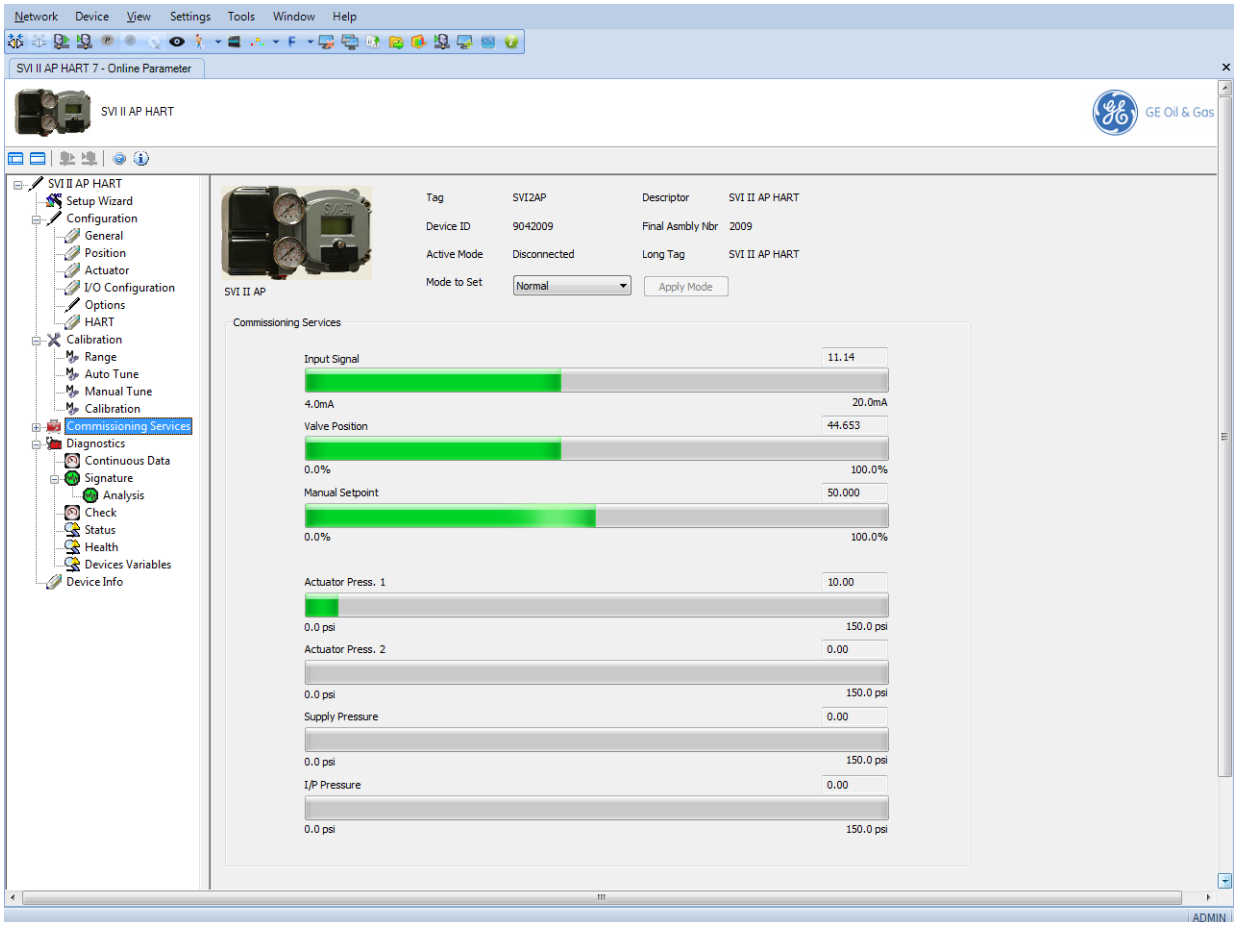
GE Oil & Gas

Masoneilan*

SVI* II AP DTM Software

Instruction Manual (Rev C.)



General

The information contained in this manual, in whole or part, shall not be transcribed or copied without GE's written permission.

All information contained herein is believed to be accurate at the time of publication and is subject to change without notice.In no case does this manual guarantee the merchantability of the positioner or the software or its adaptability to a specific client needs.

Please report any errors or questions about the information in this manual to your local supplier or visit www.geoilandgas.com/valves.

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Document Changes

Version/Date	Changes
A/11-2014	Original release
B/11-2015	Reworked the licensing registration section to reflect the new unified module. Added security View updates.
C/3-2016	Added: Switching HART versions Device Variable page Removed individual DTM installs Upgrade to report functionality Added new alert pages in diagnostics.

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1. Introduction

SVI II AP DTM Introduction

The SVI II AP Advanced DTM (*SVI II AP Advanced DTM*) is a user-friendly interface that facilitates the setup and diagnostics of a control valve.

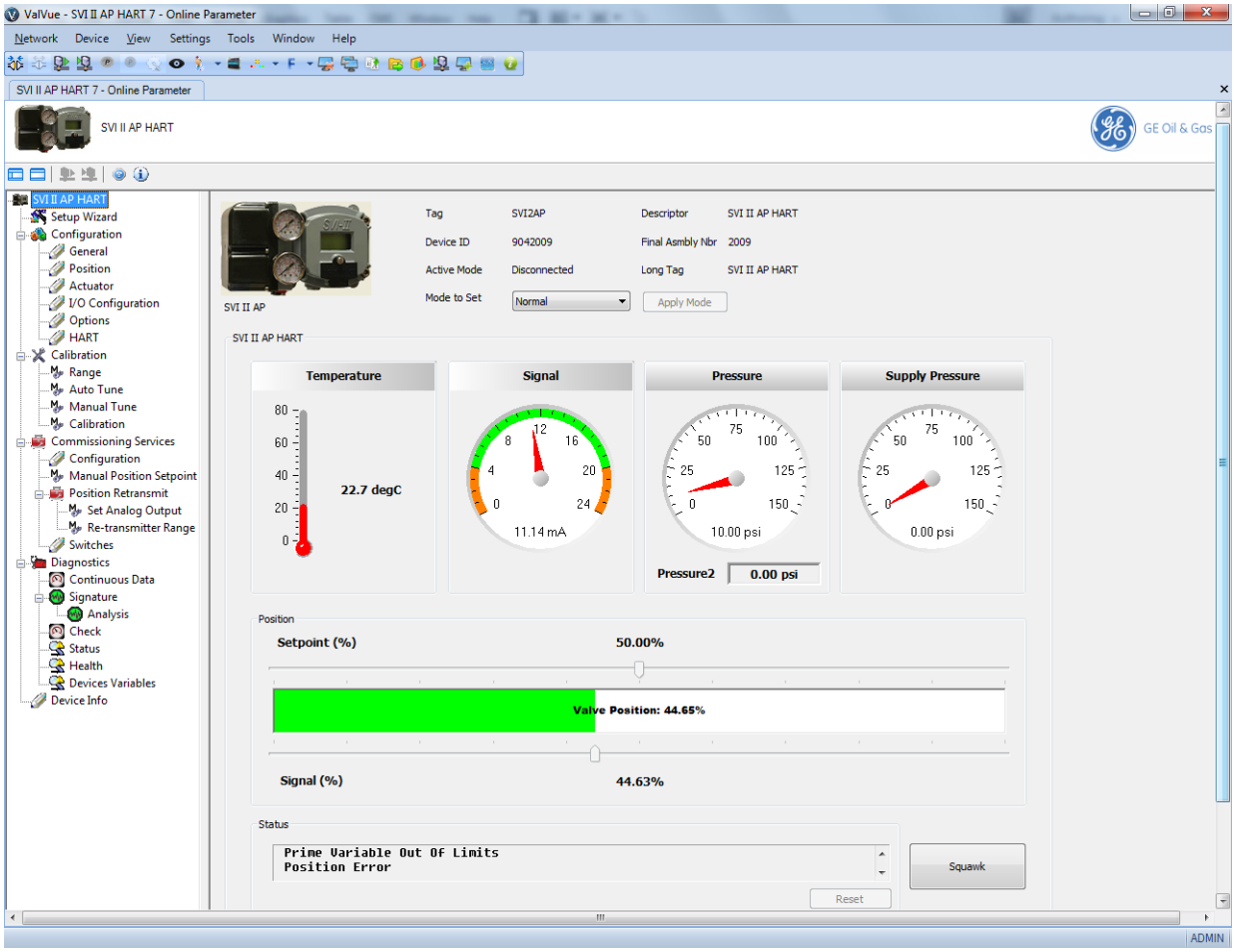

Figure 1 SVI II AP Advanced DTM

SVI II AP Advanced DTM Software

SVI II AP Advanced DTM provides, through a variety of proprietary host software, the ability to quickly and easily set up the SVI II AP you can also monitor operation and diagnose problems with advanced diagnostic capabilities. This help file primarily explains the operation of the SVI II AP Advanced DTM using ValVue* 3. The following programs can host the SVI II AP Advanced DTM:

- Masoneilan's ValVue 3 ("Installing ValVue Software" on page 39)
- PACTWare® by the PACTWare Consortium®
- FieldMate® by Yokogawa®
- FieldCare® by Endress+Hauser®
- FDM® by Honeywell
- fdtContainer® by M&M Software®

For further explanation of each package, refer to its online help.

SVI II AP Advanced DTM is a user-friendly, graphical interface that allows an efficient setup of an SVI II AP mounted on any control valve assembly.

Functionality includes:

- Setup Wizard
- Remote display of valve position, actuator pressure(s)
- Set calibration parameters
- Set configuration parameters
- Monitor status/error indicators
- Input/Output configuration
- Remote calibration of the SVI II AP
- Remote configuration of the SVI II AP
- Remote operation of the SVI II AP
- Backup and restore configuration (clone device)
- Trend setpoint, valve position, actuator pressure
- Display comparative test results
- Perform diagnostic test procedures

Advanced and Online Diagnostics

The SVI II AP offers various levels of control valve diagnostics. Up to five pressure sensors that detect circuit board temperature, loop current, and reference voltage, are available for diagnostics. For the most recent software visit and for licensing information visit our SVI II AP web site at: *http://www.ge-mcs.com/en/download.html*.

Available Options

Some of the options available for the SVI II AP are listed below:

- Remote Position Sensor
- Two Contact Outputs User Linked to Various Status and Alarm Flags
- Offshore Construction - Stainless Steel Housing and Components
- Pushbutton Display

About This Help File

These instructions are intended to help a field engineer install, setup, and calibrate an SVI II AP in the most efficient manner possible. If you experience problems that are not documented, contact GE or your local representative.

Conventions Used in This Help File

Conventions used in this help file are as follows:

- *Italicized* letters are used when referencing a term used in the SVI II AP display window, for emphasis on important items and for fields where data appears or for user-entered data.
- Actions performed on buttons, checkboxes, etc. appear **bolded**.

Indicates important facts and conditions.

Indicates a potentially hazardous situation, which if not avoided could result in property damage or data loss.

Indicates a potentially hazardous situation, which if not avoided could result in death or serious injury.

2. Audit Trail

Audit Trail

Use this screen to view a log of user actions. You can sort the columns using standard Windows®functions.

To open the audit trail dialog:

- Right-click the SVI II AP device in the *Project* pane and select **Additional Functions** > **Audit Trail** and *Audit Trail* appears.

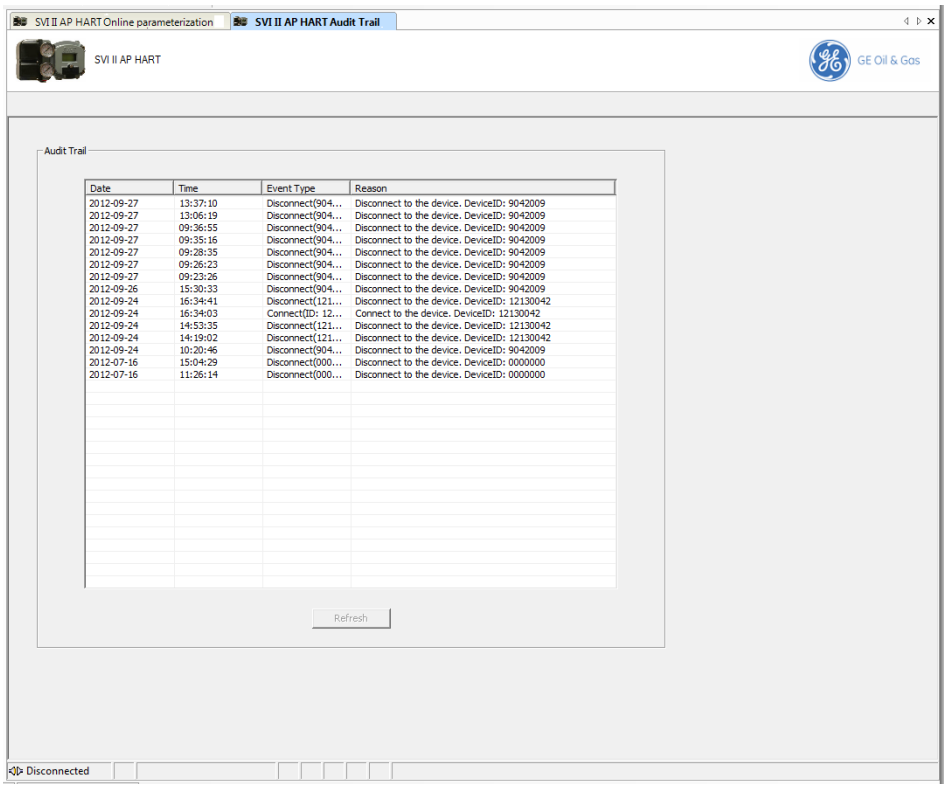

Figure 2 Audit Trail

Buttons and Fields

Date	Displays the date the event occurred.
Time	Displays the time the event occur ed.
Event Type	Displays the event type.
Reason	Displays the reason for the event.
Refresh button	Refresh Click to populate the screen with events since the screen was opened.

3. Registration Process

ValVue Licensing

This section is meant to be a generic discussion of the licensing process for ValVue and Masoneilan software DTMs. In this discussion we use ValVue as an example. Dialogs that appear will differ based on the Masoneilan software is use. For example, the SVi*1000 and 12400 DTMs have only 30 day trial periods.

Registration Process

To open the registration dialog:

- Select **Tools** > **ValVue Licensing** for ValVue.
- Select a device and then select **Additional Functions > Registration** for DTMs.
- Open Valve Aware* registration by selecting **Start > All Programs > GE Valve Aware > Valve Aware Registration**.

The Masoneilan ValVue Serial Number is obtained by contacting one of our channel partners or by contacting GE directly (software.reg@ge.com).

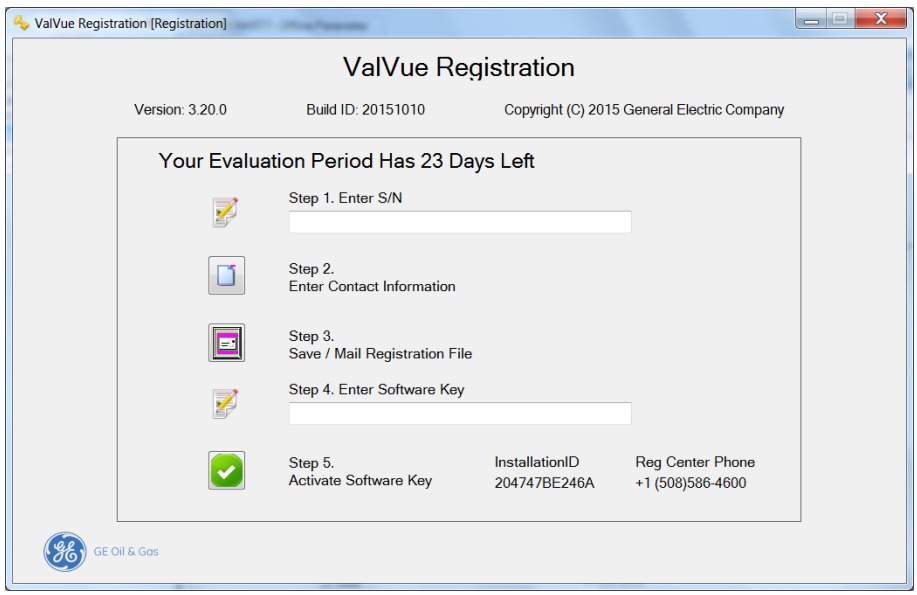

Figure 3 ValVue Registration

Use the registration dialog (Figure 3) to:

- “Register the Product” on page 21 - Required before use or at the end of the 30 day trial period.
- “Activate License” on page 23 - Required before use or at the end of the 30 day trial period.
- “Unregister the Product” on page 24 - Unregister the product. You can then transfer the license to another machine.
- “Upgrade the Product” on page 25 - Upgrade the product. Contact GE’s Masoneilan to discuss upgrade features options.

Register the Product

To register the product:

1. Enter the serial number in *Step 1*. The *Serial Number* auto-fills for the *Basic Edition*.
2. Click  or click **Next** and Figure 4 appears.

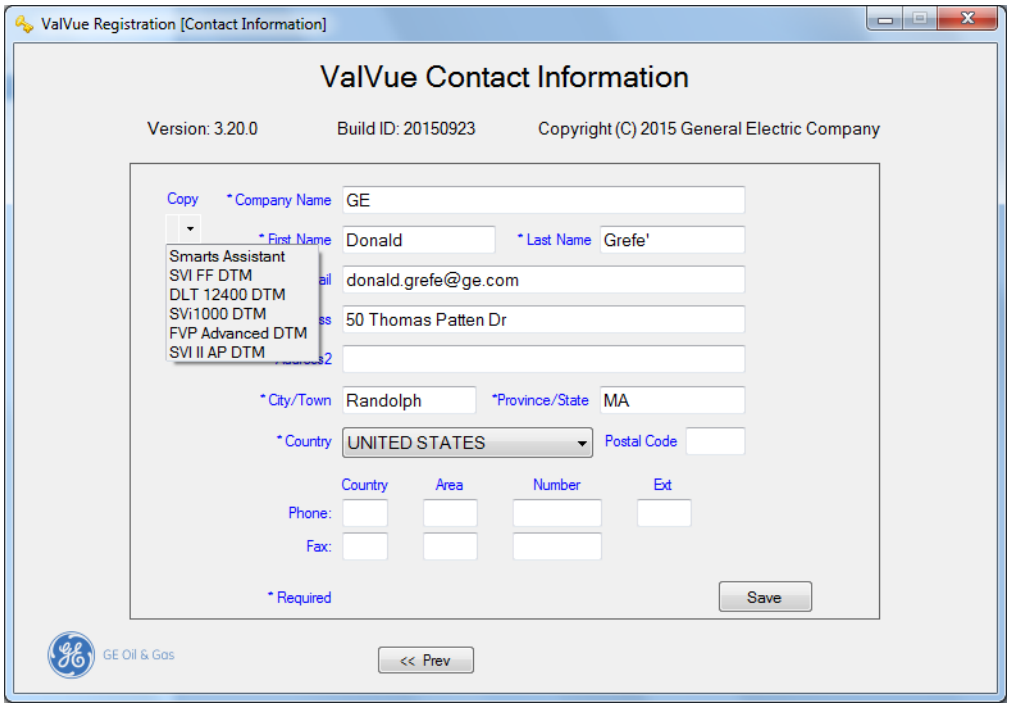

Figure 4 Contact Information

NOTE

Use the copy pulldown to import information that has been previously entered for another Masoneilan software.

3. Enter all required information, as marked by *, click Save then << Prev and click  and Figure 5 appears.

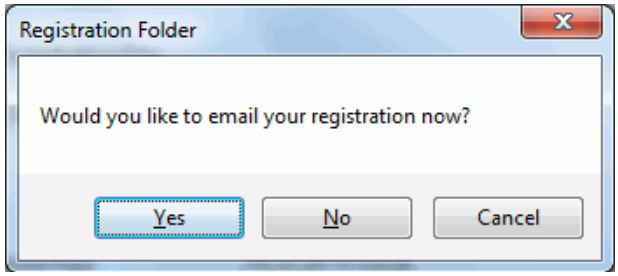

Figure 5 Email Registration

4. Ensure you have email access, click **Yes** and the registration email appears using your default email setup. The email has an *.xml* attachment containing licensing information. If sending the email fails or you wish to send from a different laptop/PC, click **No.** A dialog appears which you can use to save the file to a location for use.

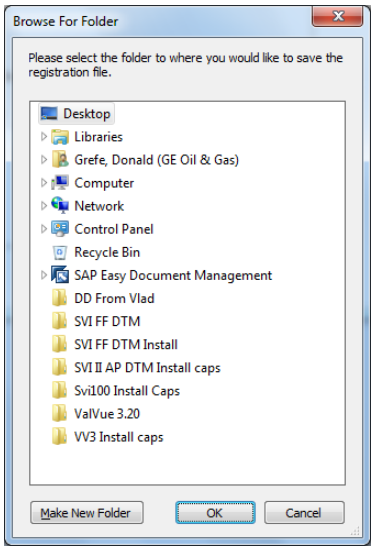

Figure 6 Browse for Folder

5. Send the email. A return email is sent containing the activation code. Proceed to “Activate License” on page 23.

Activate License

To activate the license:

1. Enter the emailed or channel partner acquired software key.
2. Click  and Figure 7 appears.

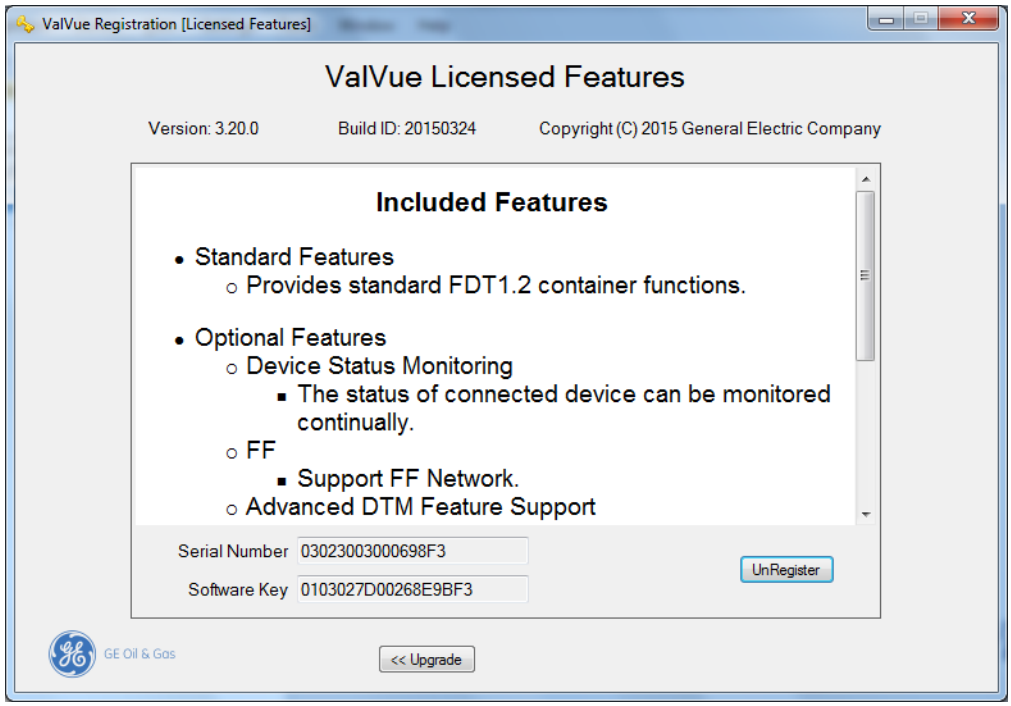

Figure 7 Included Features

3. Click **Close**.

Unregister the Product

To unregister the license:

1. Select **Tools** > **ValVue Licensing** and Figure 8 appears.

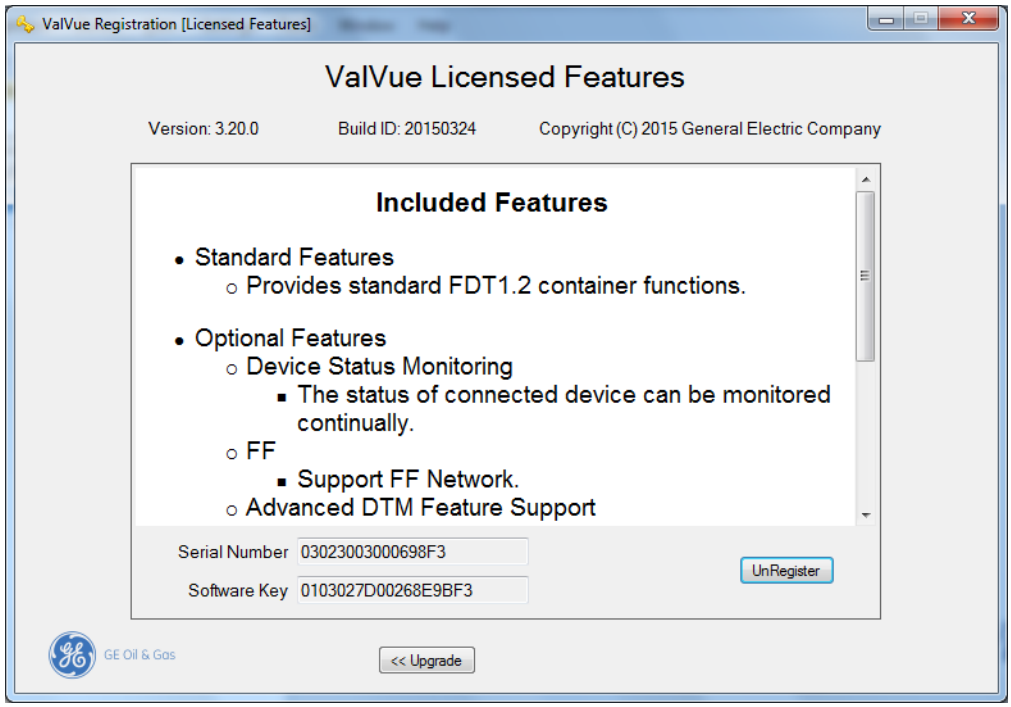

Figure 8 Included Features

2. Click UnRegister and a confirmation dialog appears.
3. Click **OK** and Figure 9 appears.

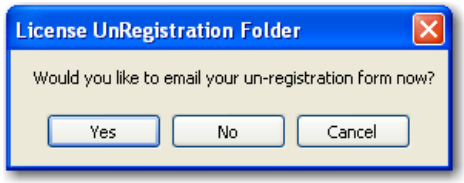

Figure 9 Unregister

4. Click **Yes** and an unregister email appears. Send the email.

Upgrade the Product

To upgrade:

1. Select **Tools > ValVue Licensing** and Figure 10 appears.

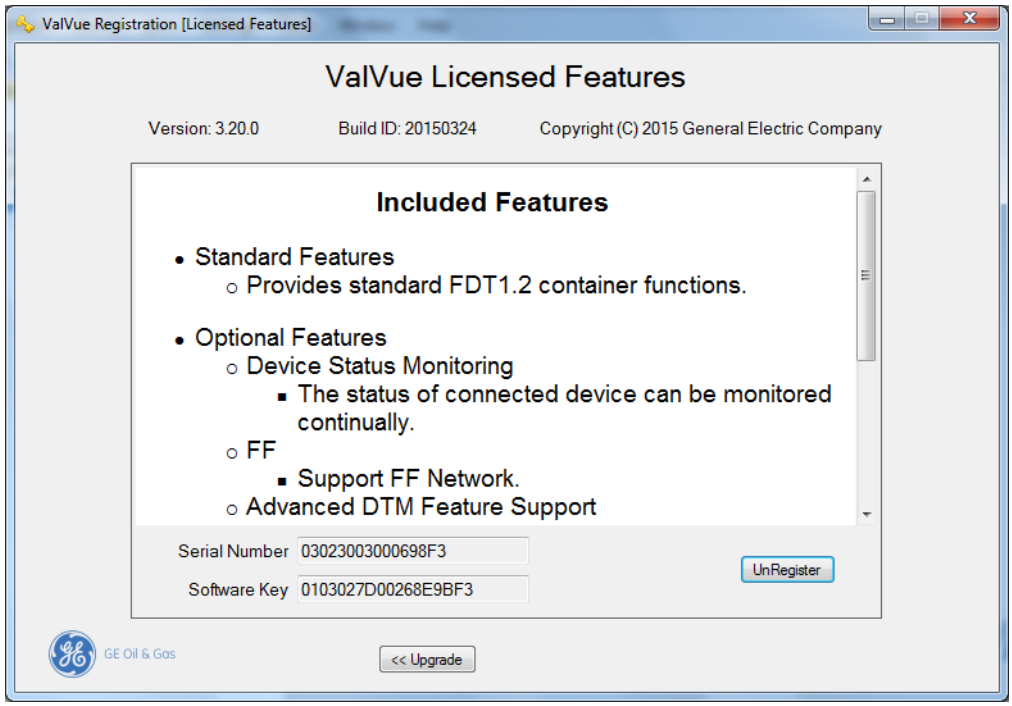

Figure 10 Included Features

2. Click 

.
3. Enter the new *License Code* provided by GE and click  .

Registration During the Trial Period

The license trial period works as follows:

1. Once you download and install the ValVue software, you are granted a 30 day trial period. We strongly encourage you to register your license with us as soon as possible. During the 30 days, you have access to all the advanced features of ValVue.
2. Once the first 30 days expires, you lose the advanced features. You then have an additional 30 day period, after which you must register to continue using the product. Contact GE at software.reg@ge.com.

NOTE

Click DTMs (not ValVue):

- Register Now and follow the prompts to register, before the trial completely expires (see"Register the Product" on page 21).
- Register Later to continue use until the 30 days expires (see"Register the Product" on page 21).

The first time you open ValVue, if the product is on trial, a dialog appears.

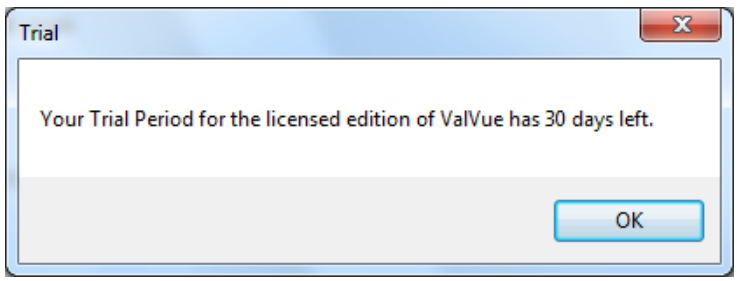

Figure 11 Trial Registration Dialog: Newly Installed

After 30 days without purchase or registration, the first time you open the DTM, Figure 12 appears.

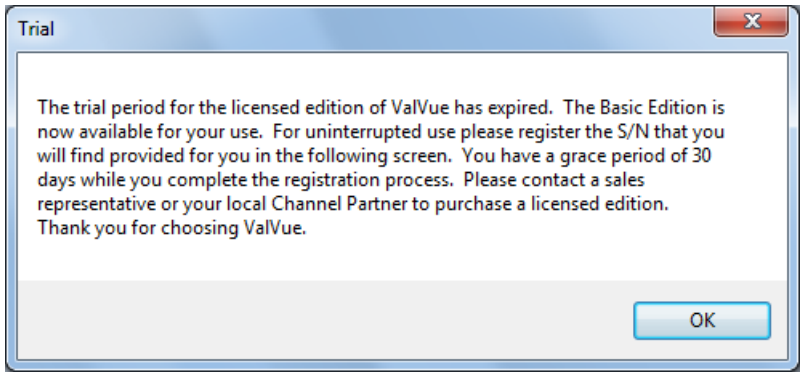

Figure 12 Advanced Features Expired

After the first time you open an expired license, and you select **Additional Functions > Registration**, Figure 13 appears. When you click **OK** the registration process starts (see “Register the Product” on page 21).

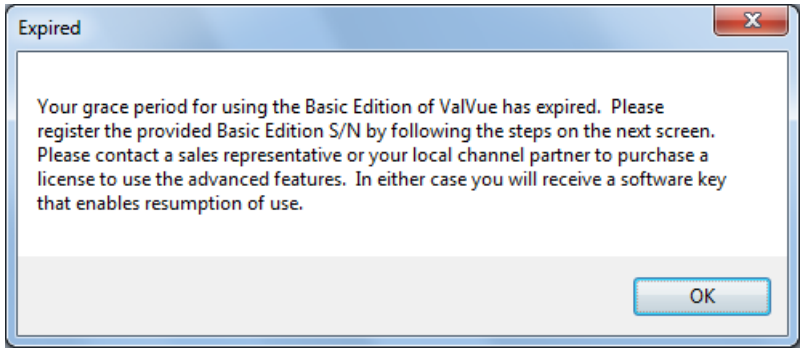

Figure 13 Ongoing Expiration

If you click anywhere in the DTM after the trial period expires, Figure 14 appears. When you click **OK**, the registration process starts (see“Register the Product” on page 21).

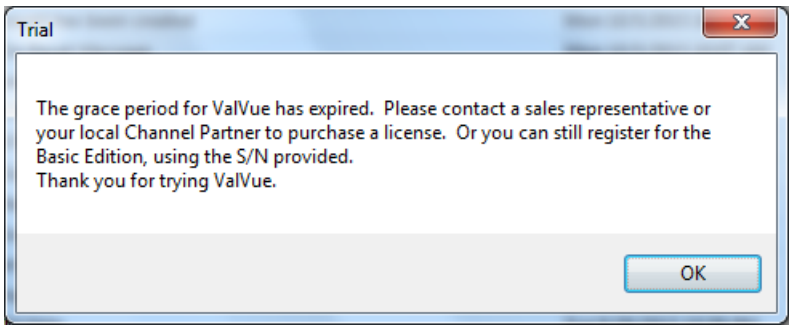

Figure 14 Trial Expired

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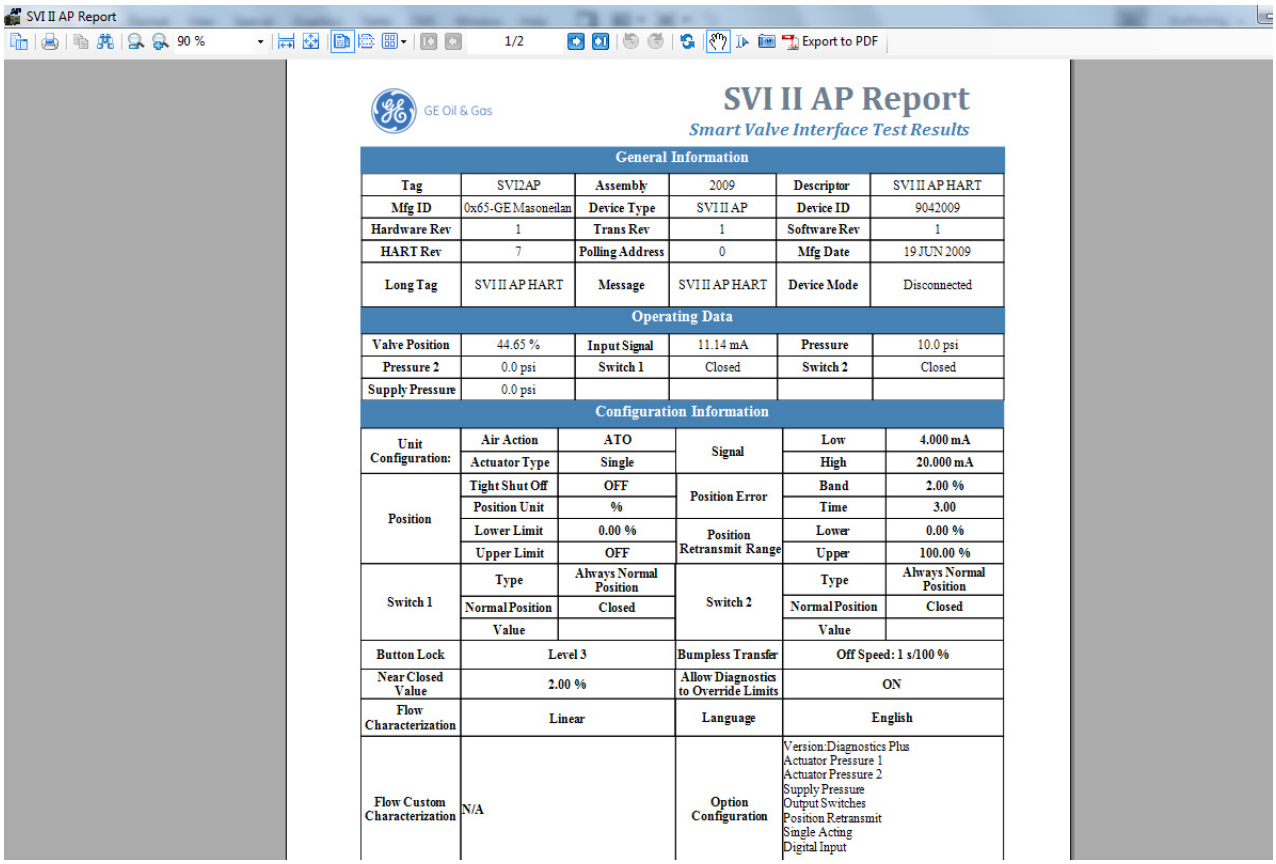
4. Report

Report

Use this screen to view a report of general configuration parameters, operating data and diagnostic data. Once created the report can be exported to pdf. To open the report:

- Right-click the SVI II AP device in the *Project* pane and select **Additional Functions** > **Report** and *Report* appears.



General Information

Tag	SVI2AP	Assembly	2009	Descriptor	SVI II AP HART
Mfg ID	0x65-GE Masoneilan	Device Type	SVI II AP	Device ID	9042009
Hardware Rev	1	Trans Rev	1	Software Rev	1
HART Rev	7	Polling Address	0	Mfg Date	19 JUN 2009
Long Tag	SVI II AP HART	Message	SVI II AP HART	Device Mode	Disconnected

Operating Data

Valve Position	44.65 %	Input Signal	11.14 mA	Pressure	10.0 psi
Pressure 2	0.0 psi	Switch 1	Closed	Switch 2	Closed
Supply Pressure	0.0 psi				

Configuration Information

Unit Configuration:	Air Action	ATO	Signal	Low	4.000 mA
	Actuator Type	Single		High	20.000 mA
Position	Tight Shut Off	OFF	Position Error	Band	2.00 %
	Position Unit	%		Time	3.00
	Lower Limit	0.00 %	Position Retransmit Range	Lower	0.00 %
	Upper Limit	OFF		Upper	100.00 %
Switch 1	Type	Always Normal Position	Switch 2	Type	Always Normal Position
	Normal Position	Closed		Normal Position	Closed
	Value			Value	
Button Lock	Level 3		Bumpless Transfer	Off Speed: 1 s/100 %	
Near Closed Value	2.00 %		Allow Diagnostics to Override Limits	ON	
Flow Characterization	Linear		Language	English	
Flow Custom Characterization	N/A		Option Configuration	Version:Diagnostics Plus Actuator Pressure 1 Actuator Pressure 2 Supply Pressure Output Switches Position Retransmit Single Acting Digital Input	

Figure 15 Report

Buttons and Fields

The icon bar at the top contains the following functionality:

Toggle Sidebar

Opens the sidebar where you view thumbnails of each page.

Print

Prints the report to the default printer.

Copy

Disabled.

Find

Opens a *Find* dialog to search the report.

Zoom

Use the left icon to zoom in, the right icon to zoom out or the presets in the pulldown list.

Fit Width /Fit Page

Use the left icon to fit to the width of the screen or the right icon to fit page to the screen size.

Page View

Use the left icon to view a single page, the center to view continuously and the right to see a grid to select a number of pages to view.

Backward/ Forward

Disabled.

Retresh

Refreshes the report content. The device must be connected to refresh content.

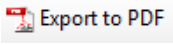
Selection Mode

Right-click to a get a menu of copy functions that include:

- *Pan Mode*: Click and drag to move the report physically around.
- *Selection Mode*: Click and drag an area to copy as text.
- *Snapshot Mode*: Click and drag an area to catch a graphic image.

Snapshot

Use to take a snapshot of a selected area.



Export to PDF

Exports the report to a selected directory.

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5. Installing SVI II AP Advanced DTM Software

Requirements

Using the SVI II AP Advanced DTM installation procedures discussed requires basic knowledge of Microsoft® Windows® operating systems and the Masoneilan SVI II AP positioner. For additional information describing the SVI II AP, consult the SVI II AP Instruction Manual.

Operation of the SVI II AP Advanced DTM requires installation of the following software components:

- SVI II AP Advanced DTM software
- MTL Communications® DTM V1.07 (http://www.mtl-inst.com/images/uploads/datasheets/4850/software/MTLCommsDTM_1.07_20100810.zip)
- P+F Wireless Gateway (http://www.pepperl-fuchs.us/usa/en/classid_1804.htm?view=productdetails&prodid=47782)
- CodeWright HART® Comm. DTM v1.0.44 (http://www.pepperl-fuchs.us/usa/en/classid_1804.htm?view=productdetails&prodid=32796)
- P+F Mux2700 (http://www.pepperl-fuchs.us/usa/en/classid_2256.htm?view=productdetails&prodid=42264)
- Additionally, you can use the following software to access the AP Advanced DTM:
  - PACTWare software, which includes Generic HART® DTM software and HART® Communications software
  - FieldCare software from Endress + Hauser
  - FieldMate software from Yokogawa
  - Field Device Manager (FDM) from Honeywell
  - fdtContainer from M&M Software GmbH

Hardware and Operating System Requirements

To successfully install and run SVI II AP Advanced DTM software, your computer system must meet or exceed the following minimum hardware and software requirements.

- Windows® XP (SP3), Windows Server® 2003 (SP2), Windows Server® 2008, Windows Server® 2012, Windows® 7, Windows® 8 or Windows® 10
- An available serial communication port or USB port
- 1 G of free hard disk space
- Windows® Pentium® or compatible microprocessor
- A HART® modem

HART® Related Issues

Before installing the DTM, determine which port the computer uses for serial (RS-232 or USB) communication. The HART® modem uses this port for communication with the SVI II AP positioner.

HART® Compliance

The SVI II AP Advanced DTM requires a HART® compliant communications loop. The HART® protocol specifies the noise level, impedance requirements, and configuration of the loop. Conventional communications loops consisting of the following components meet requirements for HART® compliance.

- Quality current source having low noise and high impedance
- Minimum loop impedance of 250 Ohms
- Twisted pair cable suitable for 4 - 20 mA current loops

When a safe barrier separates the communicating devices, a HART® compliant barrier must be used.

You cannot connect or use the DTM and another HART® master terminal device (at the same time), for example a handheld device.

Some Distributed Control System output circuits are incompatible with the HART® protocol. Connecting a HART® modem to such a circuit can cause a process upset. Use a HART® filter. Consult the DCS manufacturer to verity that the DCS is compatible with HART®, before connecting a HART® modem and using the DTM.

Failure to Communicate

If the PC (using a modem) fails to communicate with the HART® or SVI II AP Advanced DTM the PC displays the message *No Devices Found* in the DTM main screen. The message *HART I/O Failed* appears if the device communications fails during the session. Communication failure prevents the PC from establishing a link. Possible causes of communications failure related to installation include:

- Insufficient loop current and voltage
- Poor wiring contacts
- Improper connection of the HART® modem to the computer
- Incorrect serial port
- Using the DTM with another HART® master terminal in service
- Insufficient loop impedance (a minimum of 250 Ohms is required)
- Field device has a non-zero polling address (Set to multidrop)

If HART® compliance problems are suspect prepare a detailed description of the loop, including all devices on the loop, type of wiring used, loop length, and presence of any possible interference sources before contacting the factory for assistance.

Installing SVI II AP Advanced DTM Software

To install the software:

1. Double-click **SVI II AP DTM Installer.exe** and *SVI II AP Advanced DTM Install Welcome Screen* appears.

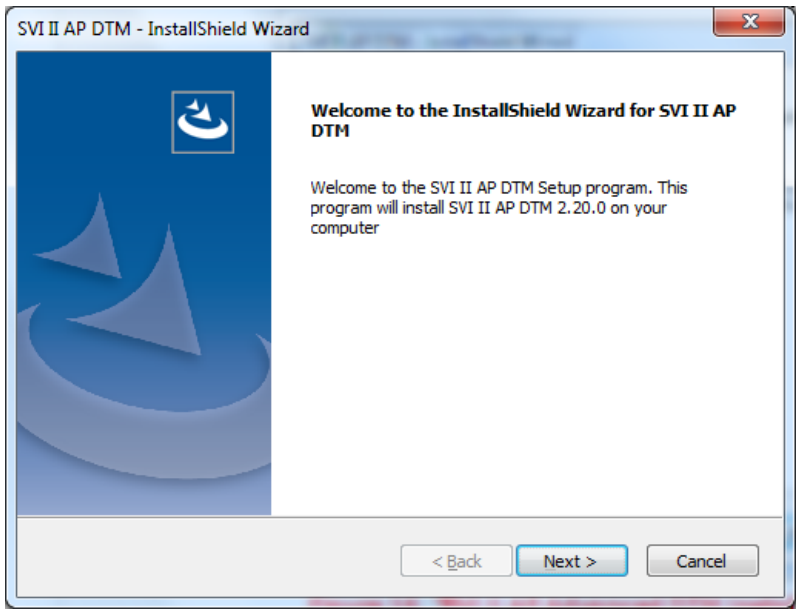

Figure 16 SVI II AP Advanced DTM Install Welcome Screen

2. Click **Next** and *SVI II AP Advanced DTM License Screen* appears.

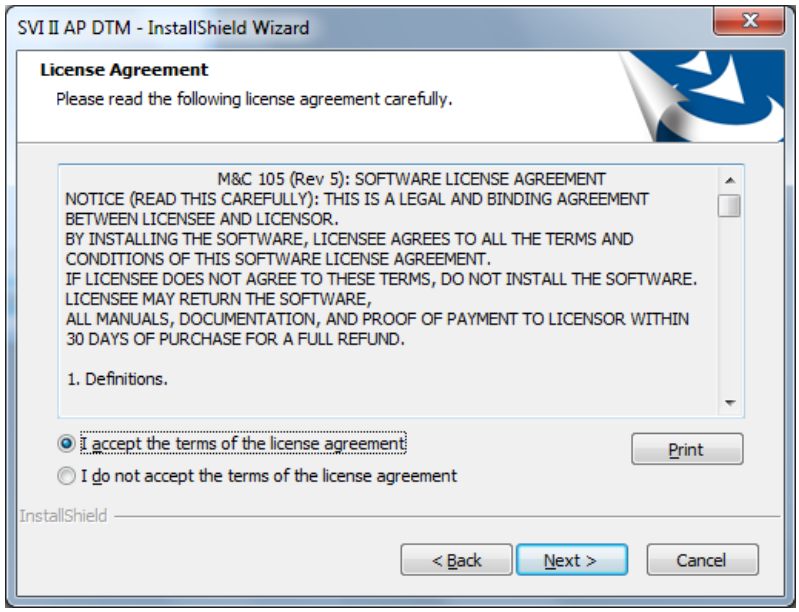

Figure 17 SVI II AP Advanced DTM License Screen

3. Click **I accept the license**....., **Next** and *SVI II AP Advanced DTM Choose Destination Folder Screen* appears.

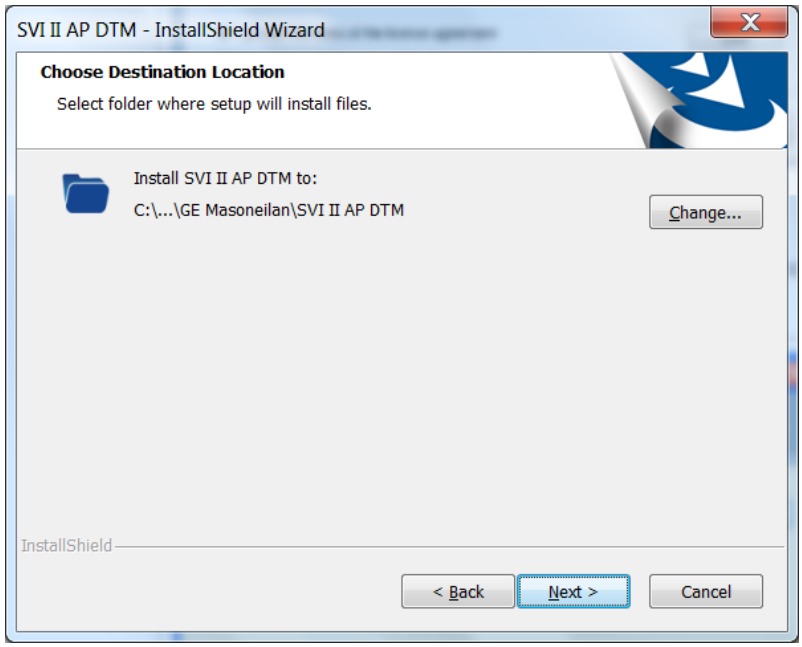

Figure 18 SVI II AP Advanced DTM Choose Destination Folder Screen

4. Click **Change** and navigate to the target directory or just click **Next** and *SVI II AP Advanced DTM Ready to Install the Program Screen* appears.

