$$

$$\text{Gain} = \frac{y_2 - y_1}{x_2 - x_1}$$

Where:

$x_1$  = Lower range value

$x_2$  = Upper range value

$y_1$  = Maximum integer

$y_2$  = An integer (usually 0) with lower than the maximum integer

2. Write the integer value of  $y$  (the maximum integer) to the appropriate configuration entry field.
3. Write the integer value of  $A$  (the gain) to the appropriate configuration entry field.
4. Write the integer value of  $B$  (the offset) to the appropriate configuration entry field.

**Example 1** The 3420 FIM is connected to a Honeywell TDC3000 control system using a PLC Gateway. The control system engineer sets up an analog input point to bring in volume flow, which enables use of flow limit alarms in the control system. On the control system, an analog input point has limits of 0 to 4095, with any input greater than 4095 indicating a “bad” process variable. The lower range limit is -100 barrels/day. The upper range limit is 300 barrels/day.

1. Set up the maximum integer, if necessary.
2. Set up scaled integer limits corresponding to the lower and upper range values.
3. Determine the gain:

$$\begin{aligned} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{4095 - 0}{300 - (-100)} \\ &= \frac{4095}{400} \\ &= 10.2375 \end{aligned}$$

4. Determine the offset:

$$\begin{aligned} &= (\text{Gain} \times x_1) - y_1 + 32768 \\ &= [10 \times (-100)] - 0 + 32768 \\ &= -1000 + 32768 \\ &= 31768 \end{aligned}$$

5. The calculated scale factor of 10.2375 was rounded down to 10, so the actual transmitter range will slightly exceed the desired range of -100 to 300. To allow proper scaling of the analog input point data by the Honeywell control system, calculate the actual transmitter range corresponding to scaled integer values of 0 and 4095:

Lower range value

$$= x_1 = -100$$

Upper range value

$$\begin{aligned} &= \frac{y_2 - y_1}{\text{Gain}} + x_1 \\ &= \frac{4095 - 0}{10} - 100 \\ &= 309.5 \end{aligned}$$

**Example 2** Scale the mass flow rate so 0 represents -100 pounds/minute (lb/min) and 30,000 represents 200 lb/min.

Scale factor:

$$\begin{aligned} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{30000 - 0}{200 - (-100)} \\ &= \frac{30000}{300} \\ &= 100 \end{aligned}$$

Offset:

$$\begin{aligned} &= (\text{Gain} \times x_1) - y_2 + 32768 \\ &= [100 - (-100)] - 0 + 32768 \\ &= 22768 \end{aligned}$$

## Method 2

Choose a maximum integer equal to or less than 65534, then using the linear equation presented to solve for A (the scale factor) and B (the offset), as shown in Example 3.

1. Write the integer value of y (the maximum integer) to the appropriate I/O point
2. Write the integer value of A (the scale factor) to the appropriate I/O point
3. Write the integer value of B (the offset) to the appropriate I/O point

### Example 3

The mass flow rate needs to remain between 30 and 40 grams per minute (g/min). Scale the mass flow rate so 0 represents a flow rate of 40.000 g/min, and 10,001 represents a flow rate greater than 40.000 g/min.

$$10000 = A(40) - (B - 32768)$$

$$0 = A(30) - (B - 32768)$$

Solve for A:

$$10000 = A(10)$$

$$A = \frac{10000}{10}$$

$$A = 1000$$

Solve for B:

$$10000 = 1000(40) - (B - 32768)$$

$$10000 = 40000 - (B - 32768)$$

$$10000 = 40000 + 32768 - B$$

$$B = 62768$$

- The maximum integer is 10,000. If the mass flow rate exceeds 40.000 g/min, the transmitter returns the integer 10,001.
- The scale factor is 1000. A change of 1 in the value of the integers represents a change of 0.001 g/min in the mass flow rate.
- The offset is 62,768. If the mass flow rate drops to 30.000 g/min, the transmitter returns a 0.



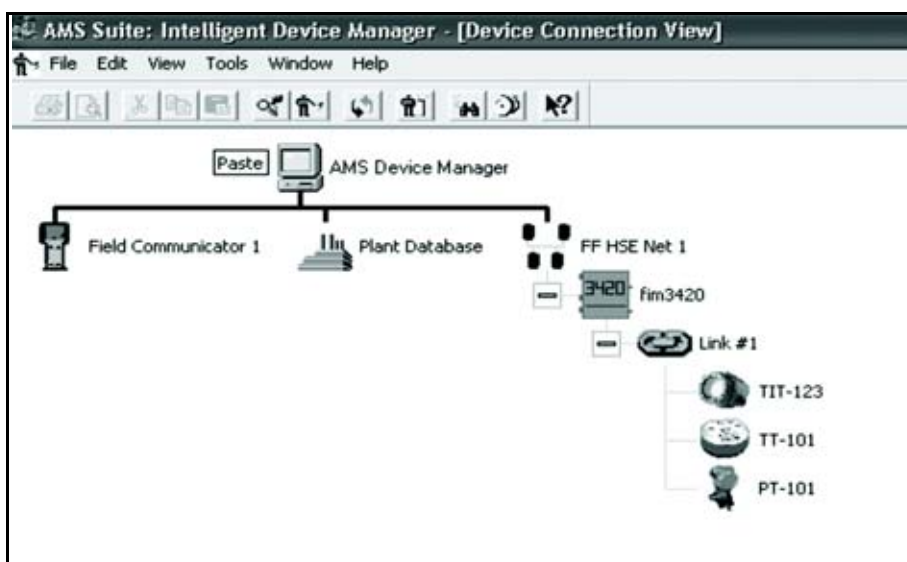
## Appendix F

# AMS™ Suite: Intelligent Device Manager with Rosemount 3420

### BENEFITS

AMS™ Suite provides a comprehensive and integrated family of predictive and proactive maintenance applications including a common interface to device diagnostics. AMS™ Suite: Intelligent Device Manager provides support for more than 141 FOUNDATION™ fieldbus devices from 33 manufacturers, and 267 HART® devices from 39 manufacturers. Its comprehensive set of analysis and reporting tools presents a single application for predictive diagnostics, documentation, calibration management, and device configuration.