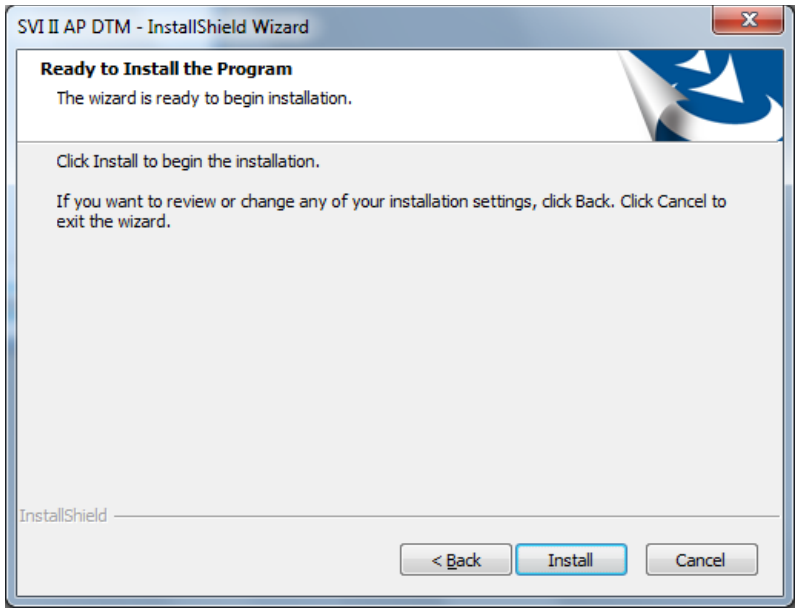

Figure 19 SVI II AP Advanced DTM Ready to Install the Program Screen

5. Click **Install** and a *Setup Status* screen appears, followed by *SVI II AP Advanced DTM Finish Screen*.

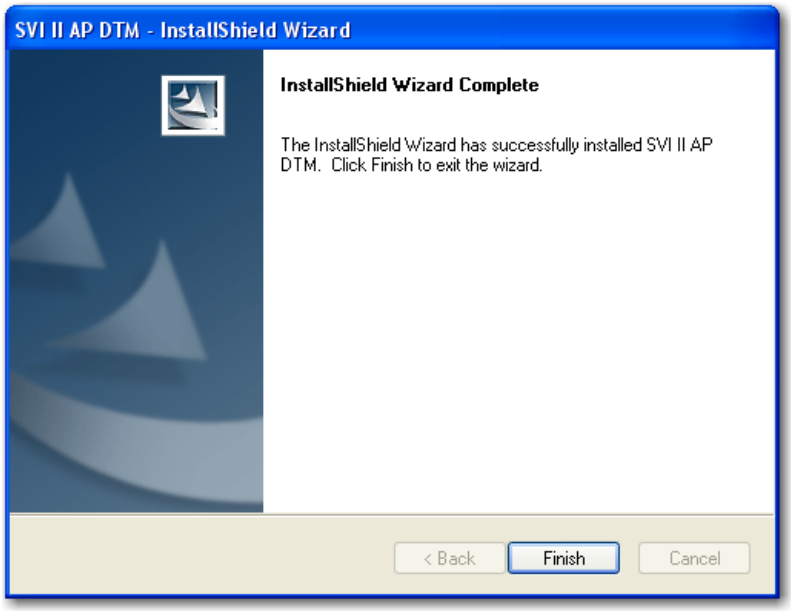

Figure 20 SVI II AP Advanced DTM Finish Screen

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6. ValVue* 3 Installation and Logon

Installation

Requirements

Using the ValVue installation procedures discussed requires basic knowledge of Microsoft® Windows® operating systems.

Hardware and Operating System Requirements

To successfully install and run ValVue software, your computer system must meet or exceed the following minimum hardware and software requirements.

- Windows® XP SP3, Windows® Server 2003 SP2, Windows® Server 2008, Windows® Server 2012, Windows® 7 or Windows® 8
- Windows® Pentium® or compatible microprocessor
- 10 G of free hard disk space

Installing ValVue Software

This installs not only the ValVue software but the SQL Express® software, the GE NI-FBUS-H1 Comm. DTM, Microsoft® VC++ Redistributable package and the .Net framework.

If you have a previous installation of the GE NI-FBUS-H1 Comm. DTM, you need to use Control Panel to uninstall before proceeding.

During the install, SQL is installed. It is highly recommended that you check for ValVue updates on the GE website (http://www.ge-mcs.com/en/download.html) every six months to keep this program current for security issues.

To install the software:

1. Double-click **ValVue3Installer.exe** and the *Install GE NI-FF-H1 Comm. DTM* screen appears.

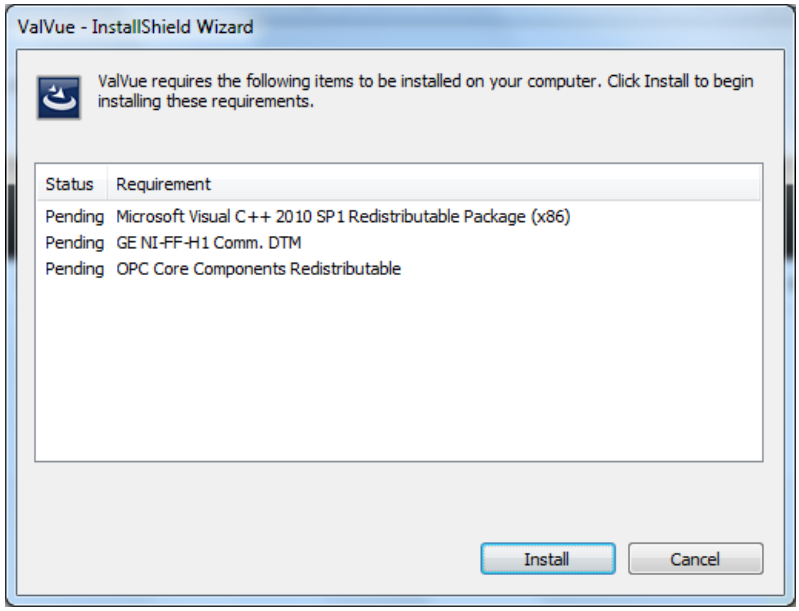


Figure 21 Install GE NI-FF-H1 Comm. DTM

2. Click **Install** and the *ValVue Install Welcome* dialog appears.

NOTE

During the initial installation, if you do not have SQL installed, you are prompted to reboot your system. Follow the prompts to do so and the ValVue install automatically commences after reboot.

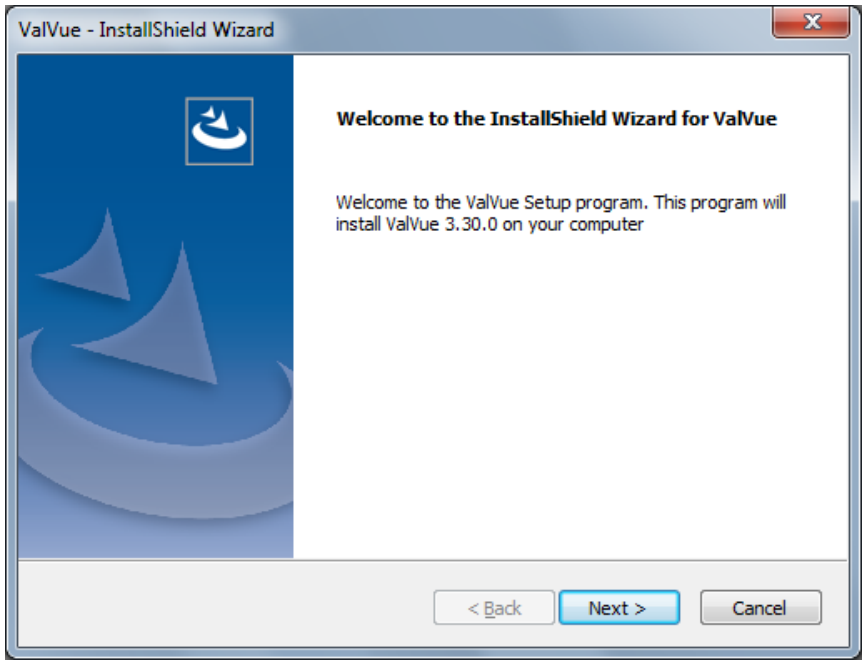


Figure 22 ValVue Install Welcome

3. Click **Next** and the *ValVue License* dialog appears.

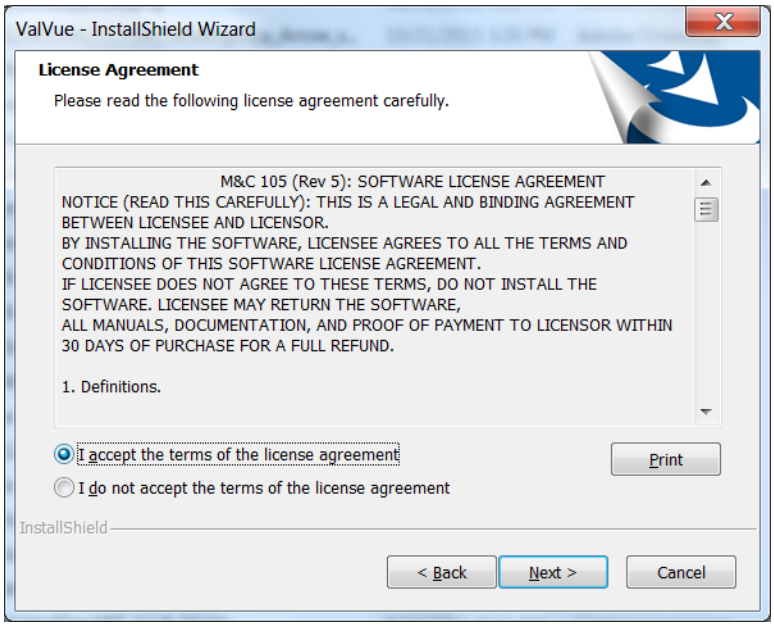


Figure 23 ValVue License

4. Click **I accept the license**....., **Next** and the *Choose Destination Location* dialog appears.

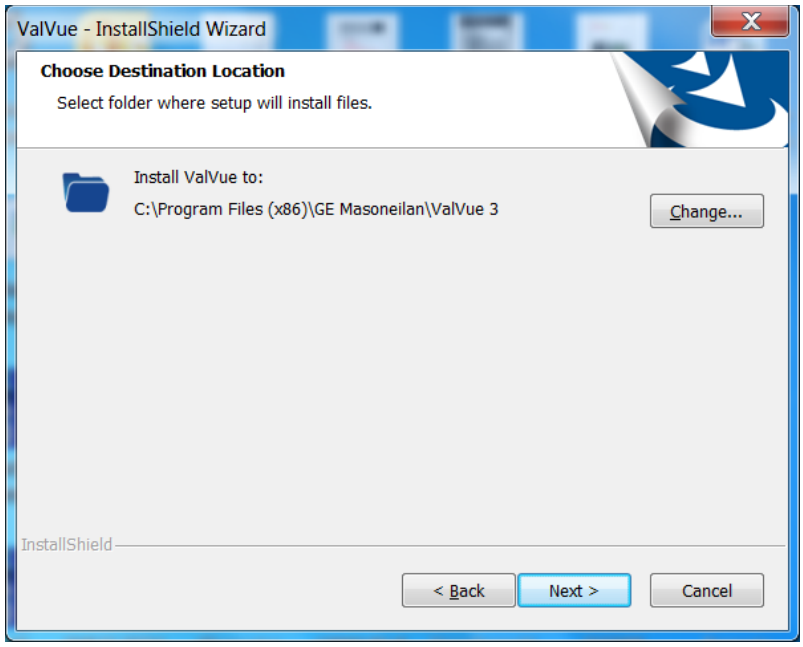


Figure 24 Choose Destination Location

5. Click **Change**, navigate to or create the target folder, click **OK** and the dialog reappears.
6. Click **Next** and the *Ready to Install Program* dialog appears.
7. Click **Install** and the install proceeds followed by the *InstallShield Wizard Complete* dialog.
8. Click **Finish**.

Log On

1. Select **Start > All Programs > GE Masoneilan > ValVue 3 > ValVue**. The 25 "ValVue Login" dialog appears.

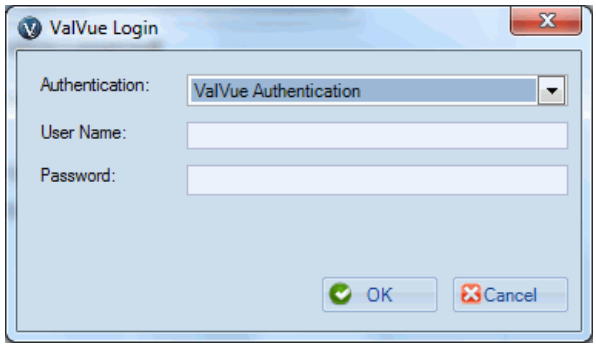


Figure 25 ValVue Login

NOTE

If you have installed/deleted DTMs or updated ValVue, a dialog appears when you open ValVue 3: Click:

- ***Yes*** *and the library is updated.*
- ***No*** *and you need to manually updated from the DTM Library Management dialog to access any new functionality.*

2. Use the *Authentication* pulldown to select either:
   - *Windows Authentication:* Any user in the list of the ValVue user group can logon. This user group is created by the system administrator.
   - *ValVue Authentication*: This is the default username and password for first login. Username *Admin* and Password: *ValVue3*. These must be changed after the first login.

   During your initial login *Change Password* appears.

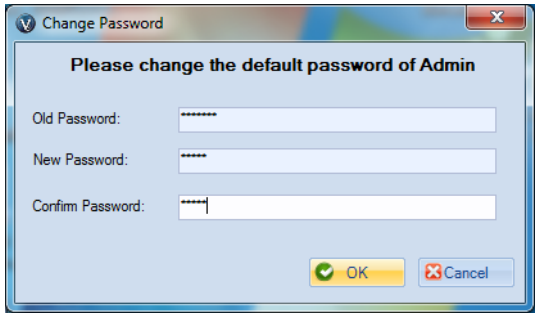


Figure 26 Change Password

You must change your password according to the constraints shown in *Passwords Constraints*.

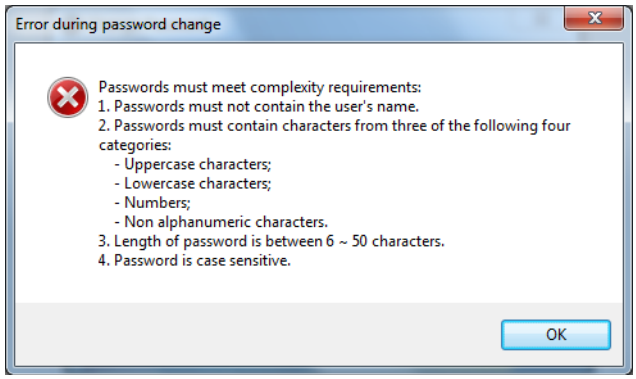


Figure 27 Passwords Constraints

- *Login as Current Windows User*: Your *Domain\Username* appear in *User Name*.

For:

- *Windows Authentication:* Enter a *Username*, *Password* and use the *Domain* pulldown to select the domain.
- *ValVue Authentication*: Enter a *User Name* and *Password*.
- *Login as Current Windows User*

3. Click **OK** and the main screen appears.

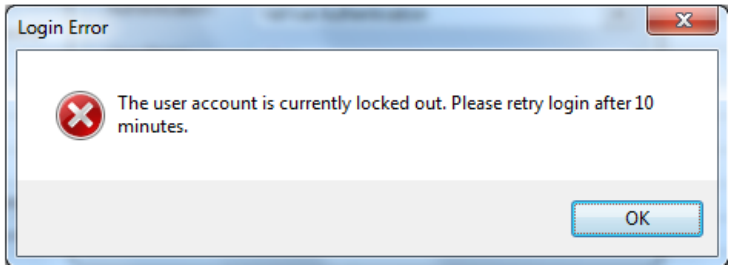
NOTE

After you successfully login into ValVue3, the User Authentication Mode is saved and next time you login, the last authentication mode automatically appears.

NOTE

User Account Security Lockout

A user account is locked out after five unsuccessful password entries and the following dialog appears:



If this occurs, wait ten minutes and retry. This behavior occurs cyclically until a successful login is completed.

The lockout behavior is account specific and occurs when using either Login as Windows Authentication or ValVue Authentication.

7. AP DTM Work Environment

Overview

This section describes the SVI II AP Advanced DTM main screen (*SVI II AP HART* screen) and how to accomplish general SVI II AP Advanced DTM tasks. After you have successfully launched and logged into the SVI II AP Advanced DTM *SVI II AP Advanced DTM Main Screen* appears.

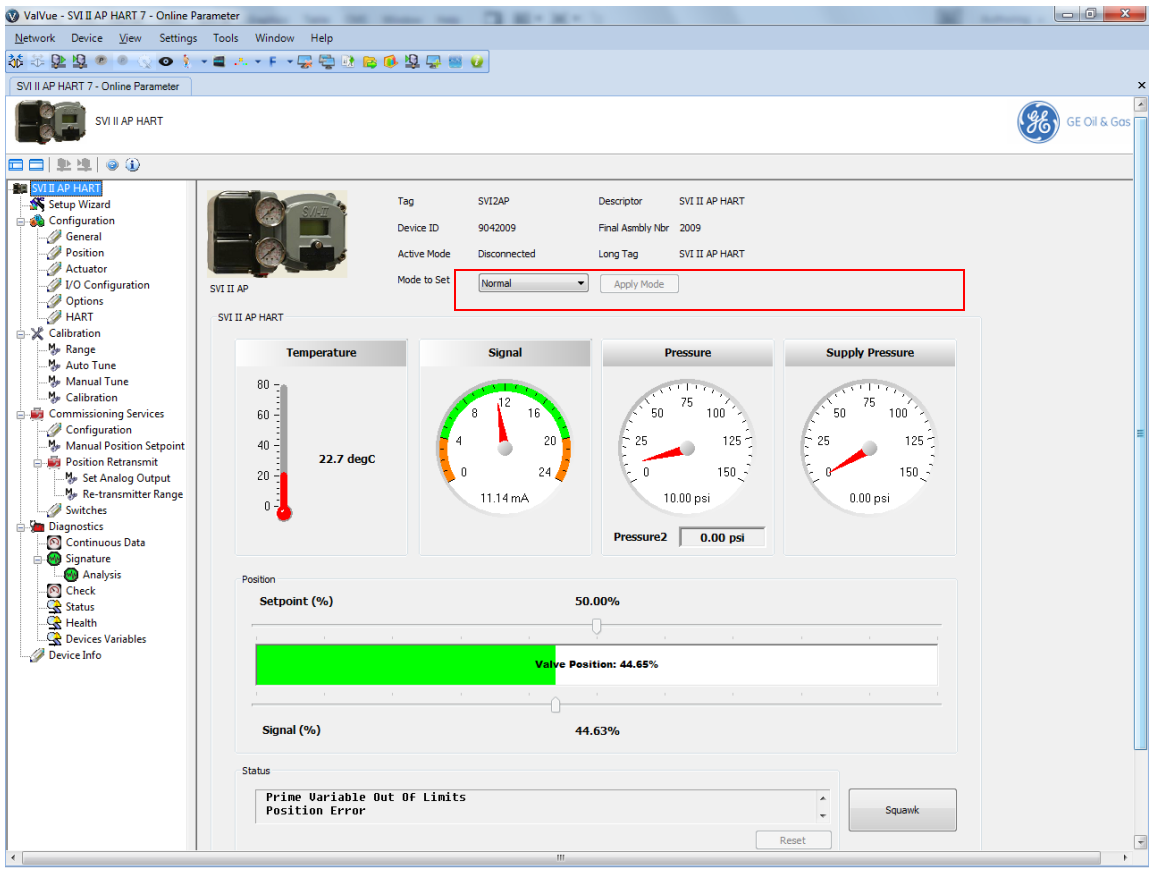


Figure 28 SVI II AP Advanced DTM Main Screen

NOTE

This discussion is restricted to the SVI AP Advanced DTM operations only.

Mode to set

Use the *Apply mode* button located at the top of all SVI II AP Advanced DTM screens (*SVI II AP Advanced DTM Main Screen* - red box) to change the operating SVI II AP mode. There are three operating modes and a failsafe mode:

- *Normal* - The SVI II AP follows the 4 - 20 mA input signal and positions the valve accordingly (indicator green).
- *Manual* - The valve setpoint is set by the valve software, the local pushbutton or a HART® compatible system. When changing to this mode the setpoint becomes the actual position.
- *Setup* - You can set calibration and configuration parameters. Additionally, you can run response time tests and a standard actuator signature test.
- *Failsafe* – When the SVI II AP cannot operate correctly the device goes to the failsafe position and remains in the failsafe mode until you reset from the *Diagnostics* screen.

Whenever you leave the Normal mode, a warning appears (*Leaving Normal Mode Warning*).

- Click **OK** to continue the mode change.

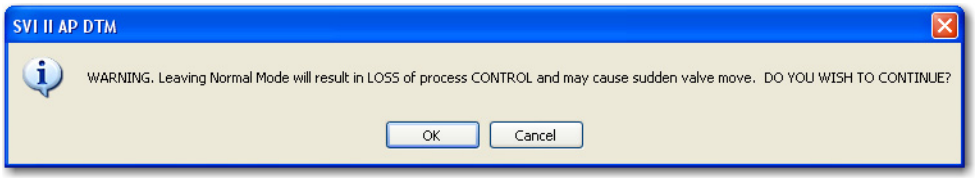


Figure 29 Leaving Normal Mode Warning

SVI II AP Advanced DTM Directory Tree

The directory tree (*SVI AP Advanced DTM Directory Tree*) is used to navigate the various screens.

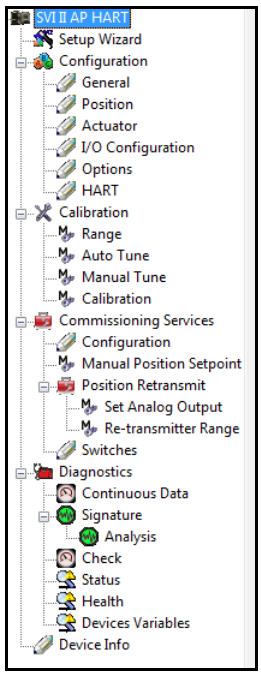


Figure 30 SVI AP Advanced DTM Directory Tree

The tree is broken down into the following functional areas:

- *SVI II AP HART®* - One screen that displays operational signal readings. See “HART® Screen” on page 49.
- *Setup Wizard* - One screen to perform automatic positioner/valve setup for stops and to perform autotuning. “Setup Wizard” on page 53.
- *Configuration* - A series of seven screens for manual configuring a wide range of settings. See “Configuration” on page 63.
- *Calibration* - A series of five screens for calibrating sensors and valve travel. See “Calibration” on page 85.
- *Commissioning Services* - A series of seven screens for configuring parameters concerned with initial commissioning. See “Commissioning” on page 101.
- *Diagnostics* - A series of eight screens for fault analysis and for viewing data numerically and graphically to analyze positioner/valve performance. See “Diagnostics” on page 111.

Topology Right-Click Menu

Use the topology view right-click menu to access functions some of which are ValVue 3 related and some SVI II AP DTM related. Figure 31 shows which items are related to positioner DTM operations and which to ValVue 3 (Black boxes are SVI II AP operations and red are ValVue 3). Descriptions for all of these can be found in the ValVue 3 help and the help print manual.