When used in conjunction with the Rosemount 3420 Fieldbus Interface Module, Intelligent Device Manager provides a powerful tool for complete management of a plant's valuable instrument and valve assets. Besides providing a user-friendly interface for configuring, diagnosing, and calibrating a plant's fieldbus devices, Intelligent Device Manager provides a complete historical Audit Trail of all events associated with these activities. The Alert Monitor within Intelligent Device Manager quickly alerts the user of diagnostic conditions associated with the fieldbus devices connected to the 3420. Calibration management of these devices is easily handled by the Calibration Assistant SNAP-ON™ available with AMS™ Suite Intelligent Device Manager. The AMS™ Suite: ValveLink® SNAP-ON™ for the FIELDVUE® Digital Valve Controller provides advanced diagnostics on complete control valve assemblies.



FOUNDATION™ Fieldbus HSE Network Displayed in AMS Device Manager with Rosemount 3420 Connected

## NETWORK CONFIGURATION FOR ROSEMOUNT 3420

Establishing a connection between Intelligent Device Manager and the 3420 is easy. The following steps are required.

1. Stop Intelligent Device Manager if it is running
2. Select **Start | Programs | AMS Device Manager | Network Configuration** from the Windows Task Bar.
3. Click **Add**.
4. Select **FF HSE Network** from the list of networks in the Select Network Component Type dialog box.
5. Click **Install**.
6. Enter a name for the HSE network. This will be the name that will appear at the top of the 3420's branch in AMS Device Manager.
7. Click **NEXT**
8. Select the Primary HSE NIC Address. This is the IP address of the NIC card to which the 3420 (s) are connected.
9. Check the box that says "**Enable Processing and acknowledgement of fieldbus alerts**"
10. Click **FINISH**
11. Click **Close**

When AMS Device Manager is restarted, the FOUNDATION™ Fieldbus HSE Network will now show up in both the Explorer and Device Connection view. Right click on the FOUNDATION™ Fieldbus HSE Network icon and request **Rebuild Hierarchy**. Next, right click on the 3420 icon and request a **Scan of all devices**. When the scan is complete, the user can expand the interface by selecting the plus sign on the 3420 icon and the fieldbus segment desired. A list of all devices on the segment will be displayed.

## USING THE FOUNDATION™ FIELDBUS HSE SYSTEM INTERFACE IN AMS DEVICE MANAGER

The FOUNDATION™ Fieldbus HSE System Interface lets you use AMS Device Manager to view and configure fieldbus devices connected to the 3420 Fieldbus Interface Module.

The 3420 Fieldbus Interface Module is connected to the AMS Device Manager PC through an Ethernet card. (a dedicated Ethernet card is recommended). AMS Device Manager supports up to 16 3420's in one FOUNDATION™ Fieldbus HSE Network. Communications with the 3420's on multiple Ethernet segments is not supported.

A fieldbus device must be commissioned in order for AMS Device manager to communicate with it.

### Foundation Fieldbus HSE Network Hierarchy

A FOUNDATION™ Fieldbus HSE network is represented by its icon, which is at the top of the network hierarchy in Device Connection View or Device Explorer View. The second level of the hierarchy displays the HSE linking devices. The icon displayed for an HSE linking device is provided by the manufacturer.

The third level of hierarchy displays the fieldbus H1 links. The fourth level of the hierarchy displays the fieldbus devices. The icons within the HSE network have context menus from which you can perform various AMS Device Manager and device functions.



AMS Tags

When a device is added to AMS Device Manager, a unique AMS Tag is automatically assigned to the device. For FOUNDATION™ Fieldbus HSE devices, the AMS tag defaults to the fieldbus physical device (PD) tag. If that tag already exists in the database, a suffix is added to the tag name to make it unique.

THE 3420 WEB  
BROWSER AND AMS  
DEVICE MANAGER

The 3420 Web Browser described elsewhere in the manual provides an excellent complement to the functionality provided by AMS Device Manager. Although all fieldbus device data is accessible via the 3420 Web browser, AMS Device Manager provides the best way to configure a device's Resource and Transducer Blocks. AMS Device Manager also provides an excellent way to view a device's diagnostic alert conditions using Alert Monitor. On the other hand, configuring a device's Function Blocks such as Analog Input Blocks, PID Blocks, etc. should be handled by the 3420 Web Browser. This includes the linking of these blocks into "control in the field" control applications.

The following chart indicates what functions are best performed in the 3420 Web Browser and which functions are best performed by the AMS Device Manager when dealing with a typical transmitter such as a Rosemount 3051S pressure transmitter.

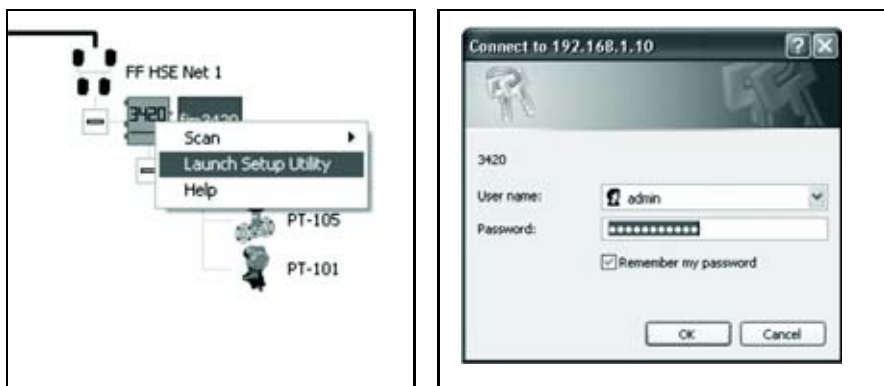
Common Functions Performed by AMS Device Manager and 3420 Web Browser

| User Function   | AMS Device Manager | 3420 Web Browser |
|---|--------------------|------------------|
| Configuring a Device's Resource Block   | X                  | Alternate        |
| Configuring a Device's Transducer Block   | X                  | Alternate        |
| Setting up a Device's Analog Input Block (including Transducer Scale, I/O Type, etc.) |                    | X                |
| Configuring a Control Strategy in a Fieldbus Device (i.e. PID, etc.)                  |                    | X                |
| Running a Setup or Calibration Procedure (i.e. method) for a Device                   | X                  |                  |
| Monitoring PlantWeb Alerts  | X                  |                  |
| Viewing Detailed Device Status  | X                  | Alternate        |
| Documenting All Changes Made to a device (i.e. Audit Trail)                           | X                  |                  |
| Calibrating a Device  | X                  |                  |
| Keeping Track of Documentation, Notes, and Help Related to a Device                   | X                  |                  |

LAUNCHING THE 3420  
WEB BROWSER FROM  
AMS DEVICE MANAGER

The 3420 Web Browser is easily launched by right clicking on the 3420 Icon under the FOUNDATION™ Fieldbus HSE System Interface branch and selecting the "Launch 3420 Setup Utility" entry in the context menu. The first time the Web Browser is launched, it will be necessary to enter the User Name and Password. The default User Name is **admin**.