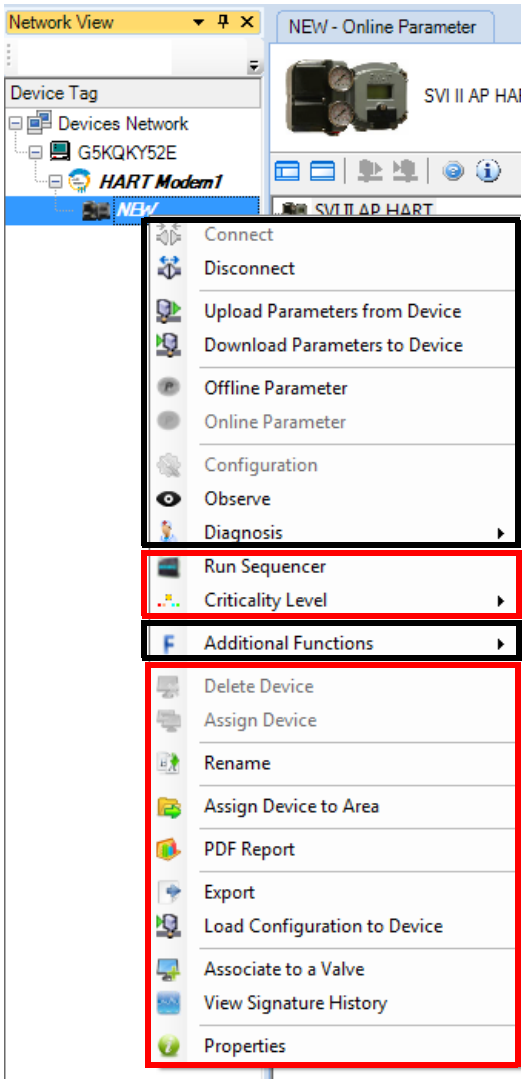


Figure 31 Topology Right-Click Menu

8. HART® Screen

SVI II AP HART® Screen

This screen displays information on positioner operations. To open this screen:

- Double-click **SVI II AP HART DTM.**

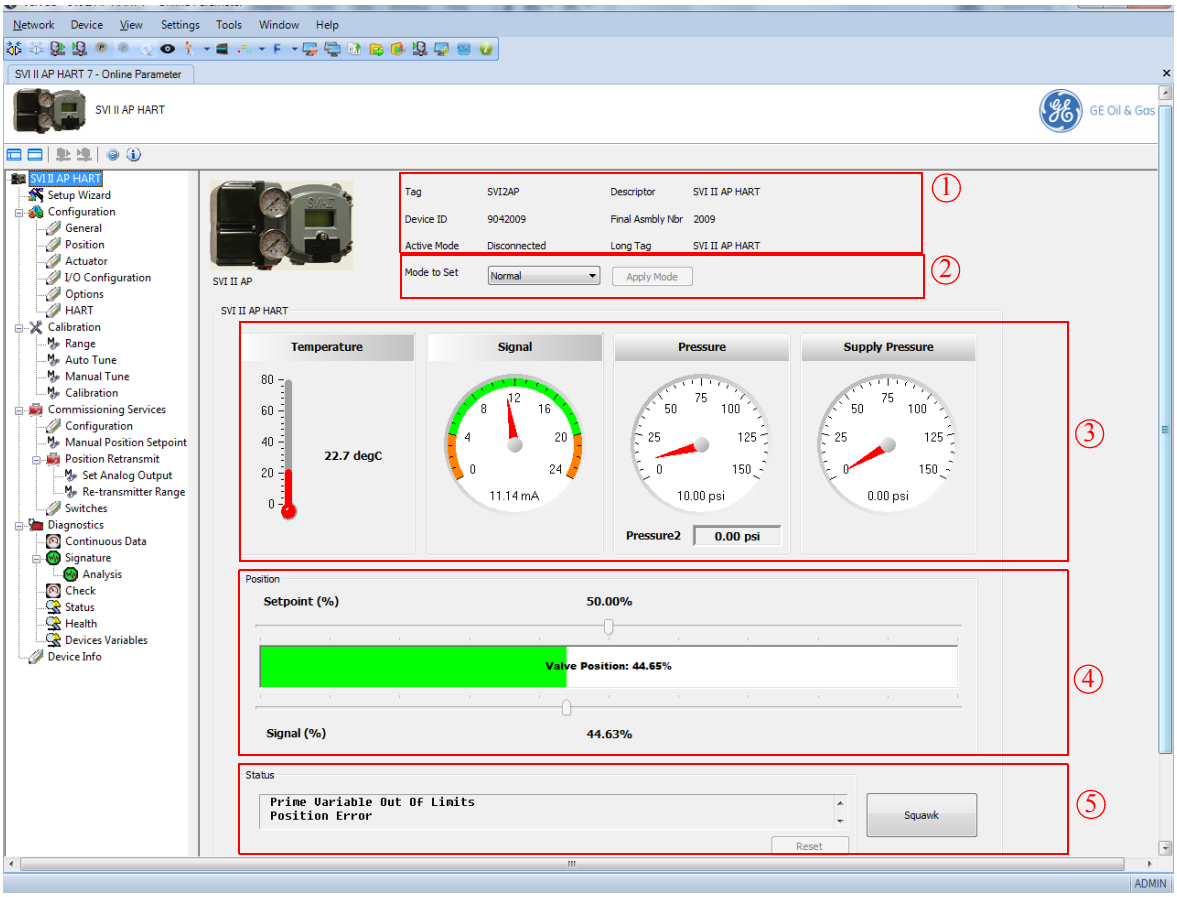


Figure 32 SVI II AP HART® Screen

NOTE

This discussion is restricted to the SVI AP Advanced DTM operations only.

Buttons and Fields

① *Tag Information*

- *Tag*
- *Descriptor*
- *Device ID*
- *Final Asmbly Nbr*
- *Long Tag*: Available for HART® 6 only.
- *Active Mode*

This data appears at the same location on all screens but can only be changed on the Setup Wizard ("Setup Wizard Screen" on page 53), *General* screen (see "Configuration General Screen" on page 65) and the *Configuration* screen for *Tag* and *Long Tag* only. (See "Commissioning Services Configuration Screen" on page 103).

② *Mode area*

- *Mode to set*
- *Apply mode*

These items appear at the same location on all screens and is used to change mode.

③ *Signals area*

- *Temperature* - Displays the current temperature the positioner has read as a thermometer and text.
- *Signal* - Displays the input analog signal strength expressed in % and in mA of the configured signal range as an analog meter. The range is set on the Configuration screen ("Configuration" on page 63).
- *Pressure* - Displays the pressure read from the sensor as an analog meter. The SVI II AP continuously monitors the actuator pressure. It is displayed according to the configured units (psi, bar, or kpa). Pressure2 displays the pressure detected for the second actuator pressure specific for double acting.
- *Supply Pressure* - Displays the supply pressure read from the sensor as a an analog meter. The SVI II AP continuously monitors the pressure. It is displayed according to the configured units (psi, bar, or kpa).

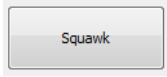
④ *Position area*

The *Position* indicator shows the valve position graphically. The indicator consists of four parts:

- *Setpoint* (%) - Contains an indicator showing the valve setpoint. In operating mode this is the same as the signal. In manual mode it is the valve setpoint.
  In MANUAL mode, it is the target position to which the SVI II AP is controlling the valve. The manual setpoint may be changed by dragging the upper arrow on the position indicator. While dragging, the number in the center bar shows the selected manual setpoint and the pen icon appears. Click **Set** to save the setting.
  In NORMAL mode, the setpoint is the target position based on the characterized input.
- Valve Position indicator - Contains a center green bar showing the actual valve position in % of valve opening. The numerical valve position appears in the center. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nominal travel, positions greater than 100% are possible (see “Calibration Range Screen” on page 86.
  The range is set on the “Calibration Range Screen” on page 86. See “Configure the Setpoint Using the Position Indicator” on page 52.
- *Signal* (%) - Contains an indicator showing the value of the input signal. In Normal mode this is the position setpoint.

⑤ *Status area*

The *Status* area consists of:

- *Status* - Displays health indicators. When there is a fault code from the SVI II AP, *Additional Status Available* appears. The fault codes also appear on the *Status* screen (“Diagnostics Status Screen” on page 129.)
  The status block also contains other status codes returned by HART®. These include *Configuration Changed*, *Device malfunction*, and *Variable out of limits*.
- 

  - Sends the squawk command.

  For HART® 6 and 7 units, use the squawk command (HART® Command 72) to assist technicians to find specific devices in an installation. Send this command using ValVue and a specific device will audibly indicate the reception of the command. For HART® 6, you need to push an any button on the SVI II AP to clear the command from the LCD.
- 

  - Clears the *Configuration Changed Flag*, which clears the *Status*.

Mode to Set

Use the pulldown list and *Apply mode* button on all screens to change the operating mode. There are three operating modes:

- *Normal* - In this mode the SVI II responds to the input signal and positions the valve accordingly (indicator green).
- *Manual* - in this mode the valve does not respond to the input signal. Instead it remains stable in one position, which is the position that the valve was in when manual mode was entered or a new position selected by you (by changing the setpoint on the "SVI II AP HART® Screen" on page 49 or on the "Commissioning Services Manual Position Setpoint Screen" on page 104).
- *Setup* - In this mode you can set calibration and configuration parameters. Additionally, you can run response time tests, step and response tests.

Whenever you leave the Normal mode, a warning appears (*Leaving Normal Mode Warning*).

- Click **OK** to continue the mode change.

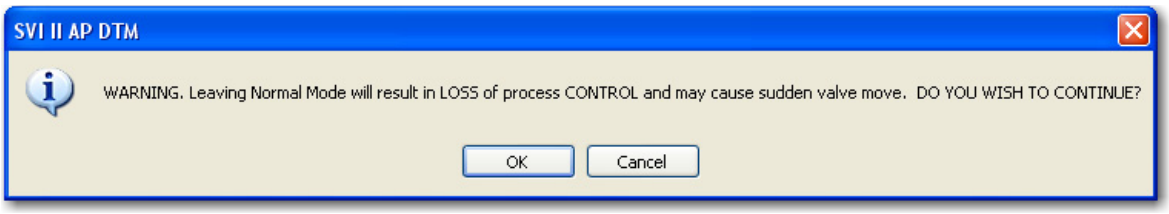


Figure 33 Leaving Normal Mode Warning

Configure the Setpoint Using the Position Indicator

The system must be in Manual mode.

To configure the setpoint:

1. Either:
   - Use the arrow and drag it to the required setpoint. The arrow top and tip changes from green to yellow as the arrow is dragged and a pen appears indicating that the value is not set (*Position Indicator Set Button with Pen*).

Figure 34 Position Indicator Set Button with Pen

or

   - Enter a value directly into the text field and *Position Indicator Set Button with Pen* appears.
2. Click **Set**.

9. Setup Wizard

Setup Wizard Screen

Running the Setup Wizard is one of two ways to set up the SVI II AP. When you decide to run the setup you can either run the entire wizard or pick and choose which components to run.

From the Setup Wizard screen you can rapidly setup the SVI II AP by configuring some basic parameters. You can set the device identification, select the air action, perform a travel calibration, and autotune the positioning parameters. When the selected tasks are started a progress screen appears. The Setup Wizard can dramatically reduce commissioning time in the field. To customize the valve setup refer to “Calibration Manual Tune Screen” on page 91.

To run the Setup Wizard you must first be in Setup mode. See “Mode to set” on page 46 for information on changing modes.

Setup Wizard Screen - Device Info Screen

Setup Wizard Screen - Device Info shows the *Device Info* screen, which is the first wizard screen. Use this screen to set some of the *Device Info*. See “Configuration General Screen” on page 65 to set the remainder of *Device Info*.

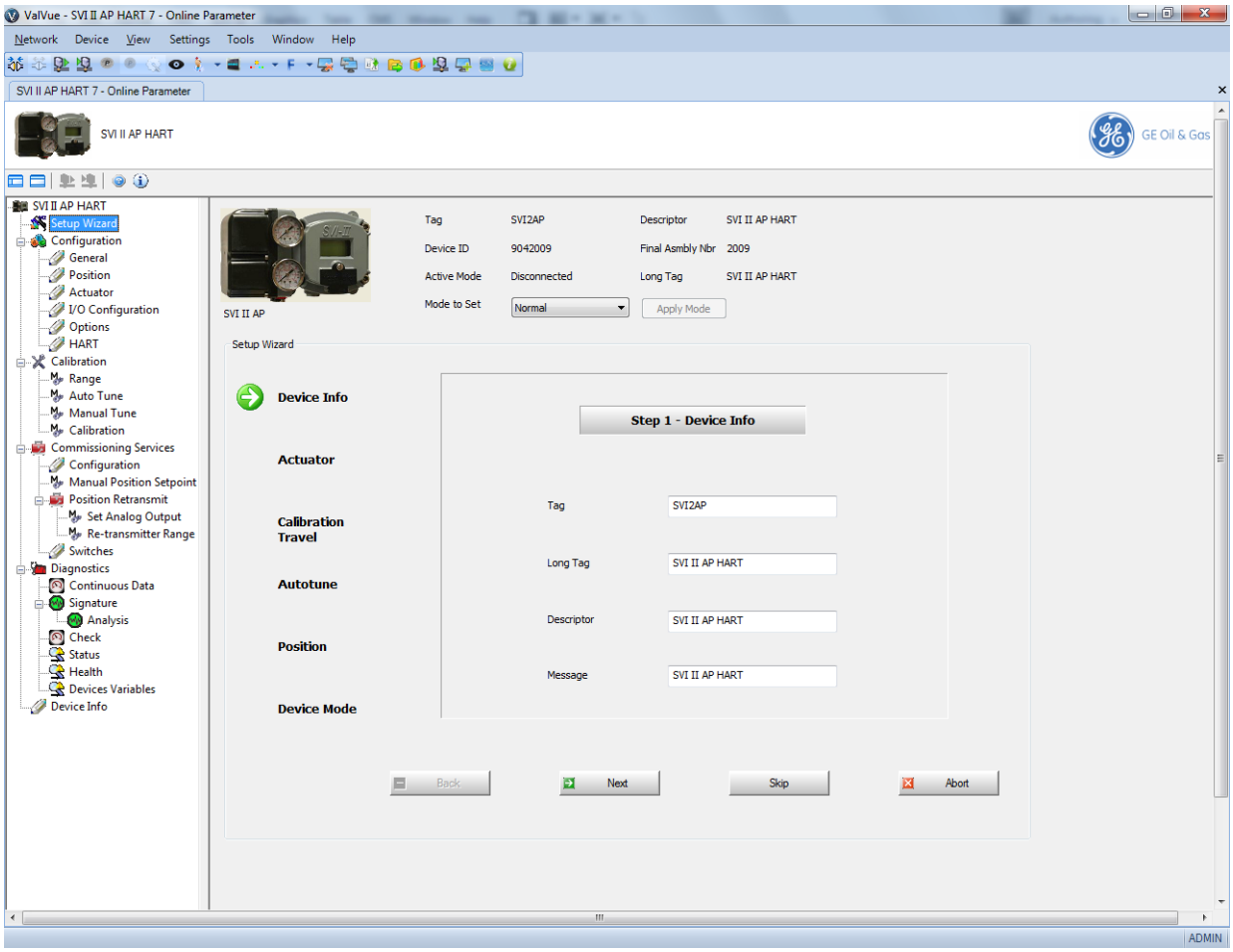


Figure 35 Setup Wizard Screen - Device Info

Buttons and Fields

Tag	Enter up to eight characters long and is used to identify the positioner in the system and appears throughout the program.
Descriptor	Enter up to 16 characters for a description for the positioner.
Long Tag	Enter up to 32 characters to identify the positioner in the system and appears throughout the program. Available for HART® 6 only.
Message	Enter up to 32 characters for a message associated with the positioner.

Setup Wizard Screen - Actuator Screen

Setup Wizard Screen - Actuator shows the *Actuator* screen used to set actuator type and air action and do a calibration reset.

The *Air Action* sets the action of the air supply by making one of the following selections:

- *Air to Open* - Air pressure is used through the SVI II AP to open the valve.
- *Air to Close* - Air pressure is used through the SVI II AP to close the valve.

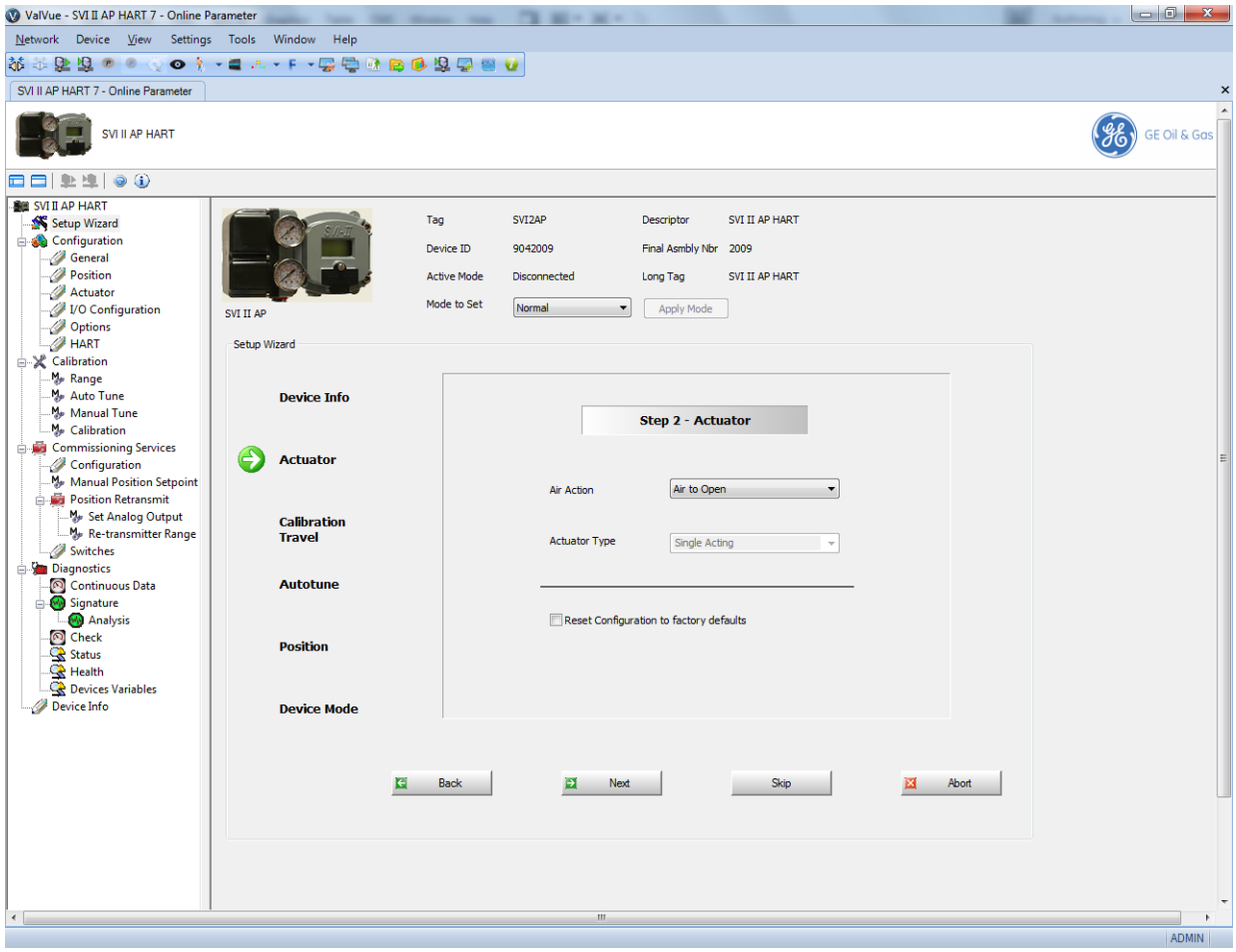


Figure 36 Setup Wizard Screen - Actuator

Buttons and Fields

Air Action	A pulldown list for selecting the valve action.
Actuator Type	Displays the actuator type single or double acting (factory set).
Reset configuration to factory defaults	Resets device configuration to factory defaults.

Setup Wizard Screen - Calibration Travel Screen

Setup Wizard - Calibration Travel Screen shows the *Calibration Travel* screen. Use this screen to automatically set the valve travel limits. To set valve travel manually see "Calibration Range Screen" on page 86.

To determine valve position, the positioner measures the closed and open positions of the valve. The SVI II AP first exhausts the actuator and measure the position, then fills the actuator and measures the position. From these measurements the valve position is determined.

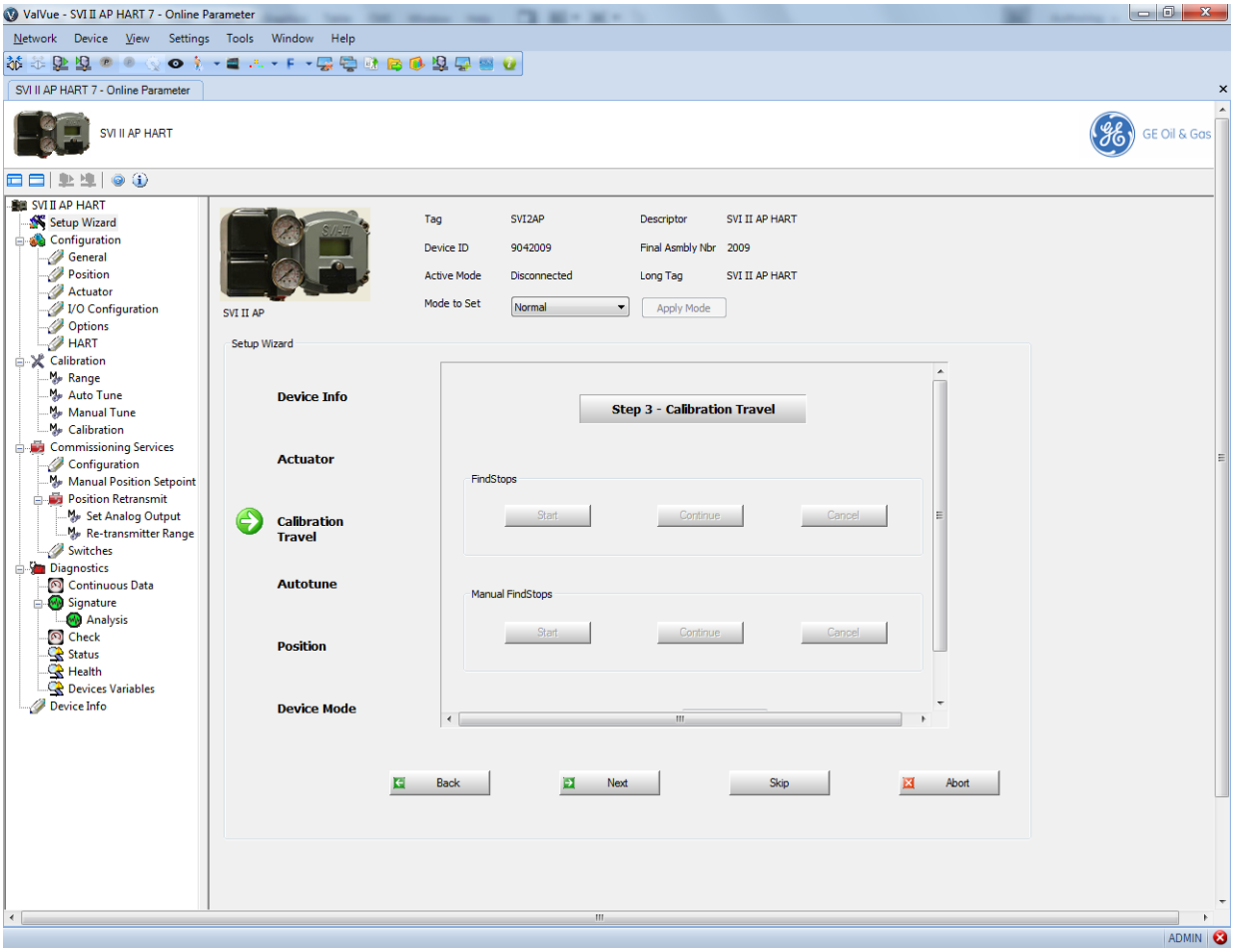


Figure 37 Setup Wizard - Calibration Travel Screen

Buttons and Fields

Open Stop Adjustment	Recomputes the position scale so that at the value entered in the Open Stop Adjustment edit box, as a percent of full stops, the position reads 100%.

Setup Wizard Screen - Autotune Screen

Setup Wizard - Autotune Screen shows the *Autotune* screen. Use this screen to set the *PID* and *Advanced Parameters*.

The SVI II AP has a built-in positioning Autotune feature. This feature automatically computes the optimal parameters for the positioning algorithm without requiring valve specific parameters for completion. The algorithm analyzes the dynamic behavior of the valve assembly, and determines optimal values for the tuning algorithm for tight and accurate position control.

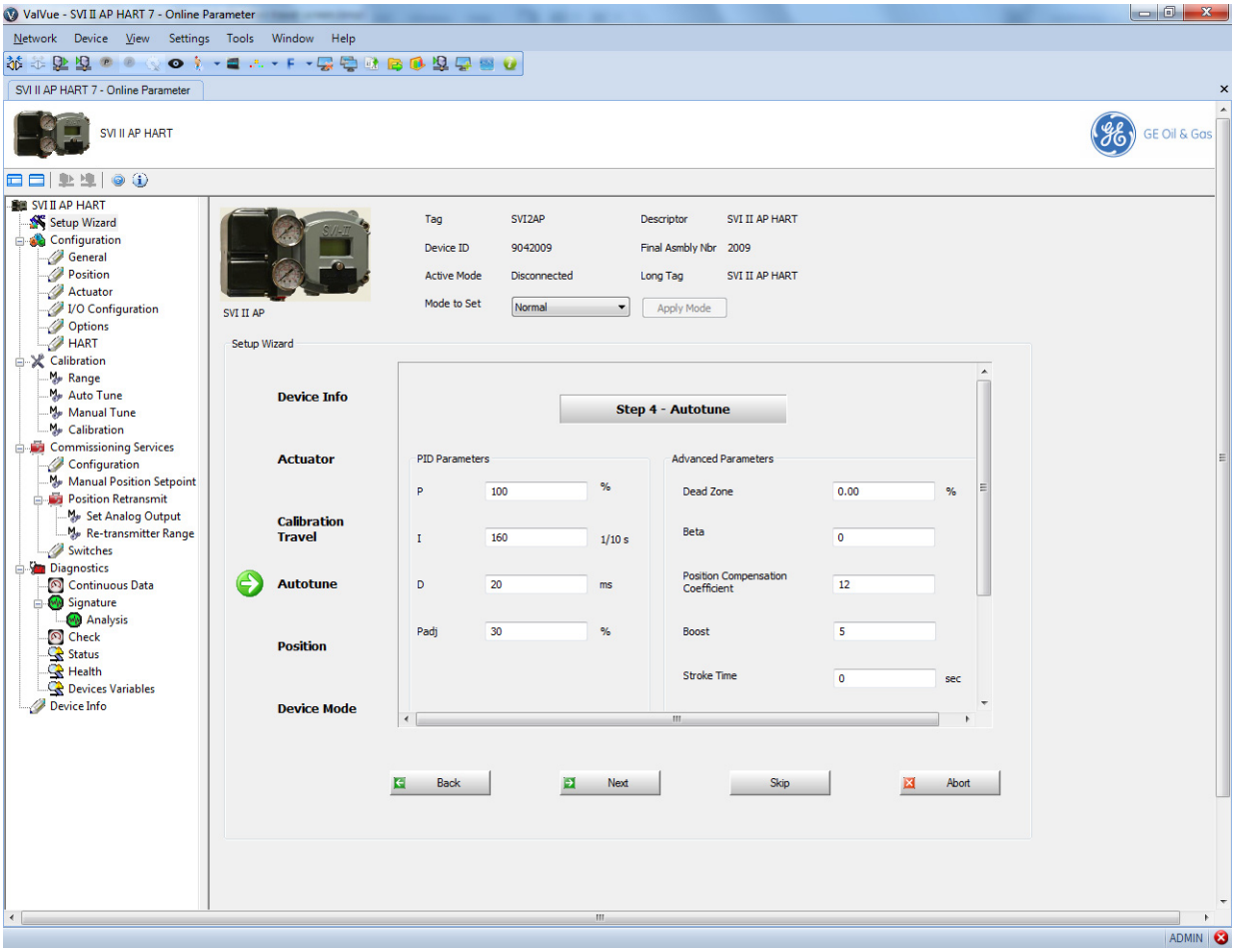


Figure 38 Setup Wizard - Autotune Screen

Buttons and Fields

PID Parameters

P Proportional gain in %. Common values for the positioner are 50 for small valves up to 4000 for large valves.

I	Integral time or reset time in 1/10th sec, is the time constant of integral control. Higher values of I cause less integral action. *0* gives no integral action. Common values are 10 to 200.
D	Derivative time or rate time (msec) is the time constant of derivative control. Common values are 10 to 100.
Padj	Valves often have significantly different response when filling verses exhausting. The proportional gain is adjusted by adding *Padj* (%) to *P* when the valve is exhausting.

Advanced Parameters

Dead Zone	When the valve position is within the setpoint +/- the dead zone, no additional position control is performed. This value is normally 0%, however for high friction valves (e.g. valves with graphite packing) a higher dead zone (%) helps avoid limit cycling due to the stick/slip action of the valve. In these cases the dead zone chosen might be 0.5% to 1%. Range: 0 to 5%.
Beta	This is a nonlinear gain factor, ranging from -9 to 9. When Beta is 0, the controller gain is linear. Otherwise, the gain is the function of error. The larger the beta, the smaller the gain for small error.
Position Compensation	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensation coefficient, which is a number between 0 and 20, make adjustments to try to equalize the valve response. The normal value is 6. For springless actuators the value is 15.
Boost	This controls a supplemental pressure, or boost, to speed up initial valve response. This compensates for pneumatic deadband. Range: 0 to 20.
Stroke Time	Enter a time to limit the rate of change for travel (sec/100% of travel). This prevents the valve from slamming open or shut.
Both Direction	Click this button to apply *Stroke Time* to both valve directions.
Open	Click this button to apply *Stroke Time* to valve open only.
Close	Click this button to apply *Stroke Time* to valve close only.
Supply Pressure	Enter the expected supply pressure. Required if the sensor is not enabled.
Aggressiveness	Enter a value that tends the valve to either fast response or overshoot. Higher aggressiveness leads to higher gains and generally faster valve performance. This can cause more overshoot.

Setup Wizard Screen - Position Screen

Setup Wizard - Position Screen shows the *Position* screen. Use this screen to set all position-based limits.

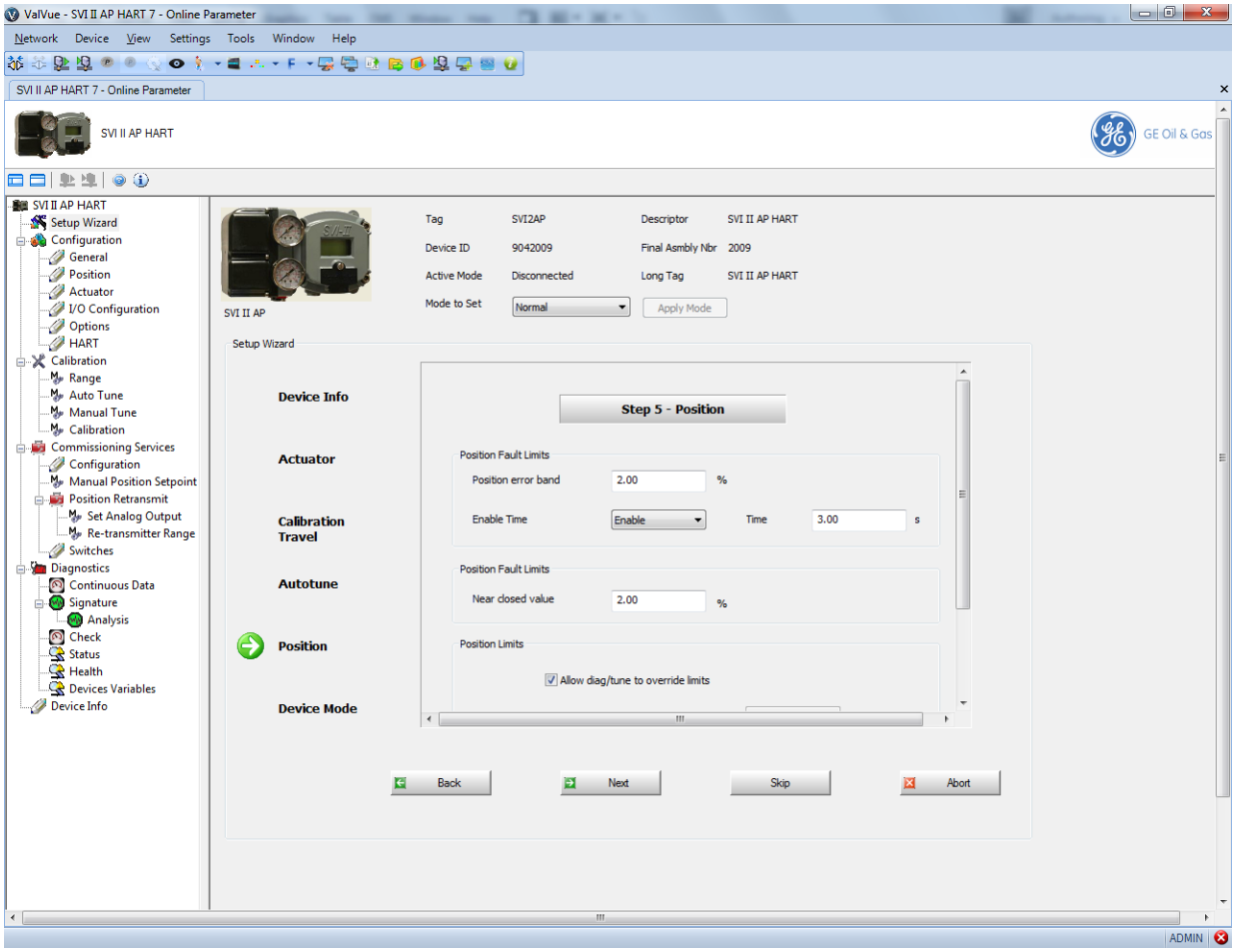


Figure 39 Setup Wizard - Position Screen

Buttons and Fields

Position Fault Limits

Position Error Band	Use this to configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in Normal mode or the manual setpoint in Manual mode) by more than the *Position Error Band* for more than the *Time*. When this occurs, a status flag is set which is reported during the next HART® message. Ranges: *Position Error Band*: .5 to 199% and *Time:* 1 to 328 seconds.
Enable Time	Activates/deactivates the *Time* field.
Time	Enter a time after which if the *Position Error Band* is exceeded a flag is set.

Near Closed Value	Use the text field to enter a value that determines the value of position below which the valve is considered near closed by the continuous diagnostic calculations. This value is defined as a percentage of the total partial stroke and must be between 0% and 20%. If you set a Near Closed value outside the range, a red **!** appears.
Position Limits	The SVI II AP allows you to establish software limit stops. If enabled, during correct operation of the SVI II AP, the control functions of the SVI II AP will not allow the valve position to be lower than the lower position limit or above the upper position limit. This option does not provide mechanical stops for the valve. In an electrical or air failure the valve will go to the fail safe position without regard to the software limit stops. The full open and full closed buttons similarly ignore the settings of the software limit stops. Some of the diagnostic tests cannot be performed with position limit stops set.
Allow Diag/ Tune to Override Limits	A checkbox for enabling/disabling autotuning and diagnostics to override limits.
Tight Shutoff Below (%)	Use this checkbox to enable/disable the use of *Tight Shutoff*'s value. Activates a tight shutoff below the value in the field. If the input signal would position the valve below the *Tight Shutoff* value, then air is supplied to fully seat the valve. Range: -0.99 and 19.99%.
Position Lower Limit	Use this checkbox to enable/disable the use of the value in the field. Activates a software limit stop. No valve position lower than this occurs when enabled. This is software only. During electrical/air failure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.
Position Upper Limit	Use this checkbox to enable/disable the use of the value in the field. Activates a software limit stop. No valve position higher than this occurs when enabled. This is software only. During electrical/air failure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.

Setup Wizard Screen - Device Mode Screen

Use the *Setup Wizard - Device Mode Screenod* to set the mode after Setup Wizard is finished.

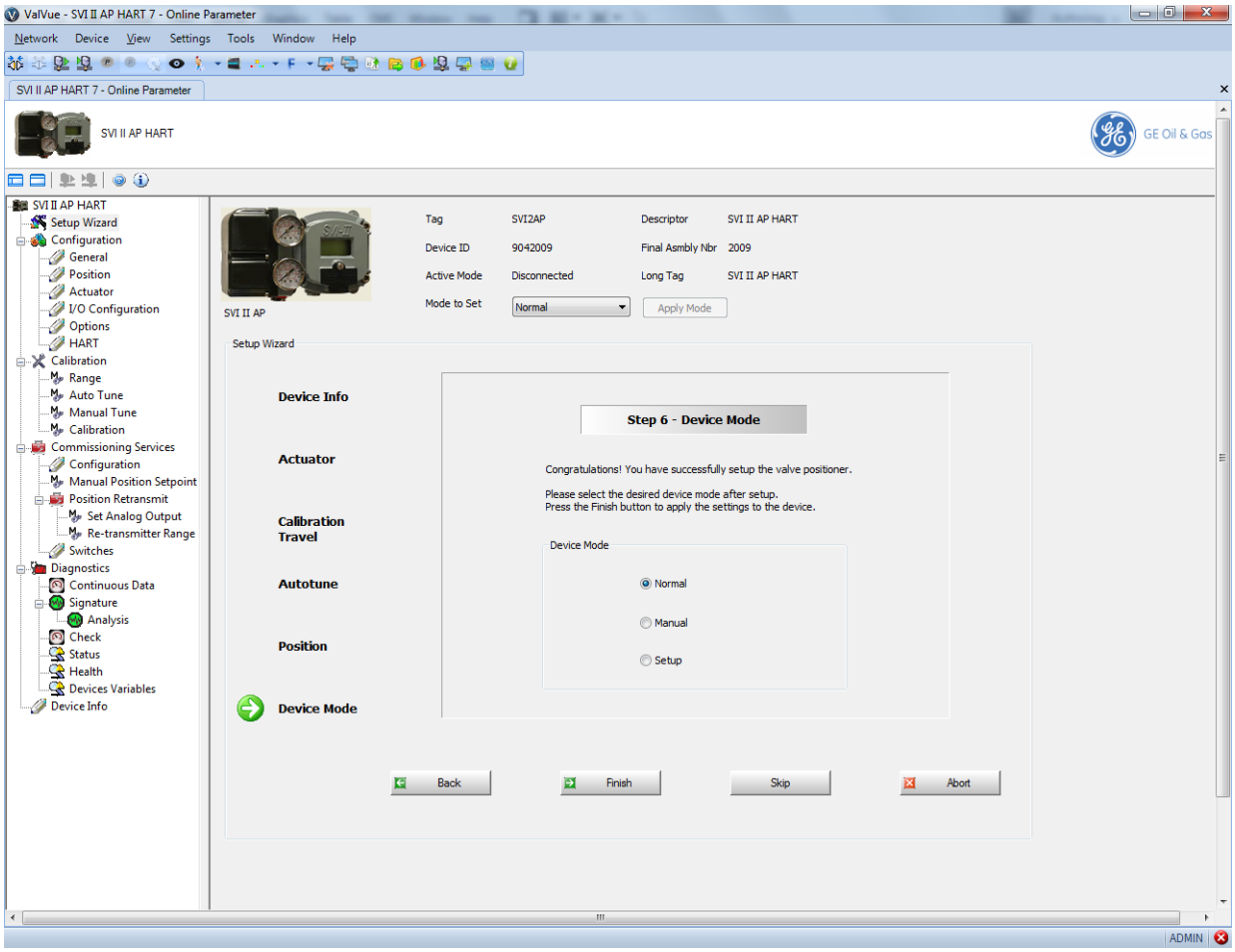


Figure 40 Setup Wizard - Device Mode Screen

Run the Setup Wizard

To run the Setup Wizard:

1. Place the system in *Setup* mode.
2. Enter *Tag*, *Descriptor* and *Message* data on *Device Info*, click Next and the *Actuator* screen appears.
3. Select the *Air Action* from the pulldown list:
   - **Air to Close**
   - **Air to Open.**
4. Click Next, the *Air Action* is written to the database and the *Calibration Travel* screen appears.

5. Open an *Open Stop Adjustment*, if required.
6. Click Start to start the Find Stops procedure.

   A warning appears above.
7. Click Continue .

   The Find Stops runs and the Autotune screen appears, if successful.

   If the procedure fails:

   1. Reset the SVI II AP on the *Diagnostics* screen (see "Diagnostics Screen" on page 111).

   2. Rerun Find Stops.

   If it fails a second time, reset to factory defaults (see "Calibration Screen" on page 85).

   3. Run the procedure from the start.
8. Configure *PID Parameters*, *Advanced Parameters*, *Supply Pressure* and *Aggressiveness* as required, click Start and a warning appears about stroking the valve.

WARNING *This procedure moves the valve.*

9. Click Continue . *Autotune is completed* appears.
10. Click Next and the *Position* screen appears.
11. Configure as required and click Next and the *Device Mode* screen appears.
12. Set the mode and click Finish .

To run Manual Find Stops:

1. Click Continue .

   A warning appears above.
2. Click Continue , wait until the valve is fully closed and click Continue .
3. Wait until the valve is fully open and click Continue .

10. Configuration

Configuration Screen

Use this screen to reset all offline configuration data to its default value including, Air Action, Travel, and PID parameters.

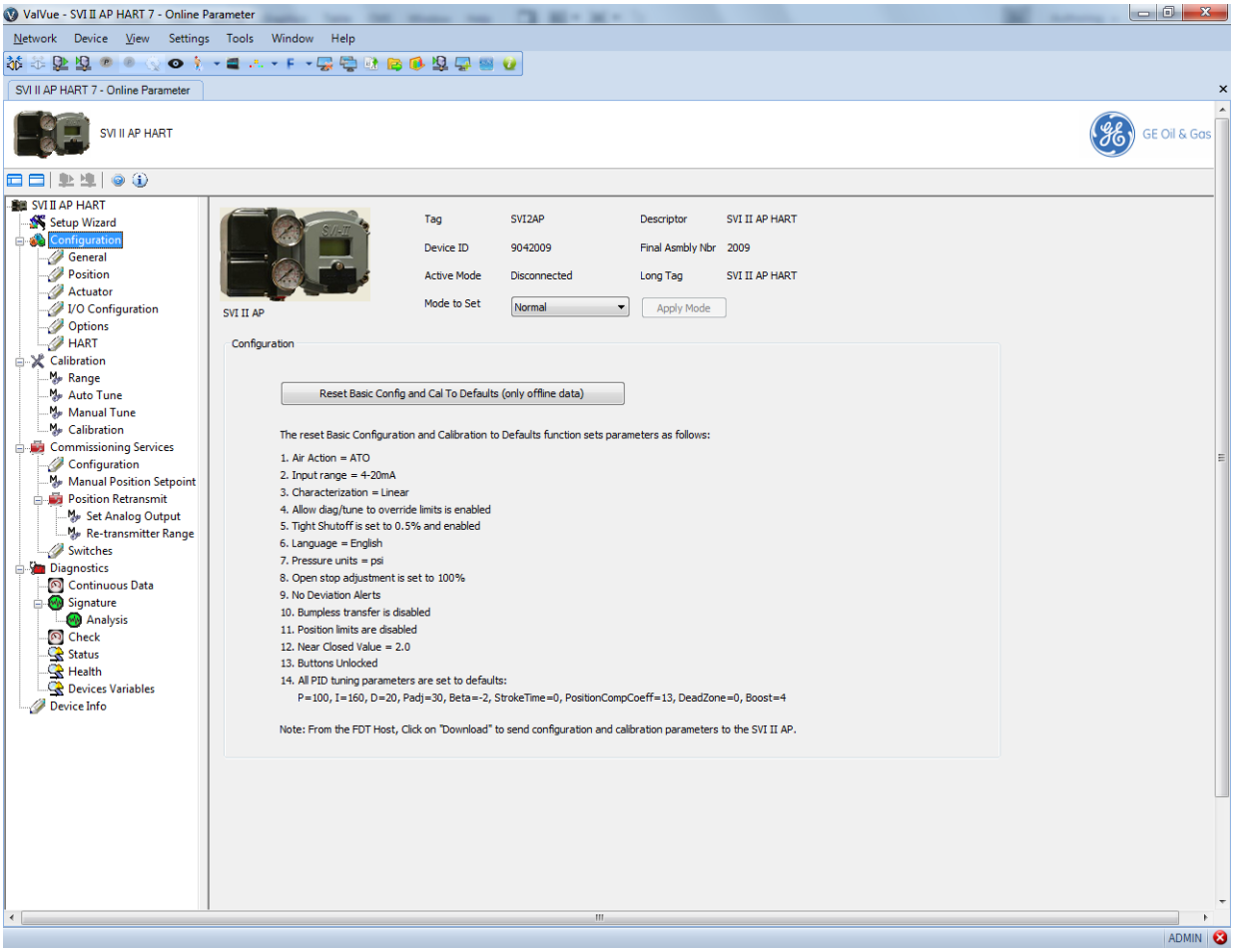


Figure 41 Configuration Screen

Reset data

To reset data:

1. Ensure you are in *Setup* mode.
2. Click Reset Basic Config and Cal To Defaults (device data and offline data) and *Reset Basic Config and Cal to Defaults Message* appears.

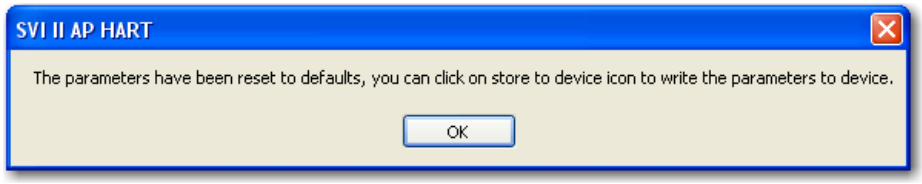


Figure 42 Reset Basic Config and Cal to Defaults Message

3. Click **OK**.

Configuration General Screen

Use this screen to configure Tag Information, display language and set LCD button control. You can read parameters from the positioner in Manual and Normal modes, but you must be in Setup mode to write to the positioner.

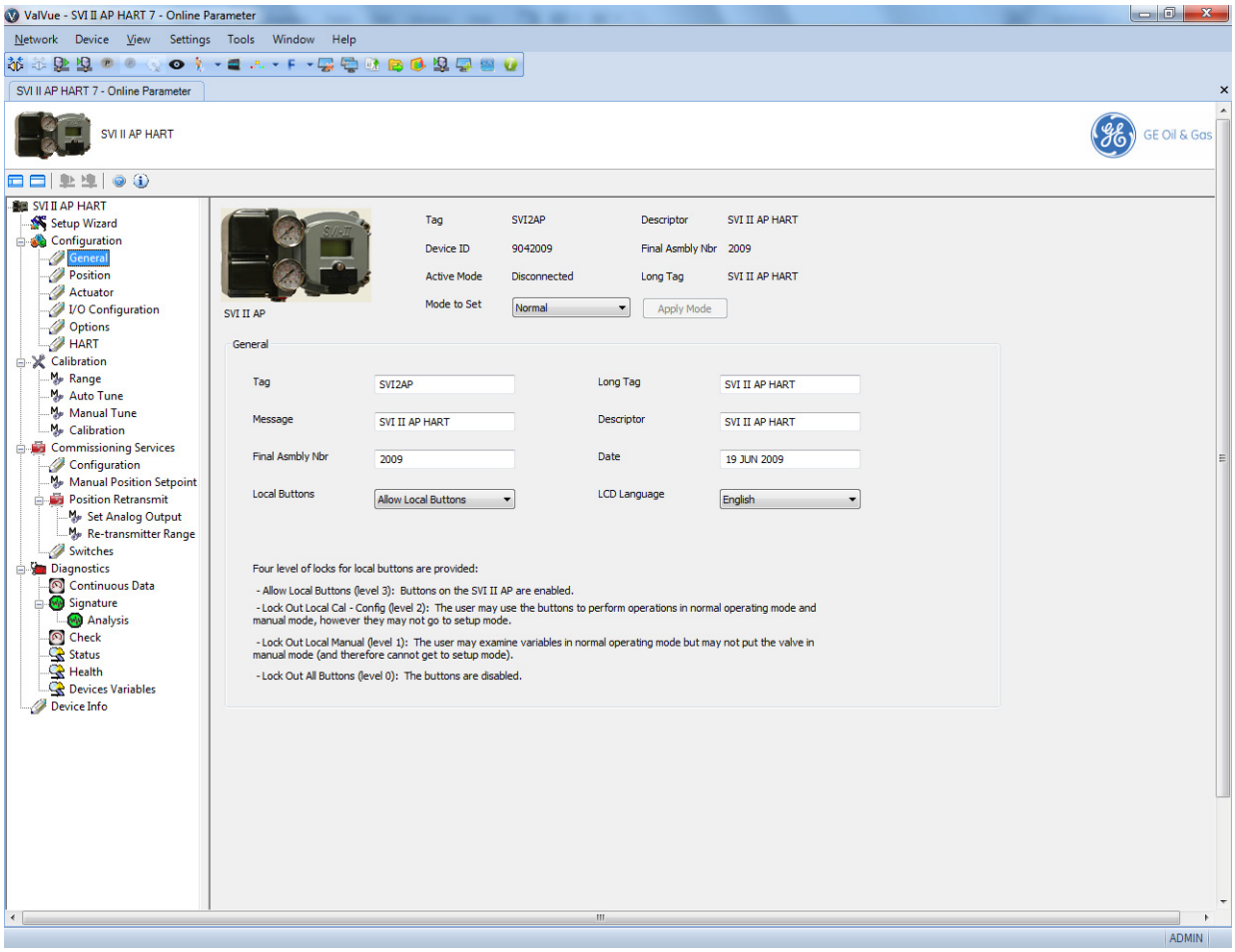


Figure 43 Configuration General Screen

Buttons and Fields

Tag	Enter up to eight characters long and is used to identify the positioner in the system and appears throughout the program.
Long Tag	Enter up to 32 characters long and is used to identify the positioner in the system and appears throughout the program. For HART® 6 only.
Descriptor	Enter up to 16 characters for a description for the positioner.
Message	Enter up to 32 characters for a message associated with the positioner.
Date	Enter a date for when the unit went into service.