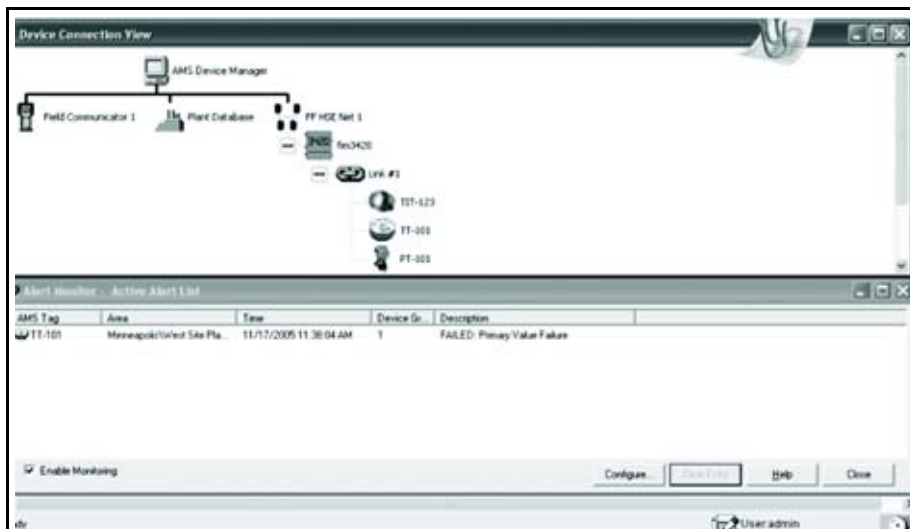
The default Password is **fielveladmin**. It is not necessary to enter the User Name and Password if the “remember password” box is selected. The use and functionality of the 3420 Web Browser is described elsewhere in this manual. When the user is finished with the Web Browser, the browser window merely needs to be closed and the user will be returned to the previous AMS Device Manager view.



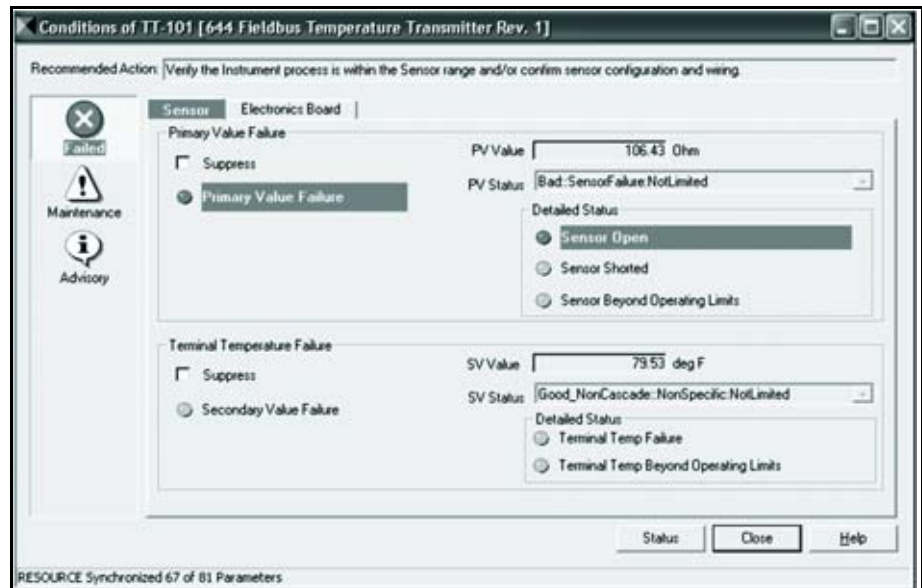
## Using AMS Device Manager’s Alert Monitor with the Rosemont 3420

The Alert Monitor in AMS Device Manager provides a powerful means to monitor device alerts reported from the fieldbus devices connected to the 3420. When an alert is reported, the “alarm bell” in the lower corner of the AMS Device Manager screen is lit and the alert shows up in the Alert Monitor window. By right clicking a specific alert, a status screen is displayed identifying the specific alert conditions. By dragging the “?” symbol onto this alert, additional information about the specific alert can be obtained.

When the alert condition is corrected, it disappears from the Alert Monitor screen. These device alerts are also captured and stored in the Audit Trail.



AMS Alert Monitor displays PlantWeb Alerts as they happen



Detailed status information can be called up from AMS Alert Monitor

In order for device alerts to be reported to the Alert Monitor from the 3420, some setup is required. The following is a list of setup requirements to ensure correct operation of Alert Monitor:

1. When performing the Network Configuration for AMS Device Manager, check the **"Enable processing and acknowledgement of Fieldbus Alerts"** box when setting up the fieldbus HSE Network as described above.
2. Some devices allow specific device alerts to be enable or disabled. In these cases, make sure the alerts are enabled. These settings are typically in the device's Transducer Block and can be changed via AMS Device Manager.
3. Some devices allow a device alert to be suppressed. This is different than disabling the alert. Make sure the alert is not suppressed. This setting is typically in the device's Resource Block.
4. For a device to have its alerts show up in Alert Monitor, it must be in the AMS Device Manager Plant Database. Make sure the fieldbus device connected to the 3420 has been placed in the Plant Database. This is done by "dragging" the device shown under the 3420 to a folder in the Plant Database.
5. For a device to show up in Alert Monitor, it must be included in the Alert Monitor List. This is done using the following steps:
  - a.) Select **CONFIGURE** from the Alert Monitor Window
  - b.) Select **ADD** from the Device Monitor List
  - c.) Select the device(s) to be added and select **OK**
  - d.) Select **OK** again

6. For an alert to show up in Alert Monitor, it is necessary that the Device Description for that device be available in the 3420. The method for doing this is described under the “Advanced” subsection in the Section labeled Fieldbus Field Devices earlier in this manual. Usually this is not necessary unless the device involved is not a commonly used fieldbus device.
7. For a device to show up in the Alert Monitor, it is necessary that the “Reports” option be enabled. For Rosemount devices, this field is found under the “Options” tab in the Resource Block.
8. Finally, it is necessary that a device connected to the 3420 change from the normal to alert state for it to show up in the Alert Monitor. If the device is already in the alert state when the device is added to the Alert Monitor List, it will not show up until it transitions into the alert state again.