Final Asmbly Numbr	Entered at the factory. Usually not changed.
Local Buttons	A pulldown list to select security level for SVI II AP pushbutton. The SVI II AP comes with an optional local display and buttons for data entry. These buttons can be used to perform basic SVI II AP setup without the need for ValVue or a handheld. It may, however, be desirable after initial setup to *lock* the buttons so that the SVI II AP parameters cannot be inadvertently changed from the buttons. Several level of locks are provided: □ *Allow Local Buttons:* All buttons on the SVI II AP are enabled. □ *Lock out Local Cal-Config (level 2)*: You can use the buttons to perform operations in Normal mode and Manual mode, but not in Setup mode. □ *Lock out Local Manual (level 1)*: You are precluded from Manual and Setup mode but can perform normal operations in Normal mode. □ *Lock out All Buttons (level 0)*: All buttons are disabled.
LCD Language	A pulldown list to select what language the valve positioner display its menu in: English or French. The DTM program is not affected.

Edit Configuration General Screen

To configure these items:

□ Enter data as required into the text fields and pulldown lists.

Configuration Position Screen

Use the *Configuration Position Screen* to set all position-based limits.

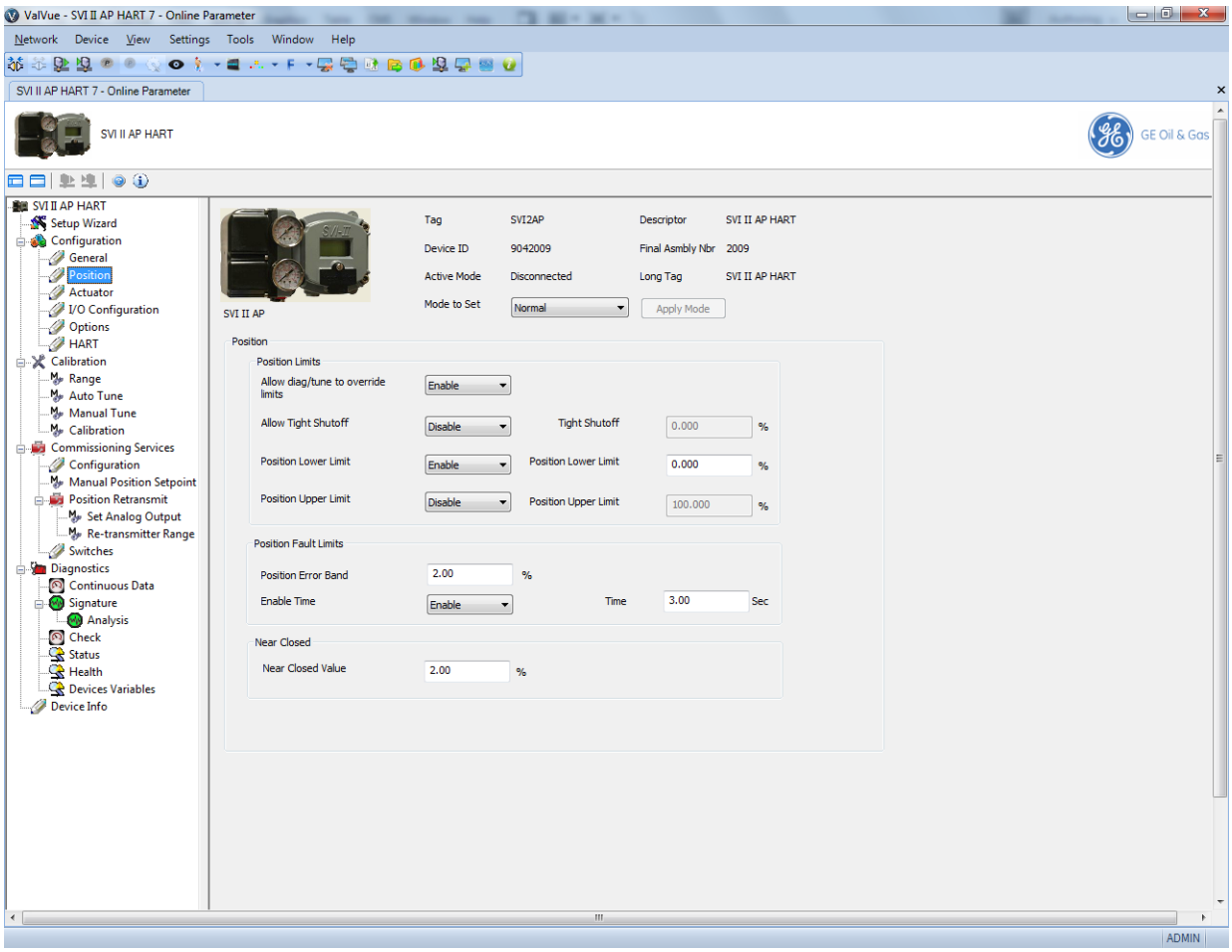


Figure 44 Configuration Position Screen

Buttons and Fields

Position Limits

Allow Diag/ Tune to Over-ride Limits	Use this pulldown to enable/disable autotuning and diagnostics to override limits.
Allow Tight Shutoff	Use this pulldown to enable/disable the use of *Tight Shutoff*'s value. Activates a tight shutoff below the value in the field.
Tight Shutoff	Enter a percentage. If the input signal would position the valve below the *Tight Shut-off* value, then air is supplied to fully seat the valve. Range: -0.99 to 19.99%.

Position Lower Limit	Use this pulldown to enable/disable the use of the value in the field. Activates a software limit stop. No valve position lower than this occurs when enabled. This is software only. During electrical/air failure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.
Position Upper Limit	Use this pulldown to enable/disable the use of the value in the field. Activates a software limit stop. No valve position higher than this occurs when enabled. This is software only. During electrical/air failure, the valve moves to failsafe position. This stop is ignored during manual full open or close operations.
Position Fault Limits	You can configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in normal operating mode or the manual setpoint in manual mode) by more than the Position Error Band for more than the Position Error Time. When this occurs, a status flag is set which is reported during the next HART® message (only that a flag is set is reported).
Position Error Band	Use this to configure how position errors are handled. A position error occurs when the valve position differs from the requested position (from the input signal in Normal mode or the manual setpoint in Manual mode) by more than the *Position Error Band* for more than the *Time*. When this occurs, a status flag is set which is reported during the next HART® message. Only that a flag is set is reported. Ranges: .5 to 199% and 1 to 328 seconds.
Enable Time	Enable/disables the *Time* field.
Time	Enter a time after which if the *Position Error Band* is exceeded a flag is set.
Near Close	
Near Closed Value	Use the text field to enter a value that determines the value of position below which the valve is considered near closed by the continuous diagnostic calculations. This value is defined as a percentage of the total partial stroke and must be between 0% and 20%. If you set a *Near Closed* value outside the range, a red **!** appears.

Configuration Actuator Screen

Use this screen to select the *Air Action* type.The type of actuator: *Single Acting* or *Double Acting* is factory set.

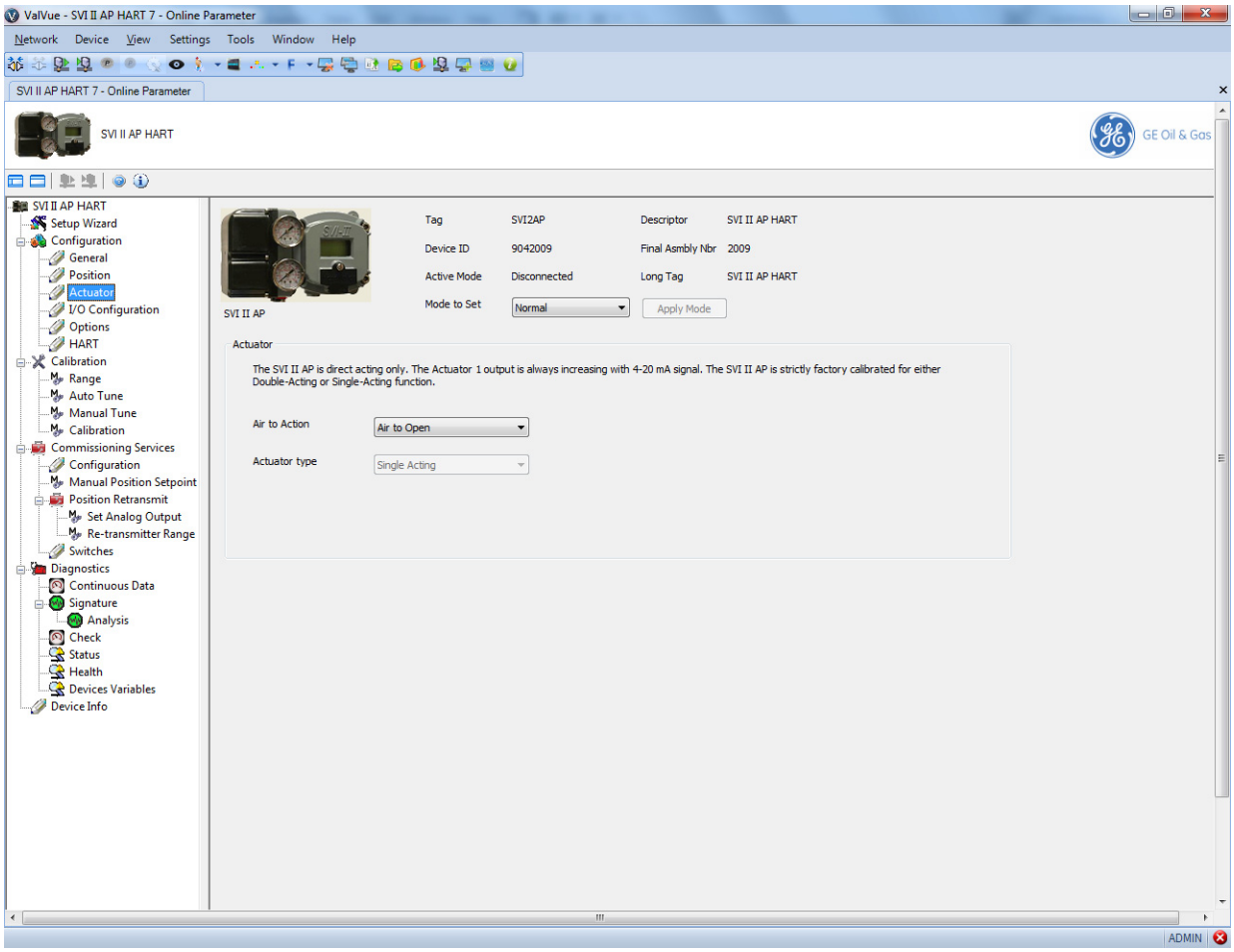


Figure 45 Configuration Actuator Screen

Set Air Action

To set air action:

- Select the item from the pulldown list.

Configuration I/O Configuration Screen

Use the *Configuration I/O Configuration* screen to configure switch states, activate/deactivate digital input, configure the input signal range and valve retransmit range.

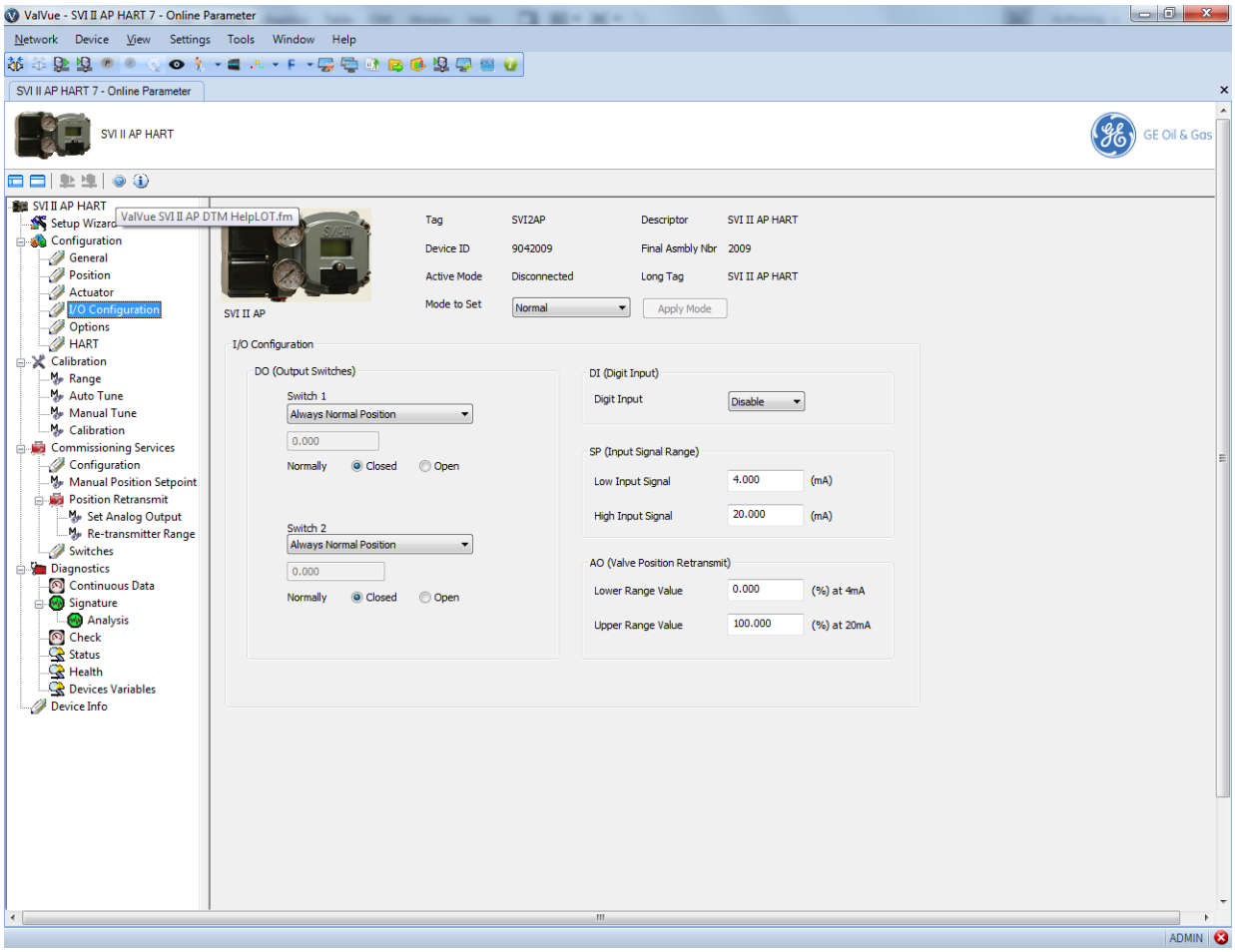


Figure 46 Configuration I/O Configuration Screen

Buttons and Fields

NOTE

The contacts are OPEN when the SVI II AP is unpowered and may be made to be open or closed when the flag is asserted after boot.

DO Output Switches

Switch 1/ Switch 2

The SVI II AP supports two identical contact outputs which can be logically linked to status bits. The two output switches can be opened or closed in response to conditions that the SVI II AP detects. Use this pulldown to select the type of action:

- *Always Normal Position* - The switch is not controlled by the SVI II AP and remains in the default position. The two digital output switches can be opened or closed in response to detected conditions. The default configuration setting is *Always Normal Position*, where normal is closed, which means that the switch will not switch for any valve travel. To activate the switch at a given valve position, configure the switch *Position Low Limit* or *Position High Limit*.
- *Failsafe* - The switch is activated when the SVI II AP is in Failsafe mode
- *Reset* - The switch is activated whenever a reset has occurred and the switch remains activated until the SVI II AP status is cleared
- *Position Error* - The switch is activated whenever a position error has occurred and is deactivated when the position recovers to the correct position
- *Tight Shutoff Active* - The switch is activated whenever the device is in tight shutoff (tight shutoff is on and the valve position is less than the tight shutoff position).
- *Position Low Limit* - The switch is activated whenever the valve position is less than the position setting of this switch control.
- *Position Upper Limit* - The switch is activated whenever the valve position is greater than the position setting of this switch control.
- *Manual Mode* - The switch is activated whenever the SVI II AP is in Manual mode.

Normally Open/Closed

Use this to set the switch as normally open or closed.

DI (Digital Input)

Digital Input

Use this pulldown to enable/disable digital inputs.

SI (Input Signal Range)

Use this parameter to adjust the current range Input Signal the low and high signal values. The low value must between 3.8 and 14 mA and the high value must be between 8 and 20.2 mA.

Low Input Signal

Enter a value for the low end for the input signal.

High Input Signal

Enter a value for the high end for the input signal.

AO (Valve Position Retransmit)

The SVI II AP has the ability to retransmit the position signal as an output to another device with 4 - 20 mA current output proportional to position.

Lower Range Value

Enter a position for the valve in percent for the closed (4 mA) position.

Higher Range Value

Enter a position for the valve in percent for the open (20 mA) position.

Set Switch Parameters

To set switch parameters:

1. Use the *Switch 1* or *Switch 2* pulldown to select an action:

☐ *Always Normal Position*	☐ *Failsafe*	☐ *Reset*
☐ *Position Error*	☐ *Tight Shutoff Active*	☐ *Position Low Limit*
☐ *Position Upper Limit*	☐ *Manual Mode*	

CAUTION

*If both Position Low Limit and Tight Shut Off are used, the Position Low Limit **must** be above the Tight Shut Off.*

*If both Position High Limit and Full Open Above are used, the Position High Limit **must** be below the Full Open Above.*

2. Use the *Normally* radio buttons to select an action: **Closed** or **Open**.
3. Use the *Digital Input* pulldown to select enable or disable digital inputs.
4. Edit the values in the *Low Input Signal* or *High Input Signal* fields, as required.
5. Edit the values in the *Lower Range Value* or *Higher Range Value* fields, as required.

Configuration Options Screen

Use the *Configuration Options Screen* to configure the parameters related to valve characterization, pressure units and bumpless transfer.

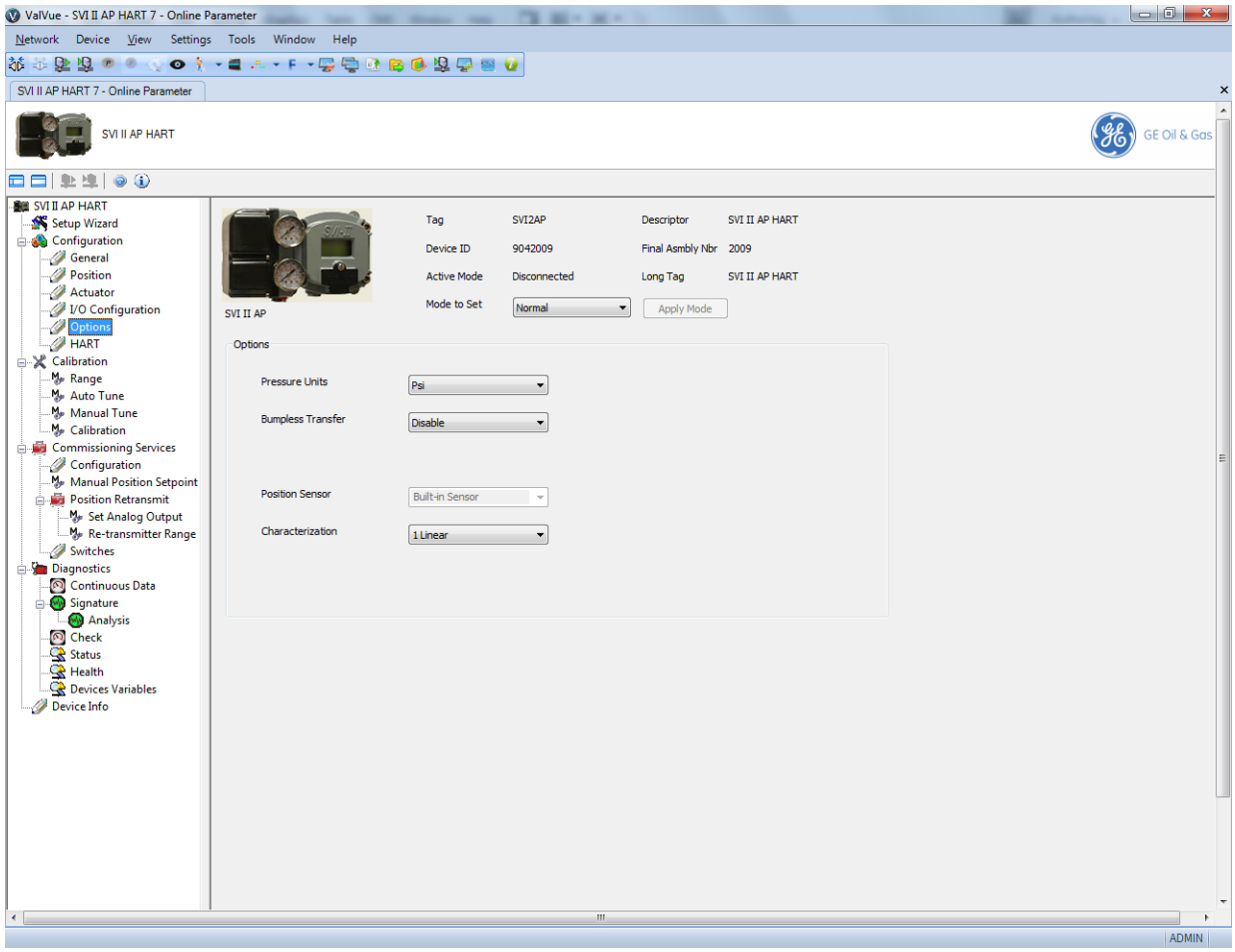


Figure 47 Configuration Options Screen

Buttons and Fields

Pressure Units	A pulldown list for selecting the pressure units for use: *psi*, *bar* or *kPa*.
Bumpless Transfer	Use the pulldown list to select/deselect this option. This option provides a means to maintain smooth valve control positioning when changing to Normal mode from Manual or Setup. Without Bumpless Transfer, when changing to Normal mode, the setpoint could vary in a manner that causes a significant process disturbance. Bumpless Transfer moves the controller signal to match the valve position so that smooth resumption of control with little disturbance results. When *Bumpless Transfer* is selected, returning to Normal mode from Manual or Setup mode is deferred until the input signal matches the current valve position. Either the input signal or the valve position can be changed to match. If nothing is done, the system slowly changes the position until it matches the signal setpoint. The time taken to move to the position is determined by the Transfer Time which is a number between 0 and 255 and is approximately the number of seconds required to move the valve 100% toward the signal position.
Position Sensor	Displays the type of sensor installed.

Characterization

Use the pulldown list to select the characterization type.

Control valves are *characterized* to give a specific relationship between flow capacity (Cv) and percent opening of the valve. The valve can be characterized with special purpose trim or with the SVI II AP positioner. Several characterizations are available:

- *Linear*: Causes the valve to open proportionally with the input signal. Select this option if non-linear trim is used in the valve.
- *Equal % (50)* and *Equal % (30)*: Two equal percentage characterizations are available, one with R=50 and the other with R=30.
- *Quick Open*: The quick opening characterization is the inverse to the *Equal Percentage 50%* characterization curve.
- *Custom*: Selecting this option displays a *Custom Data* field showing the default custom data points and an *Edit* button to access an additional dialog where you can enter or draw a custom characterization curve. The curve can have up to nine points and points in between are linearly interpolated.
- *Camflex*: This characterizes the valve as a Camflex* valve with settings of *Linear* and *Equal 50%*.

  Characterization Curves shows the characterization curves in a graphical format.

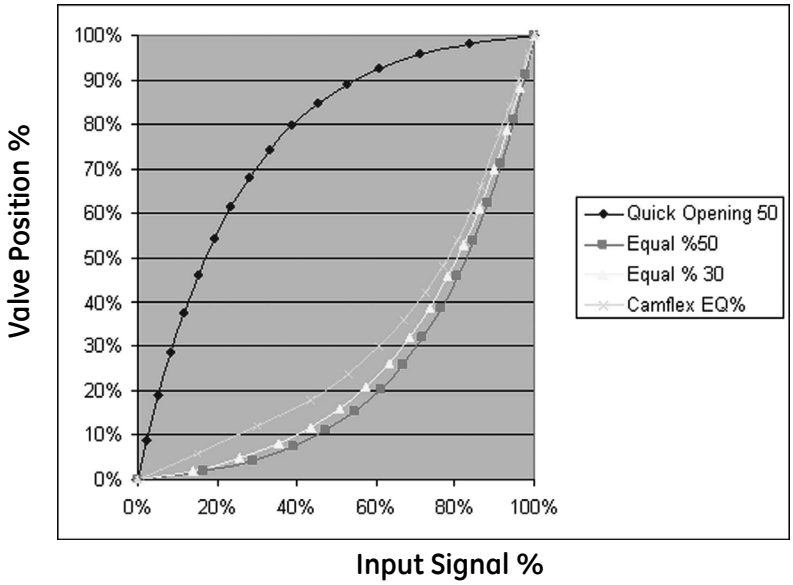


Figure 48 Characterization Curves

Custom Characterization

Custom Characterization is accomplished using the *Custom Characterization Dialog*.

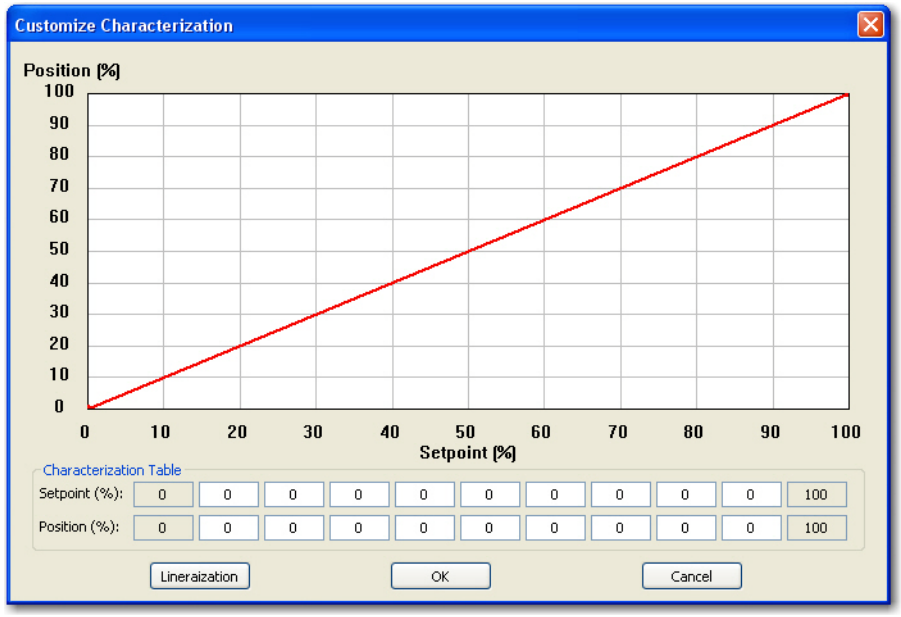


Figure 49 Custom Characterization Dialog

Setpoint (%)/ Position (%)

Activated by selecting *Custom* in *Characterization*.

A custom characterization defines the relationship between the input signal and the output position of the valve. The characterization may contain up to nine XY pairs and the position is linearly interpolated between the pairs. The first position is always 0, 0 and the last position is always 100, 100. Both first and last positions indicate 0 and 100 percent and are not counted as any of the nine points allowed. See "Create a Custom Characterization" on page 78.

Linearization

When mounted on a reciprocating valve, a small non-linearity in the reported valve position versus actual valve position may result from the linkage configuration. This non-linearity can be corrected using a custom characterization that matches the specific linkage used. The custom linearization procedure automatically generates this custom characterization. Custom characterization must be the selected configuration option to use the generated curve.

Two types of linkages are modeled: simple and compound. Most Masoneilan linkages use the compound linkage system.

Simple Lever Type

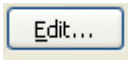
The simple lever has the pivot point (the potentiometer in the SVI II AP) mounted a fixed distance (L1) from the valve stem pickup point. In order to compute the proper correction curve, the stroke length, the distance from the pivot to the valve stem pickup point and the valve position at horizontal must be entered. Clicking **Simple** computes the correction and display the curve.

Compound Lever Type

The compound lever linkage has two lever segments attached at one end to the pivot and the other end to the valve stem pickup point. In order to compute the proper correction curve, enter the stroke length, first lever segment length (L1), second lever segment length (L2), the distance from the pivot to the valve stem pickup (L3), the valve position at horizontal. Clicking **Compound** computes the correction and display the curve.

Most Masoneilan linkages use a linkage with L3 equal to L1, i.e. the second lever arm is vertical when the first lever arm is horizontal. The correction computation will correctly compute the correction curve when L3 is not equal to L1, however L3 must be greater than 0 which requires that the valve stem pickup not be lined up with the pivot and that the pickup be on the same side of the pivot as the link between the first and second lever segments.

Edit button



Click this and *Custom Characterization Dialog* appears. Use this sub-screen to configure custom characterizations. See "Create a Custom Characterization" on page 78.

Create a Custom Characterization

A custom characterization defines the relationship between the input signal and the output position of the valve. The characterization may contain up to 9 XY pairs and the position is linearly interpolated between the pairs. The first position must be 0, 0 and the last position must be 100,100. Both first and last positions indicate 0 and 100 percent and are not counted as any of the 9 points allowed. To create a custom characterization:

1. Use the *Characterization* pulldown to select **Custom** and the *Edit* button appears.
2. Click **Edit** and the *Custom Characterization Dialog* dialog appears, along with the *Custom Data* field on the *Options* tab. The *Custom Data* field displays the data points once configuration is complete.

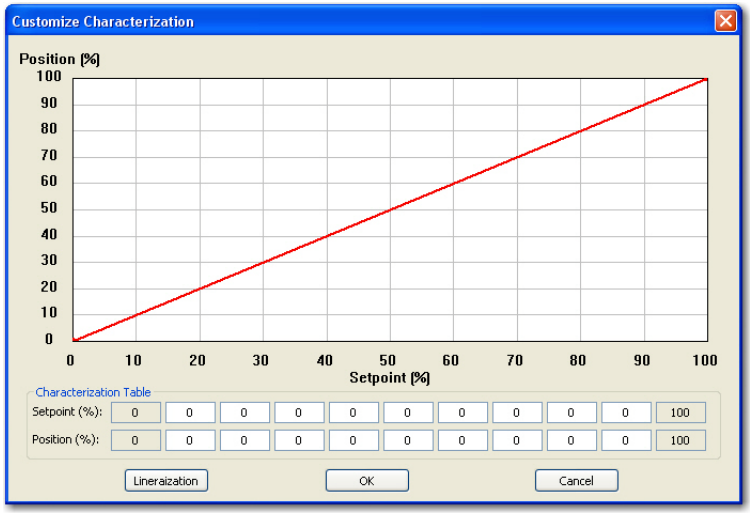


Figure 50 Custom Characterization Dialog

3. Enter values in the *Setpoint (%)/Position (%)* fields from lowest to highest. If there is too drastic a slope change a dialog appears (*Invalid Segment Dialog*). Adjust values accordingly.

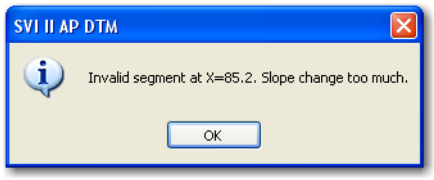


Figure 51 Invalid Segment Dialog

Setpoint (%)/Position (%) fields activate and Lineraization appears.

4. Click Lineraization and *Linearization Dialog* appears.

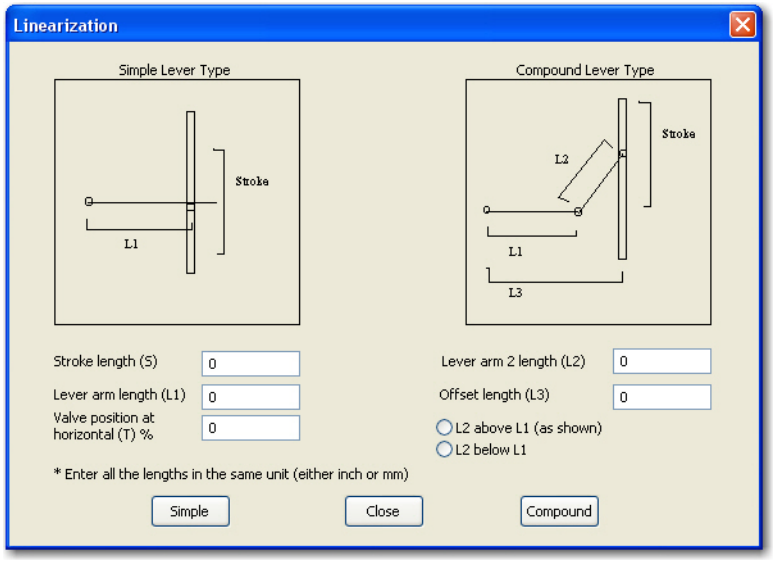


Figure 52 Linearization Dialog

5. Enter values in the fields associated with either lever type and click the associated button and click **OK**.
6. Click **OK** and a dialog appears prompting you to save.
7. Click **OK**.

Configuration HART® Screen

The Burst mode is when the HART® device continuously sends out data for a device not capable of being polled by a Master. Use this mode only for devices that are passive (i.e. not a HART® master), such as a HART® to Analog converter (SPA from Moore Industries, Tri-Loop by Rosemount). Turning on Burst mode in cases where it is not required affects the communication bandwidth. Burst mode is not supported for the SVI II AP in HART®7.

Burst Mode Data Return provides a summary of the data returned from the Burst mode (HART® Command #3 equivalent to Process-Vars-Current).

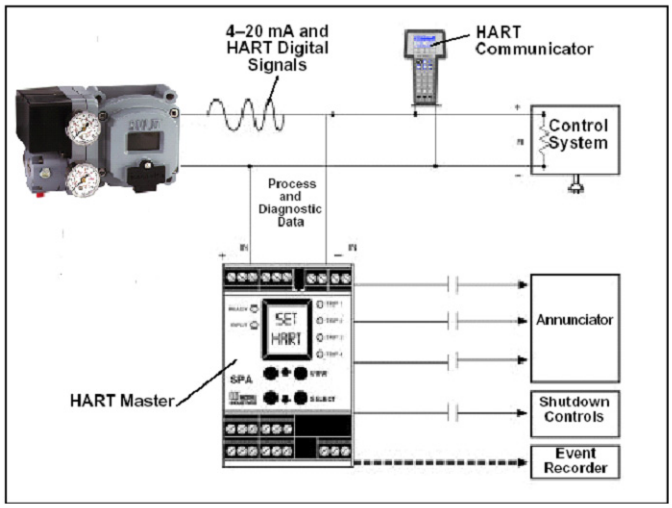
Table 1 Burst Mode Data Return

Variable	Description
SVI II AP (firmware 311, 313, 321, 323, 325 and 411)	
PV (Primary Variable)	Valve position
SV (Secondary Variable)	Actuator Pressure
Supply Pressure	The pressure generated by the air supply.
Pressure2	The pressure detected for the second actuator pressure, specific for double acting.
For 411 (HART® 6)	
Position	Valve position
Supply Pressure	The pressure generated by the air supply.
P2	The pressure detected for the second actuator pressure, specific for double acting.
Pos Retransmit	Number of D/A counts.
Num Cycles	Number of cycles (number of back and forth movements).
Num Strokes	Number of strokes.
Raw Position	Number of temperature compensated A/D counts.
VoltsInput	Not used.
Temperature	The board temperature expressed as °C x 100.
DI	The state of the switch where 0 is closed and 100 is open.
DO2	The state of the switch where 0 is closed and 100 is open.
DO1	The state of the switch where 0 is closed and 100 is open.
Signal	The setpoint expressed in mA.

Table 1 Burst Mode Data Return (Continued)

Variable	Description
Setpoint	The setpoint expressed in percentage.
P1-P2	Pressure of actuator 1 minus the pressure from actuator 2.

Connecting the SPA with the AP



- must be set as as a secondary master if the SPA is in polling mode to be able to connect

- PV = Position
- SV = Actuator Pressure
- TV = Supply Pressure
- QV = Pressure 2

The on/off contacts can be triggered from the status bits sent with every message.
The module must be configured to let it know which bit will trigger the contact.

Figure 53 Burst Mode Configuration

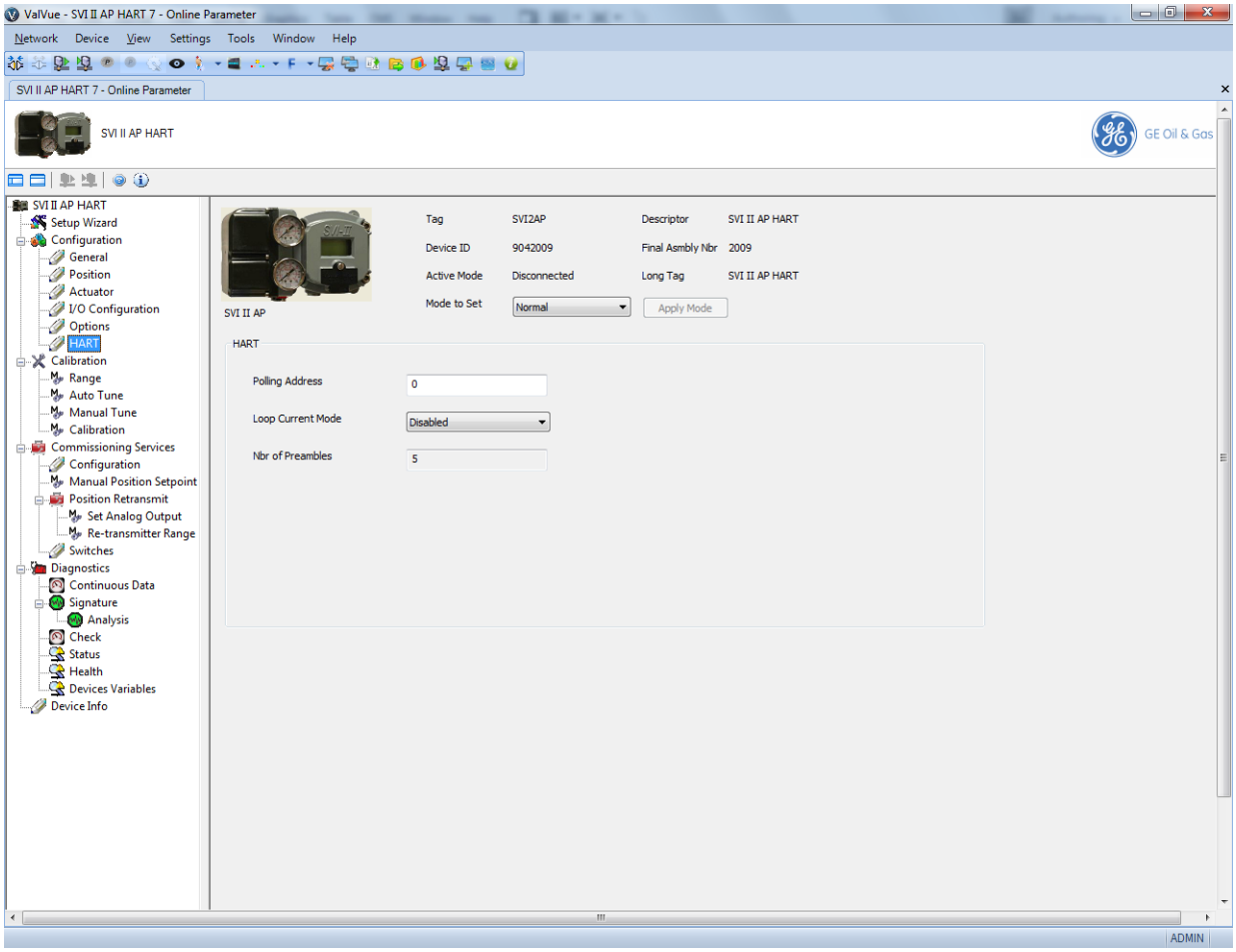


Figure 54 Configuration HART® Screen

Buttons and Fields

Polling Address	Enter the polling address used by the host to identify a field device; usually *0*.
Loop Current Mode	Use the pulldown to enable/disable this mode. Enabling this mode makes the loop current fixed, which is used when in multi-drop mode. For HART® 6 only.
Nubr of Preambles	Displays the number of preambles. A host using the HART® protocol sends a short string of characters at the beginning of each communication to *wake up* the other device. This string is a *preamble*. The number of preambles prefixed to each HART® command sent to a device varies from device to device. The valid range is 2 to 20. Recommended values for this parameter are 3 to 5 when using the *Mux*.

Burst Mode Select	Use the pulldown list to activate/deactivate the mode.
Burst Command Number	Use the pulldown to select the data for transmission: *Cmd 1* - Reads the PV only. Cmd 2 - Read the current. *Cmd 3* - Reads all variables, including: PV and SV. *Cmd 9* - Reads device vars w/status. *HART® 6 only*. *Cmd 33* - Reads device variables. *HART® 6 only*.

Configure Burst Mode

To configure a burst mode:

1. Set the system to manual or Normal mode.
2. Use the *Burst Mode Select* pulldown to select an action: **Enter** (enables the mode) or **Exit**.
3. Use the *Burst Command Number* pulldown to select the data sent:
   - **Cmd 1** - Reads the PV only.
   - **Cmd 2** - Read the current.
   - **Cmd 3** - Reads all variables, including: *PV* and *SV*.
   - **Cmd 9** - Reads device vars w/status. *HART® 6 only*.
   - **Cmd 33** - Reads device variables. *HART® 6 only*.
4. If using Cmd9 or Cmd33: Choose the variables for the burst command and the order for command variables to be returned using the four Burst Variable pulldowns. There are 15 variables:

Position	*P2*	*P1-P2*
Supply Pressure	*Setpoint*	*Signal*
DO2	*DO1*	*Temperature*
DI	*Raw Position*	*VoltsInput*
Num Strokes	*Num Cycles*	*Pos Retransmit*

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11. Calibration

Calibration Screen

Use the *Calibration* screen to restore the factory calibration data for all sensors.

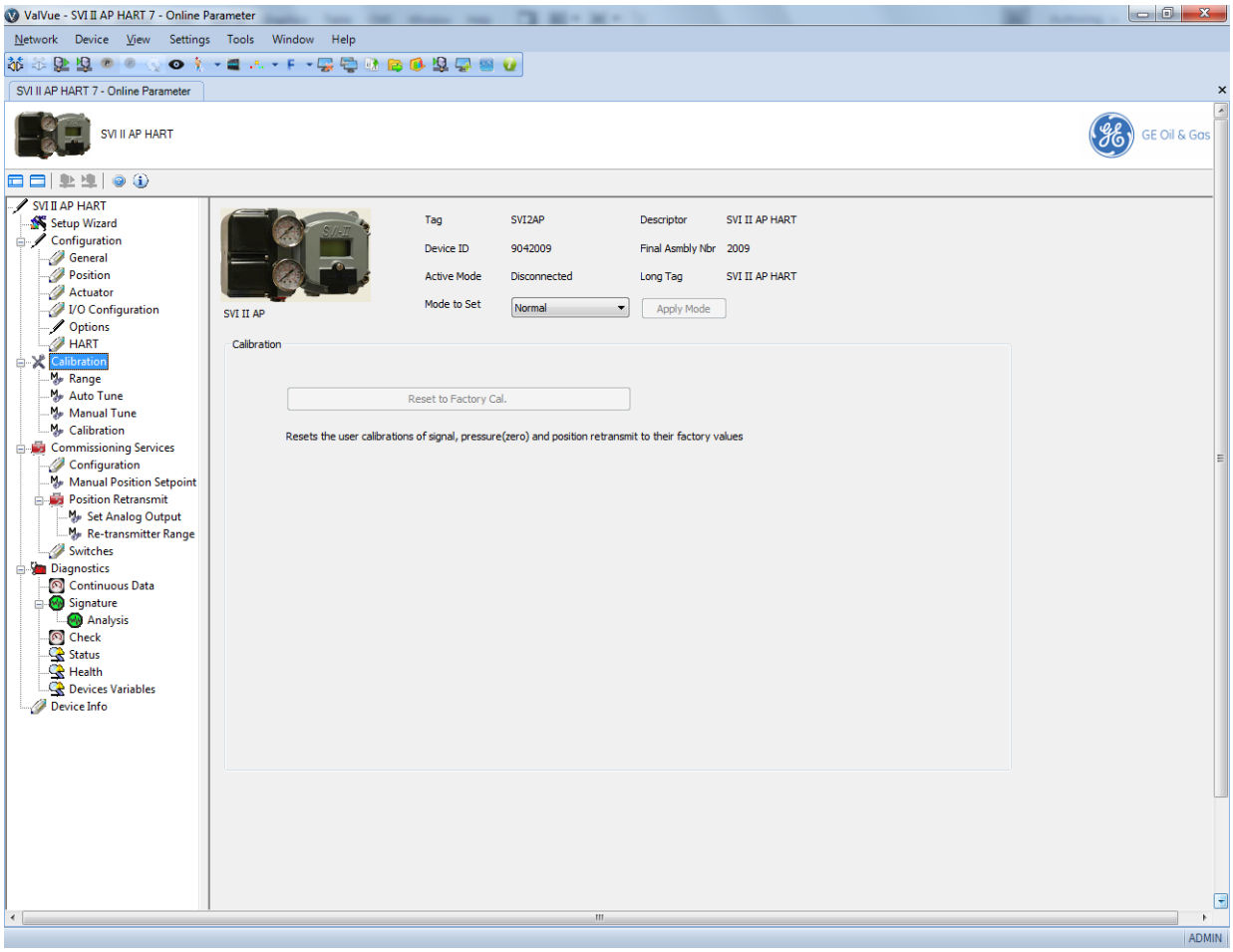


Figure 55 Calibration Screen

Buttons and Fields

Reset to Factory Cal.	Resets sensor data to factory defaults.

Calibration Range Screen

Use the *Calibration Range Screen* to perform valve tuning, including manual and automatic manual stops and open stop adjustment.

Automatic Find Stops

Use this screen to perform an automatic find stops procedure. This sets the calibration position of the valve at the fully vented position and at full supply pressure.

To determine valve position, the positioner must measure and save the closed and open positions of the valve. The SVI II AP first exhausts the actuator and measures the position, then fills the actuator and measures the position. From these measurements the valve position can be determined. Correction can be made for nominal valve travel if it is less than full travel. For double acting actuators, both ports are filled and exhausted.

Manual Stops

On some actuators, it is possible that the automatic Find Stops procedure will not find the correct end positions of the travel. A semi-automatic method of calibrating the stop positions is provided.

Manual Stops moves the valve to full closed and you respond when the valve reaches the closed position. The valve then moves to full open and you respond when the valve reaches the full open position.

For some valves where the travel exceeds the nominal travel of the valve, use open *Stop Adjustment* for details about how to trim the open stop.

Open Stop Adjustment

Recomputes the position scale so that at the value entered in the open stop adjustment edit box as a percent of full stops, the position reads 100%.

In some valves the travel exceeds the nominal valve travel. You can compensate for this so that the valve position reads 100% at the nominal travel.

Open Stop Adjustment Diagram shows how this works. This calibrates the position with the full travel of the valve.