## Appendix G

# CSI 9120 Machinery Health Transmitter

### PURPOSE OF THE CSI 9210 APPENDIX

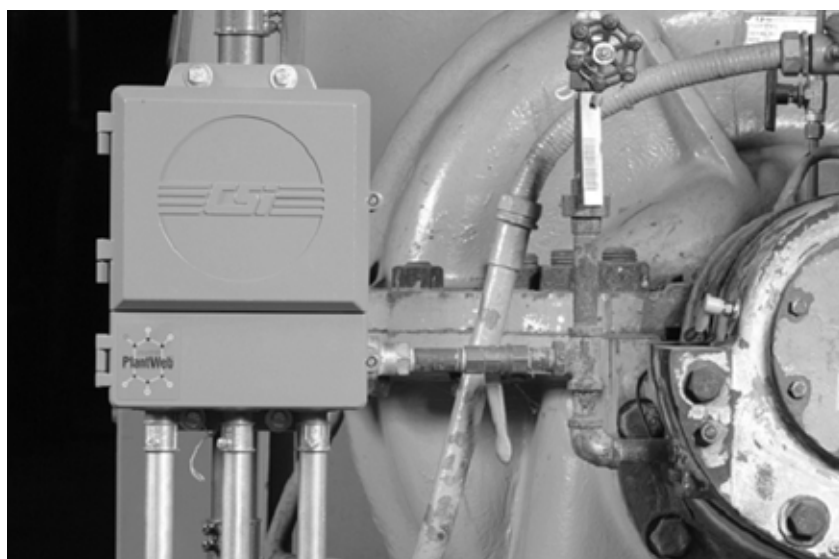
The purpose of this appendix is to provide pertinent details needed to use the Rosemount 3420 in conjunction with the CSI 9120 Machinery Health Transmitter. This appendix focuses primarily on the PlantWeb Alert configuration and the AI and MAI function block configuration. The CSI 9210 transducer block configuration details are contained in the CSI 9210 user manual and the user is encouraged to consult this separate manual for the explanation of these details as they are not contained in this appendix to the 3420 user manual.

### INTRODUCTION

The CSI 9210 Machinery Health Transmitter is a four-wire, field mountable, intelligent device that tightly integrates machinery health analysis into the process automation environment. Each device monitors a single machine train consisting of one AC induction motor coupled to one centrifugal pump. Analysis results are delivered as:

- FOUNDATION™ Fieldbus block alerts
- Machinery Health Values to FOUNDATION™ Fieldbus-capable process automation systems via Analog Input function blocks.

The CSI 9210 collects data from various sensor inputs and assesses the health of the motor-pump machine train. This assessment is based on an analysis engine that has been specifically optimized and embedded into the device for the particular machine train.



REV CA/CSI9210\_PHOTO.TIF

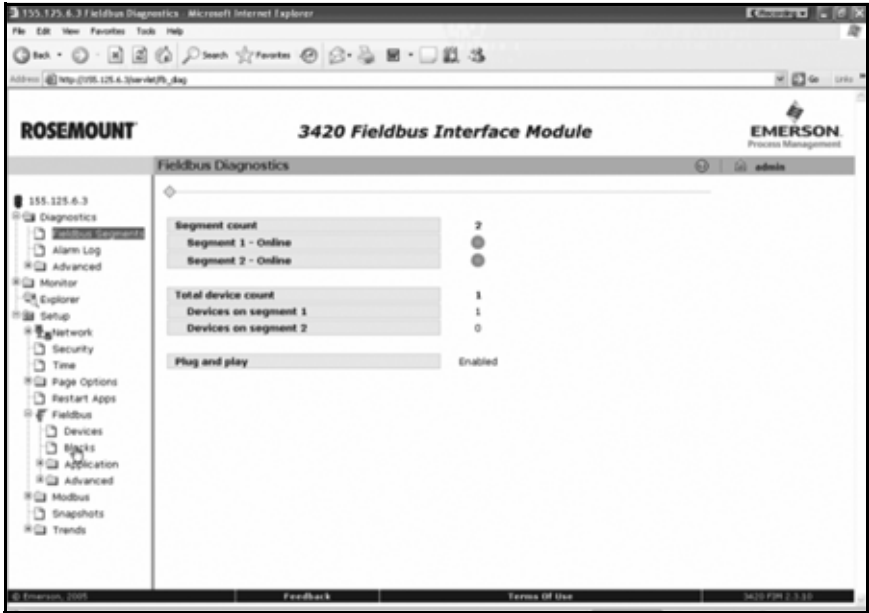
Motor-pump combinations are the backbone of most industries. The processes that are being driven by these pumps are the life blood of the plant. Unfortunately, many of these mechanical assets contribute to higher than desired maintenance costs and are often responsible for the majority of unplanned process downtime. The CSI 9210 provides an optimized solution for easy device implementation as the data collection logic and the data analysis logic are factory configured. The data collection logic and the analysis logic are based on the specific needs of motor-pump combinations typically found in process industries.

SCOPE

This section covers the configuration details needed to configure and commission this device using the Rosemount 3420 Fieldbus Interface Module.

Block Configuration

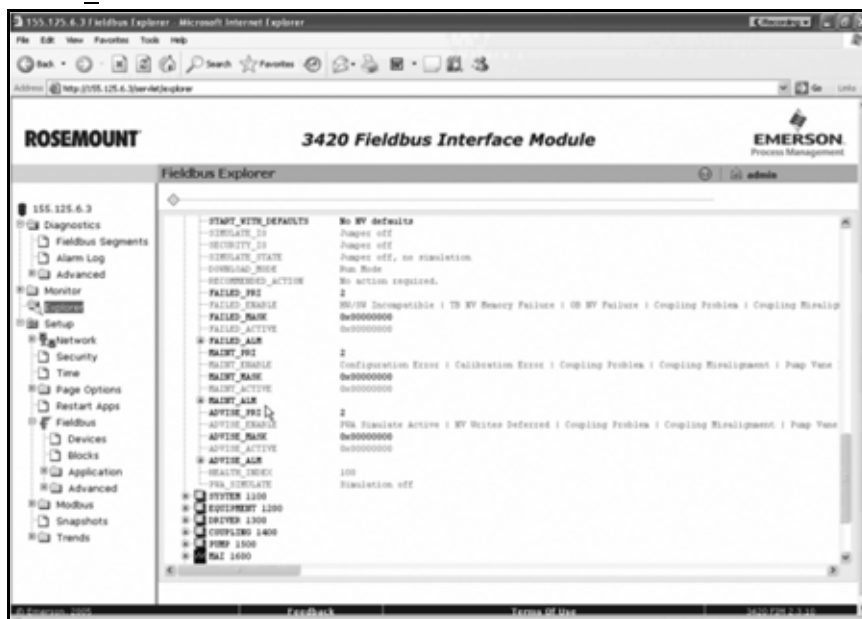
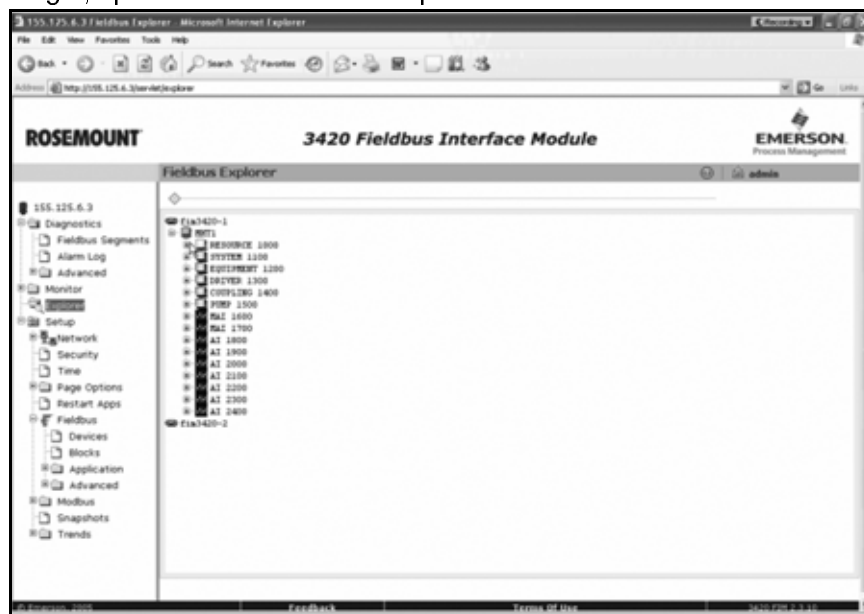
Ensure that all of the resource, transducer, and function blocks are set up to operate properly.



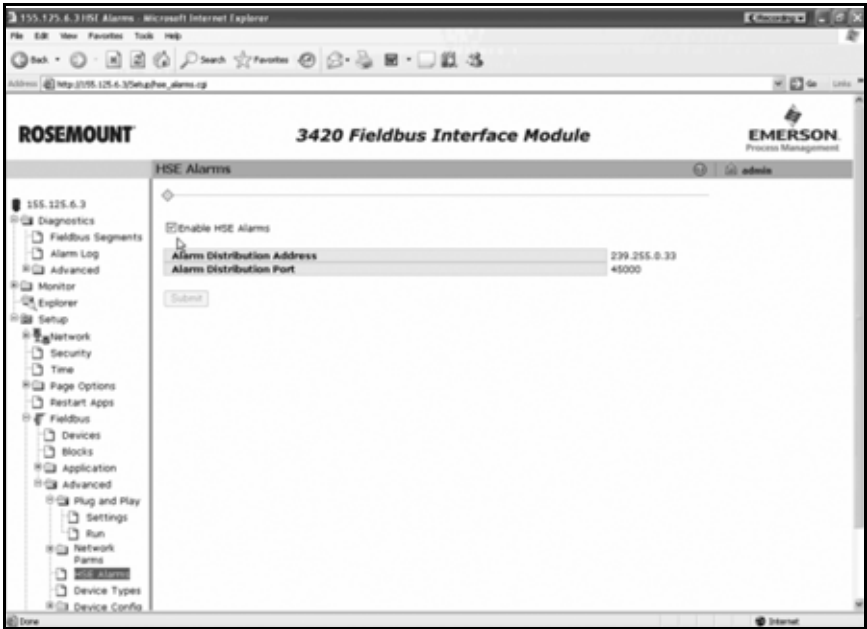
For the fieldbus block setup, select **Setup>Fieldbus>Blocks** to ensure all of the blocks are enabled. Then, to ensure the alarms are enabled, check the alarms box for Resource 1000.



To configure the Alarm Enabling, click on Explorer and then in the window at the right, open the device and then open the Resource 1000 block.

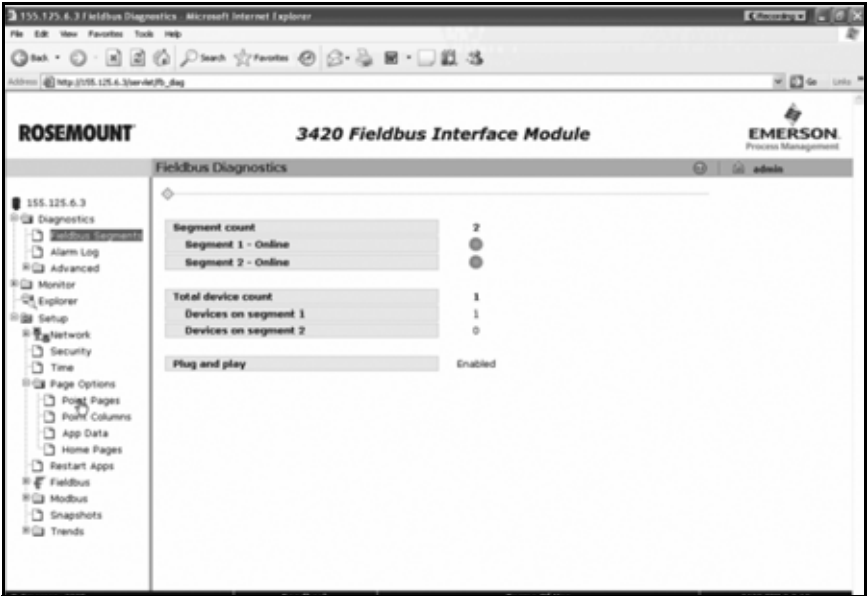


If the 3420 will not be used with AMS Device Manager, uncheck this box to put the 3420 in the standalone mode. The change will need to be submitted and then the application will need to be restarted.



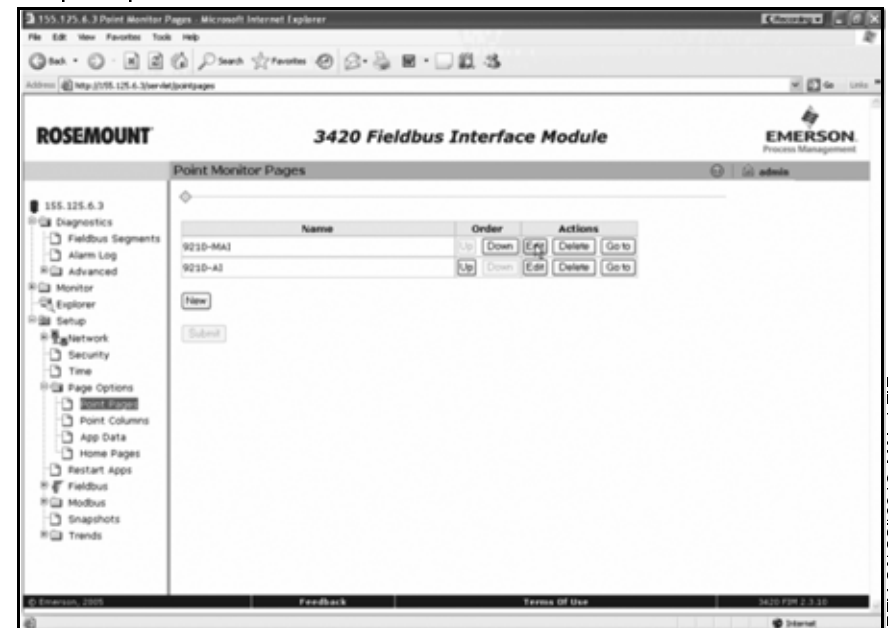
Point Pages  
Configuration - MAI  
Blocks

To configure the 3420 web page for viewing the process values produced by the CSI 9210's MAI function blocks, click on Setup, Page Options, and then Point Pages.

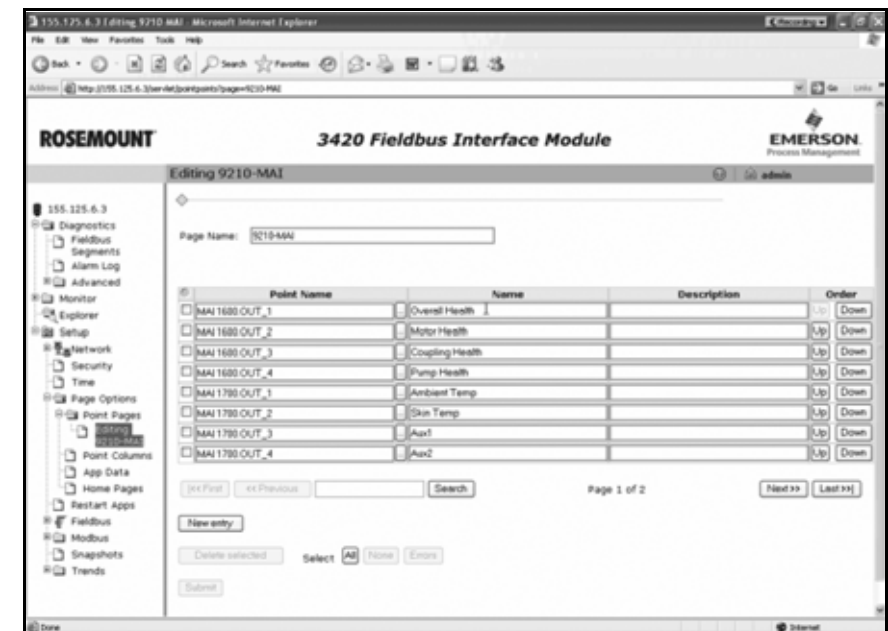




Enter "9210-MAI" for the name of the point page. Click **New Entry** at the bottom of the page. Next, click on the **browse** button under the point name. Select the output you want to monitor and then go into edit mode in order to set-up the points.



REV CA/CS/9210\_MAI\_1.TIF



REV CA/CS/9210\_MAI\_2.TIF

On this set-up page, type in the desired names for each of the points. The recommended names are:

MAI1600 out\_1 - Overall health

out\_2 - Motor health

out\_3 - Coupling health

out\_4 - Pump health

MAI1700 out\_1 - Ambient temp

out\_2 - Skin temp

out\_3 - Aux1

out\_4 - Aux2

out\_5 - Term panel temp

out\_6 - Internal temp

Click on submit to save the page.

## Point Pages Configuration-AI blocks

To set-up the 3420's web page to view the CSI 9210's AI function block values, click on **Setup>Page Options>Point Pages**. Enter "9210-AI" for the name of the point page and click **New Entry** at the bottom of the page.

Click on the browse button under the point name and select the output that is to be monitored.

| Point Name                          | Name                                     | Description | Order   |
|-------------------------------------|--|-------------|---------|
| <input type="checkbox"/> AI1800 OUT | <input type="checkbox"/> Current Speed   |             | Up Down |
| <input type="checkbox"/> AI1900 OUT | <input type="checkbox"/> Overall Health  |             | Up Down |
| <input type="checkbox"/> AI2000 OUT | <input type="checkbox"/> Motor Health    |             | Up Down |
| <input type="checkbox"/> AI2100 OUT | <input type="checkbox"/> Coupling Health |             | Up Down |
| <input type="checkbox"/> AI2200 OUT | <input type="checkbox"/> Pump Health     |             | Up Down |
| <input type="checkbox"/> AI2300 OUT | <input type="checkbox"/> Driver Temp     |             | Up Down |
| <input type="checkbox"/> AI2400 OUT | <input type="checkbox"/> Ambient Temp    |             | Up Down |

Set the following values:

AI1800.out - Speed

AI1900.out - Overall Health

AI2000.out - Motor Health

AI2100.out - Coupling Health

AI2200.out - Pump Health

AI2300.out - Driver Temp

AI2400.out - Ambient Temp

Click on Submit to save the page.

## Transducer Block Configuration

For the device to function optimally, the transducer blocks must be configured. Each transducer block is related to a specific part (or combination) or the motor-pump equipment train:

Equipment setup (Transducer 1200)

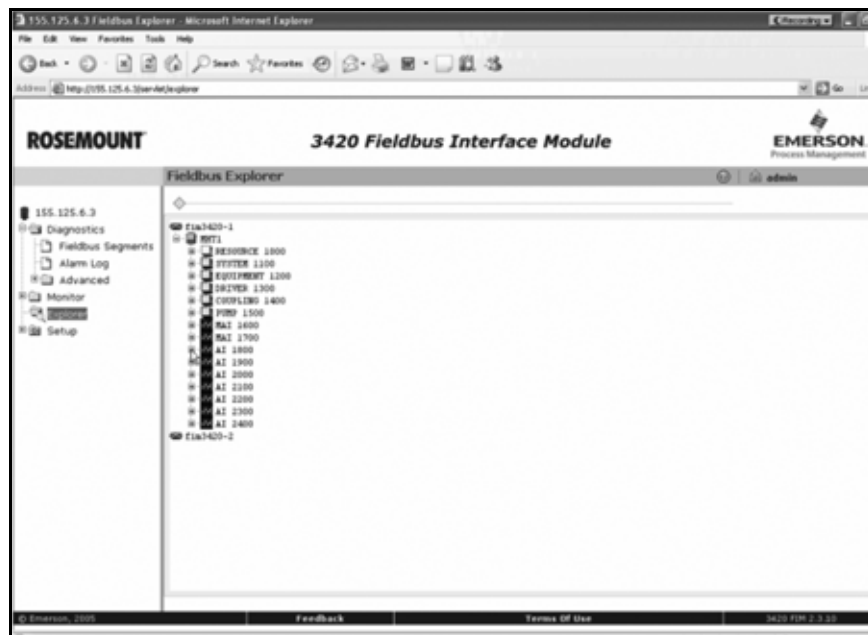
Motor setup (Transducer 1300)

Coupling setup (Transducer 1400)

Pump setup (Transducer 1500)

The user should refer to the CSI 9210 user's manual for a definition of all of the set-up terms and recommendations for the transducer blocks.

## Health MAI Block Configuration



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All of the blocks must be set correctly or the blocks will not function properly. Click on explorer, Click on MAI1600 (Health Values) and to setup, click on Mode and set the Target to OOS. (Out of Service). Set Channel to Custom.

Set the following values:

L\_TYPE = Indirect

OUT\_SCALE 100% scale = 100

OUT\_SCALE 0% scale = 0

OUT\_SCALE Engineering Units = %

XD\_SCALE 100% of scale = 1

XD\_SCALE 0% of scale = 0

XD\_SCALE Engineering Units = no units

## Temperature MAI Block Configuration

Channel1 = Overall Health  
Channel2 = Motor Health  
Channel3 = Coupling Health  
Channel4 = Pump Health  
Set Target back to Auto

Click on the MAI1700 block and to setup, click on Mode and set the Target to OOS. (Out of Service). Set the Channel to Custom and set the following parameter values:

L\_TYPE = Direct  
OUT\_SCALE 100% of scale = Maximum Desired Temp  
OUT\_SCALE 0% of scale = Minimum Desired Temp  
OUT\_SCALE Engineering Units = °F or °C  
XD\_SCALE 100% of scale = Maximum Desired Temp  
XD\_SCALE 0% of scale = Minimum Desired Temp  
XD\_SCALE Engineering Units = °F or °C  
Channel1 = Ambient Temp  
Channel2 = Motor Temp  
Channel3 = Aux1  
Channel4 = Aux2  
Channel 5 = Term Panel Temp  
Channel6 = Enclosure Temp

After ensuring the values are set correctly, set the Target back to Auto.

## Health AI Block Configuration

To configure any one of the four Health AI blocks, first, click on explorer and then set the following AI block values:

1800 = Current Speed  
1900 = Overall Health  
2000 = Motor Health  
2100 = Coupling Health  
2200 = Pump Health  
2300 = Driver Temp  
2400 = Ambient Temp

Set the Health AI block values:

L\_TYPE = Indirect  
OUT\_SCALE 100% scale = 100  
OUT\_SCALE 0% scale = 0  
OUT\_SCALE Engineering Units = %  
XD\_SCALE 100% of scale = 1

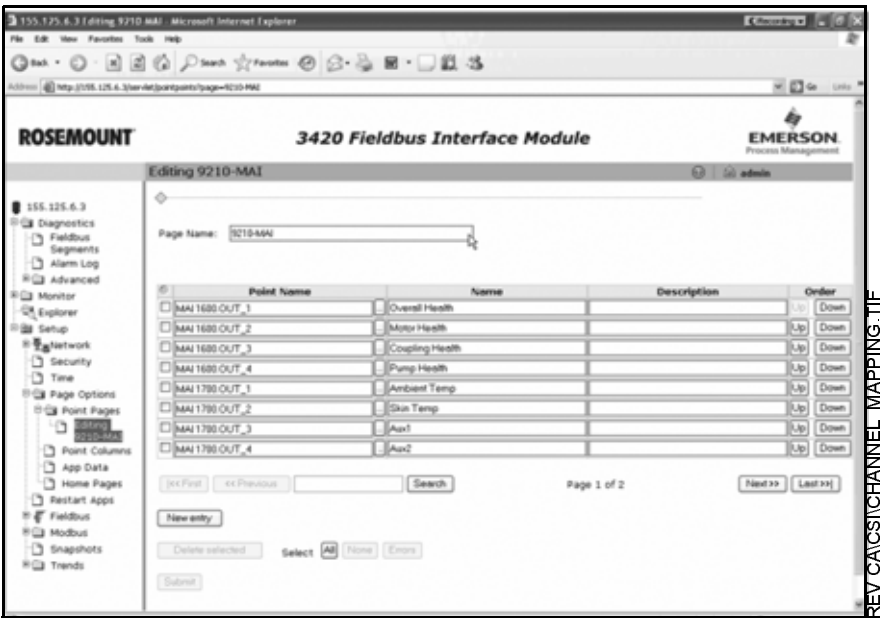
Temperature AI Block Configuration

XD\_SCALE 0% of scale = 0  
XD\_SCALE Engineering Units = no units  
Set the Temperature AI' block values:  
L\_TYPE = Direct  
XD\_SCALE 100% of scale = Maximum Desired Temp  
XD\_SCALE 0% of scale = Minimum Desired Temp  
XD\_SCALE Engineering Units = °F or °C  
OUT\_SCALE – Same as XD\_SCALE

Speed AI Block Configuration

Set the Speed AI block values:  
L\_TYPE = Indirect  
OUT\_SCALE 100% scale = Maximum RPM (3600)  
OUT\_SCALE 0% scale = 0  
OUT\_SCALE Engineering Units = RPM  
XD\_SCALE 100% of scale = Maximum HZ (60)  
XD\_SCALE 0% of scale = 0  
XD\_SCALE. UNITS = Hz

Channel Mapping



The channel mapping should be set to the following values:  
Overall Health – Ch1  
Motor Health – Ch2  
Coupling Health – Ch3  
Pump Health – Ch4

Motor Speed – Ch5  
Ambient Temperature – Ch6  
Skin Temperature – Ch7  
Aux1 Temperature – Ch8  
Aux2 Temperature – Ch9  
Term Panel Temperature – Ch10  
Internal Housing Temperature – Ch11

# Glossary

|                              |            |
|------------------------------|------------|
| Networking Definitions ..... | Glossary-1 |
| Fieldbus Definitions .....   | Glossary-2 |

## NETWORKING DEFINITIONS

| Term               | Definitions   |
|--------------------|---|
| <b>DHCP</b>        | Dynamic Host Configuration Protocol: Used to configure the network parameters automatically. This device contains a DHCP Client to retrieve the network configuration parameters from a DHCP server on the network. |
| <b>NTP/SNTP</b>    | Network or Simple Network Time Protocol: Used to set the system time. This device contains an NTP client for keeping the system time synchronized with a network time server.                                       |
| <b>Domain Name</b> | A unique designator on the internet composed of symbols separated by dots such as: this.domain.com  |
| <b>FTP</b>         | File Transfer Protocol: A method for transferring files to and from remote computers on the network.  |
| <b>Host Name</b>   | A unique designator in a domain associated with the IP address of a device such as: device.this.domain.com. In that example the hostname is device.   |
| <b>HTML</b>        | Hyper Text Markup Language: The file format used to define pages viewed with a web browser.   |
| <b>HTTP</b>        | Hyper Text Transfer Protocol: The protocol that defines how a web server sends and receives data to and from a web browser.   |
| <b>IP</b>          | Internet Protocol: The protocol that specifies how data is transmitted over the internet.   |
| <b>Netmask</b>     | A string of 1's and 0's that mask out or hide the network portion of an IP address leaving only the host component.   |
| <b>Network</b>     | The portion of the network that the device resides on.  |
| <b>Broadcast</b>   | The address that a station can send to that will be received by all devices on the network.   |
| <b>Gateway</b>     | The address of the node on the network that serves as an entrance to other networks.  |

## FIELDBUS DEFINITIONS

| Term  | Definitions   |
|---|---|
| <b>Terminator</b>                                 | A device attached to the end of a communications bus or network to absorb signals so they do not reflect back.  |
| <b>Resource Block</b>                             | The resource block defines device specific characteristics such as software revisions, hardware revision and materials of construction.   |
| <b>Transducer Block</b>                           | The transducer block defines device specific input/output characteristics for function block application purposes. It contains universal parameters and device specific parameters such as trim limits, sensor type, sensor serial number and sensor diagnostic information.  |
| <b>Function Block</b>                             | Function blocks define the capabilities of the high level measurement and control available in the device. There are many possible function block capabilities contained in a device such as analog input, discrete input, discrete output, signal characterizer, arithmetic, integrator, PD or PID control, input selector or analog output.   |
| <b>Analog Input (AI) Function Block</b>           | Scanned by the Rosemount 3420.  |
| <b>Multiple Analog Input (MAI) Function Block</b> | Provides up to 8 variable in one function block, reducing scan times.   |
| <b>Mode</b>                                       | <p><b>Target</b> - The mode requested by the operator</p> <p><b>Actual</b> - The current mode of the block which may differ from the target based on the current operating conditions. The actual mode is calculated during block execution.</p> <p><b>Permitted</b> - The modes allowed by target during operation</p> <p><b>Normal</b> - The desired operating mode of the block.</p>   |
| <b>Mode: Out of Service</b>                       | In this mode the algorithm of the block is no longer being executed and any outstanding alarms will be cleared. This is the highest priority mode.  |
| <b>Mode: Auto</b>                                 | In this mode the block algorithm is being executed with new value and status as well as mode being computed each Macrocycle or execution of the block   |
| <b>Mode: Manual</b>                               | In this mode the block output is not being calculated although it may be limited. It is set directly by the operator through an interface device.   |
| <b>Macrocycle</b>                                 | The period of execution in which the function block schedule is defined.  |
| <b>Schedule</b>                                   | The rate and relative time which function blocks process their inputs and generate their outputs. The schedule defines when a function block is triggered to start execution  |
| <b>Link Master</b>                                | A link master device is a device that is capable of becoming the LAS. There is a bid procedure that is followed that selects the link master device with the lowest node address.   |
| <b>Link Active Schedule Device</b>                | <p>The LAS performs five functions:</p> <ul style="list-style-type: none"> <li>• Maintains the schedule to send compel data (CD) messages (DLPDU's) to devices on the network. This is the highest priority function.</li> <li>• Sends probe node (PN) messages to unused addresses to detect new devices added to the link/segment and adds them to the Live List when found.</li> <li>• Periodically distributes data link time and link schedule time</li> <li>• Send pass token (PT) messages to devices to provide them the opportunity to send unscheduled data.</li> <li>• Monitor responses to pass token (PT) messages and removes devices from the Live List when a device fails to use or return the token.</li> </ul> |
| <b>Device Tag</b>                                 | The 32 character name of the device.  |
| <b>Block Tag</b>                                  | The 32 character name of the function block.  |
| <b>Parameter Name</b>                             | The name of the function block parameter.   |
| <b>Subparameter Name</b>                          | The name of the function block subparameter.  |





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