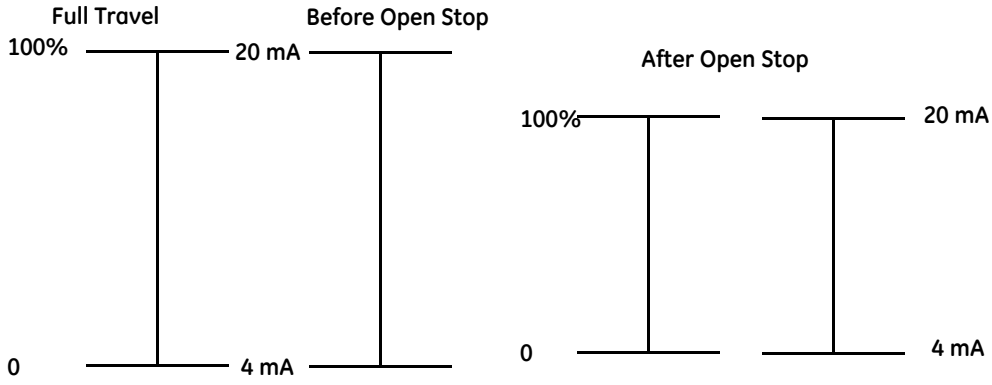


Figure 56 Open Stop Adjustment Diagram

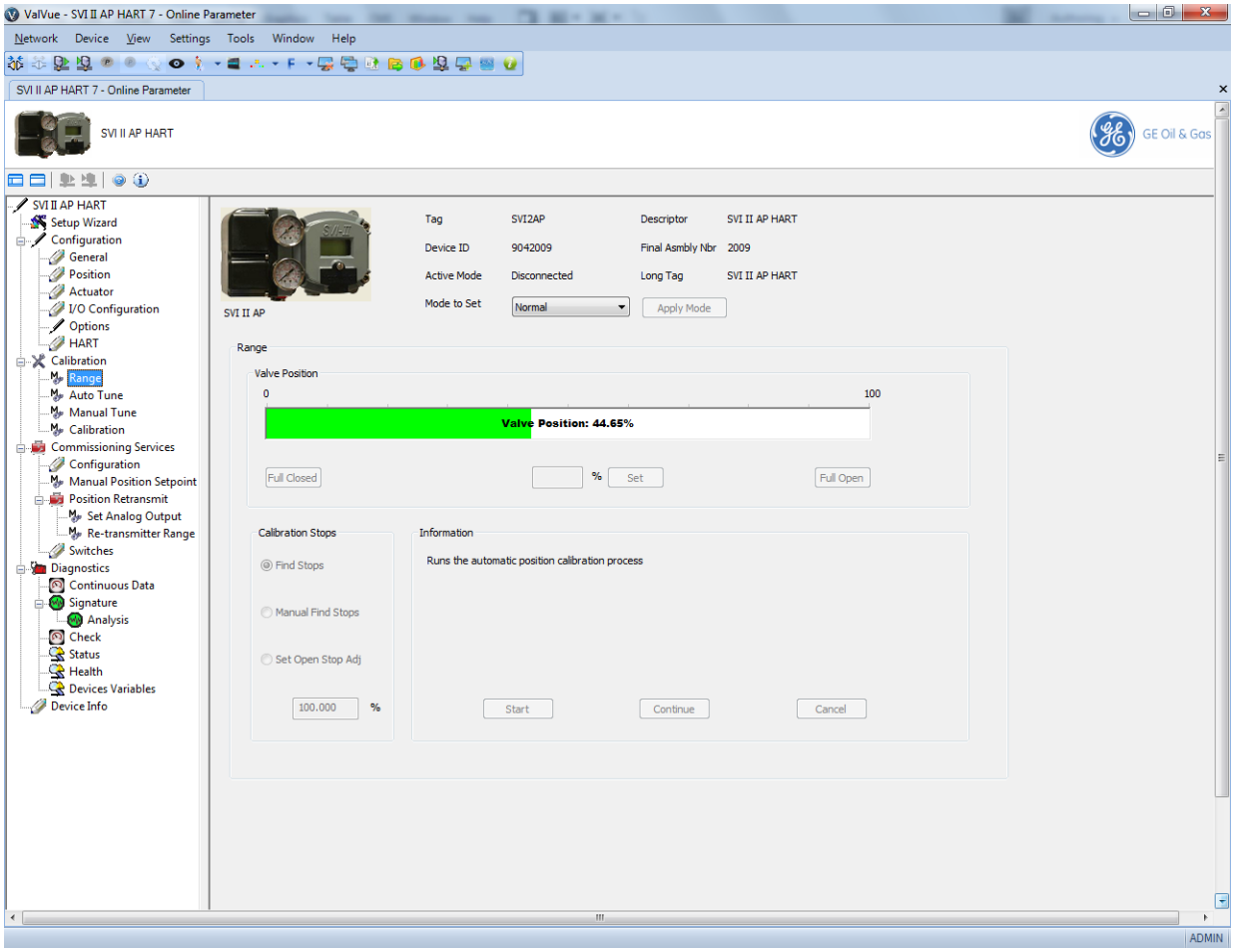


Figure 57 Calibration Range Screen

Buttons and Fields

Range

Valve Position indicator	Contains a center green bar showing the valve position. The numerical valve position appears in the center.
Full Closed button	Full Closed Moves the valve to fully closed.
Full Open button	Full Open Moves the valve to fully open.
Set button	Set Moves the valve to the percent open in the text field.

Calibration Stops

Find Stops	Runs an automatic find stops.

Manual Find Stops	Runs a manual find stops.
Set Open Stop Adj.	Sets this adjustment value. Enter the value and click **Start**. Recomputes the position scale so that at the value entered in the edit box, as a percent of full stops, the position reads 100%.

Run Manual Find Stops

WARNING

This procedure moves the valve. This results in loss of process control.

To run *Manual Find Stops*:

1. Place the system in *Setup* mode.
2. Click **Manual Find Stops**.
3. Click Start.

   A warning appears above.
4. Click Continue, wait until the valve is fully closed and click Continue.
5. Wait until the valve is fully open and click Continue.

Run Automatic Find Stops

WARNING

This procedure moves the valve. This results in loss of process control.

1. Place the system in *Setup* mode.
2. Click **Find Stops**.
3. Click Start and then Continue.
4. Click Continue and the procedure runs.

If the procedure fails, a list of possible reasons appears:

1. Troubleshoot these issues.
2. Reset the SVI II AP on the *Diagnostics* screen (“Diagnostics Screen” on page 111) and rerun the procedure.

Calibration Autotune Screen

Use the *Calibration Autotune Screen* screen to run autotune.

The SVI II AP has a built-in positioning Autotune feature. This feature automatically computes the optimal parameters for the positioning algorithm without requiring valve specific parameters for completion. The algorithm analyzes the dynamic behavior of the valve assembly, and determines optimal values for the tuning algorithm for tight and accurate position control.

Auto tune results appear after the process completes, and a graphical curve appears in the *Diagnostics Signature Analysis* screen

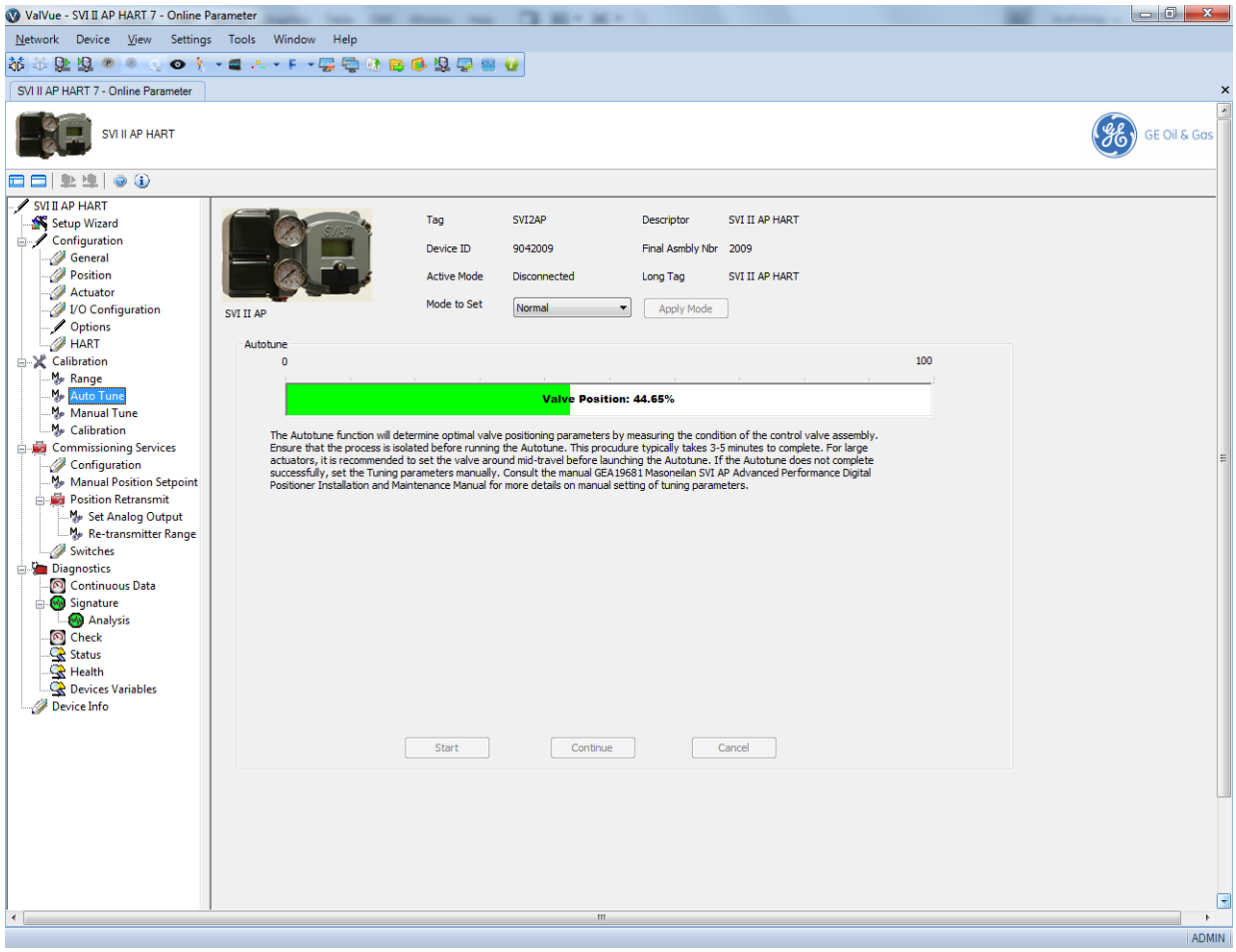


Figure 58 Calibration Autotune Screen

Run Autotune

WARNING

This procedure moves the valve. This results in loss of process control.

To run autotune:

1. Click Start and a warning appears.
2. Click Continue and *Calibration Aggressiveness Screen* appears.

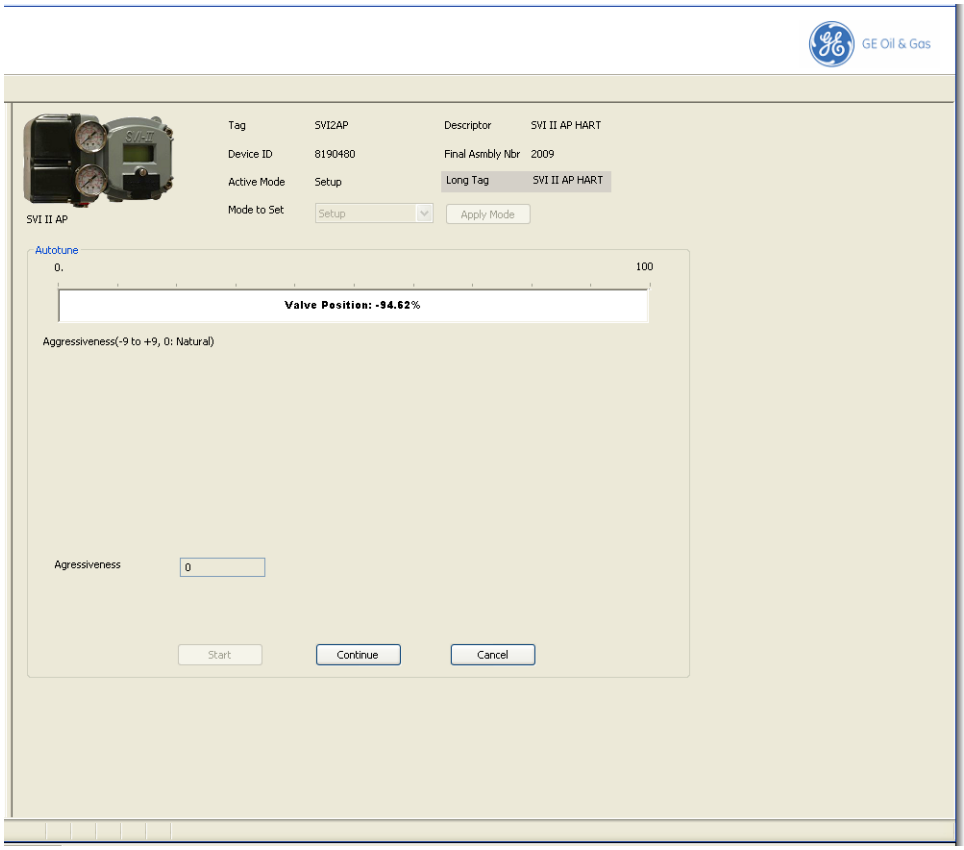


Figure 59 Calibration Aggressiveness Screen

3. Enter a number and click Continue and PID tuning runs.
4. Click Finished.

Calibration Manual Tune Screen

Use the *Calibration Manual Tune Screen* to enter manual tuning parameters and view the results of those parameters on the *Trend* display.

Additionally, this screen access the *Live Tuning* dialog (“Live Tuning” on page 93).

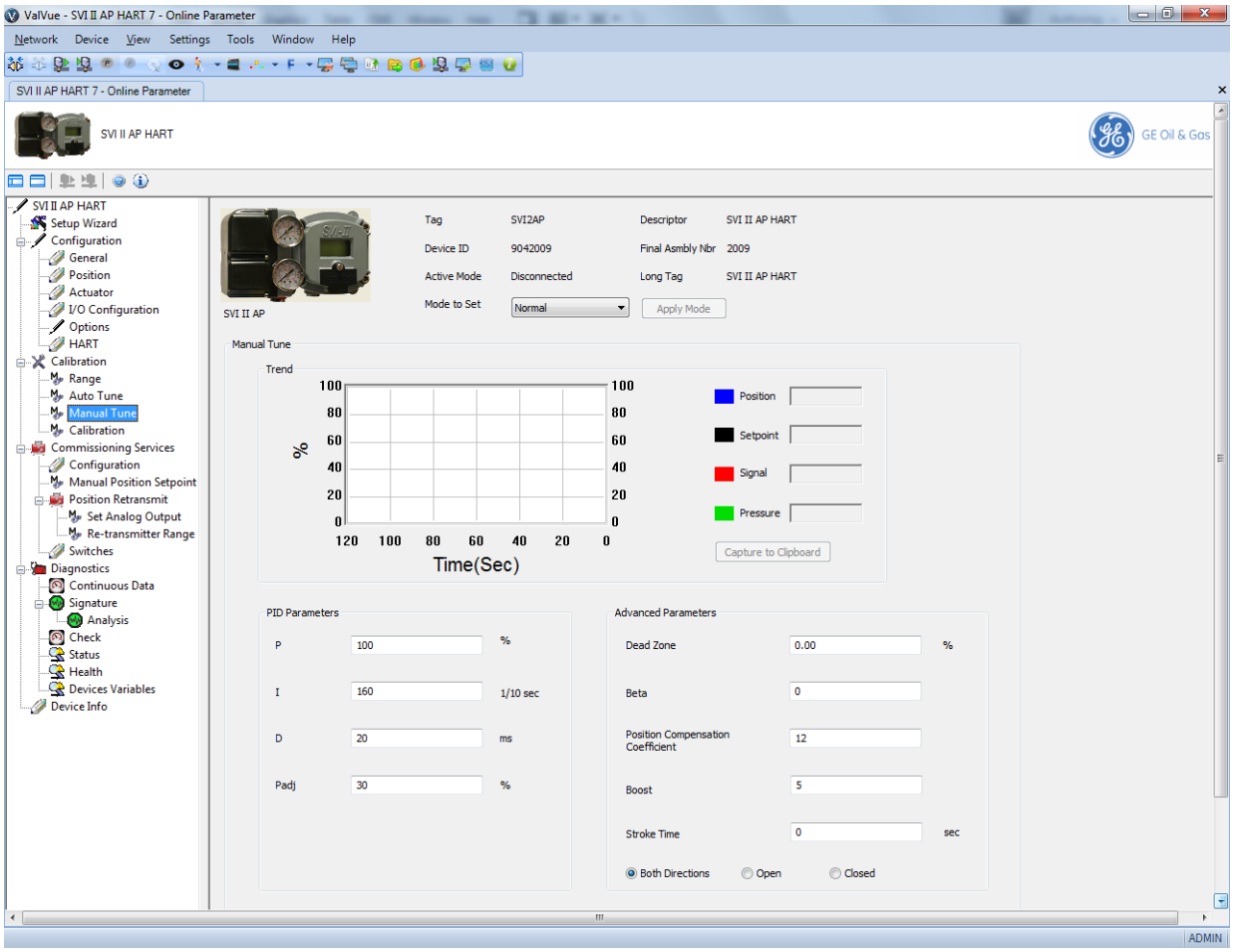


Figure 60 Calibration Manual Tune Screen

Buttons and Fields

Trend	See “Diagnostics Signature Screen” on page 114 for an explanation of functionality.
PID Parameters	
P	Proportional gain in %. Common values for the positioner are 0 for small valves up to 4000 for large valves.
I	Integral time or reset time in 1/10th sec, is the time constant of integral control. Higher values of I cause less integral action. *0* gives no integral action. Common values are 10 to 200.

D	Derivative time or rate time (msec) is the time constant of derivative control. Common values are 10 to 100.
Padj	Valves often have significantly different response when filling verses exhausting. The proportional gain is adjusted by adding *Padj* (%) to *P* when the valve is exhausting.
Live Tuning button	 click and the *Live Tuning Wizard* dialog appears.

Advanced Parameters

Dead Zone	When the valve position is within the setpoint +/- the dead zone, no additional position control is performed. This value is normally 0%, however for high friction valves (e.g. valves with graphite packing) a higher dead zone (%) helps avoid limit cycling due to the stick/slip action of the valve. In these cases the dead zone chosen might be 0.5% to 1%. Range: 0 to 5%.
Beta	This is a nonlinear gain factor, ranging from -9 to 9. When Beta is 0, the controller gain is linear. Otherwise, the gain is the function of error. The larger the beta, the smaller the gain for small error.
Position Compensation	The response of the valve is different when the valve is nearly closed than when the valve is nearly open. The position compensation coefficient, which is a number between 0 and 20, make adjustments to try to equalize the valve response. The normal value is 6. For springless actuators the value is 15.
Boost	This controls a supplemental pressure, or boost, to speed up initial valve response. This compensates for pneumatic deadband. Range: 0 to 20.
Stroke Time	Enter a time to limit the rate of change for travel (sec/100% of travel). This prevents the valve from slamming open or shut.
Both Direction	Click this button to apply *Stroke Time* to both valve directions.
Open	Click this button to apply *Stroke Time* to valve open only.
Close	Click this button to apply *Stroke Time* to valve close only.

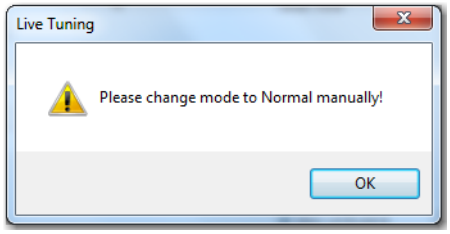
Live Tuning

In Normal mode, experienced users can tune PID parameters live. *Only experienced users should use this feature.*

To avoid process disturbance, this dialog limits the change in each parameter to ±20% of the original value.

CAUTION

If the mode cannot automatically be changed back to Normal, a dialog appears instructing you to change the mode.



To do this:

1. Click Live Tuning and the *Live Tuning Wizard* dialog appears.

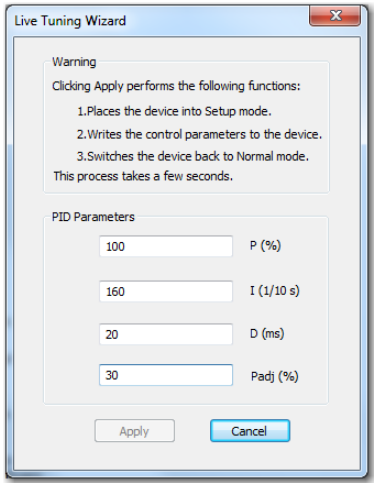


Figure 61 Live Tuning Wizard

2. Configure the desired parameters and click **Apply**. The dialog closes and the parameters are applied.

Calibration Calibration Screen

Use *Calibration Calibration Tune Screen* to calibrate pressure and input signals.

NOTE

Prior to performing pressure calibration all air must be turned off and all pressures vented. This procedure references a measuring instrument capable of reading +/- 0.01 psig.

Use this screen to recalibrate the pressure or signal sensor in the SVI II AP. The sensor is calibrated at the factory and does not usually require recalibration, but if needed, this dialog provides a convenient method.

The currently measured value of pressure or signal is displayed and can be compared to reference pressures to see if recalibration is necessary.

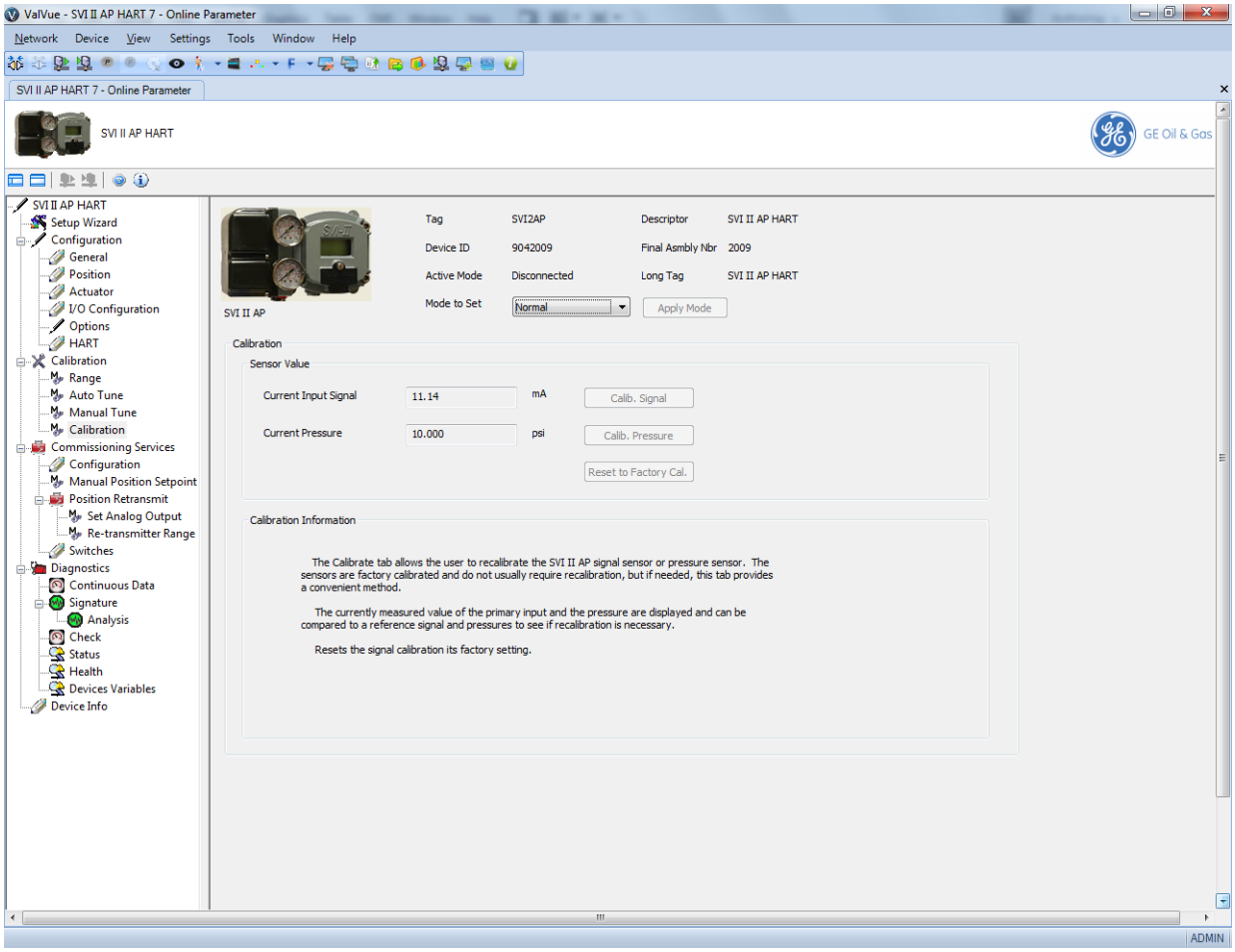


Figure 62 Calibration Calibration Tune Screen

Buttons and Fields

Sensor Value	
Current Input Signal	Displays the current system input signal.
Current Pressure	Displays the current system input pressure.
Calib. Signal button	 Click this to perform an automatic signal calibration.
Calib. Pressure button	 Click this to perform an automatic pressure calibration.
Reset to Factory Cal. button	 Resets the sensor and calibration values to factory defaults.

Calibrate Input Signal

To do this:

1. Click Calib. Signal and the lower screen changes to *Calibration Calibration Screen with Calibration Information Pane*.

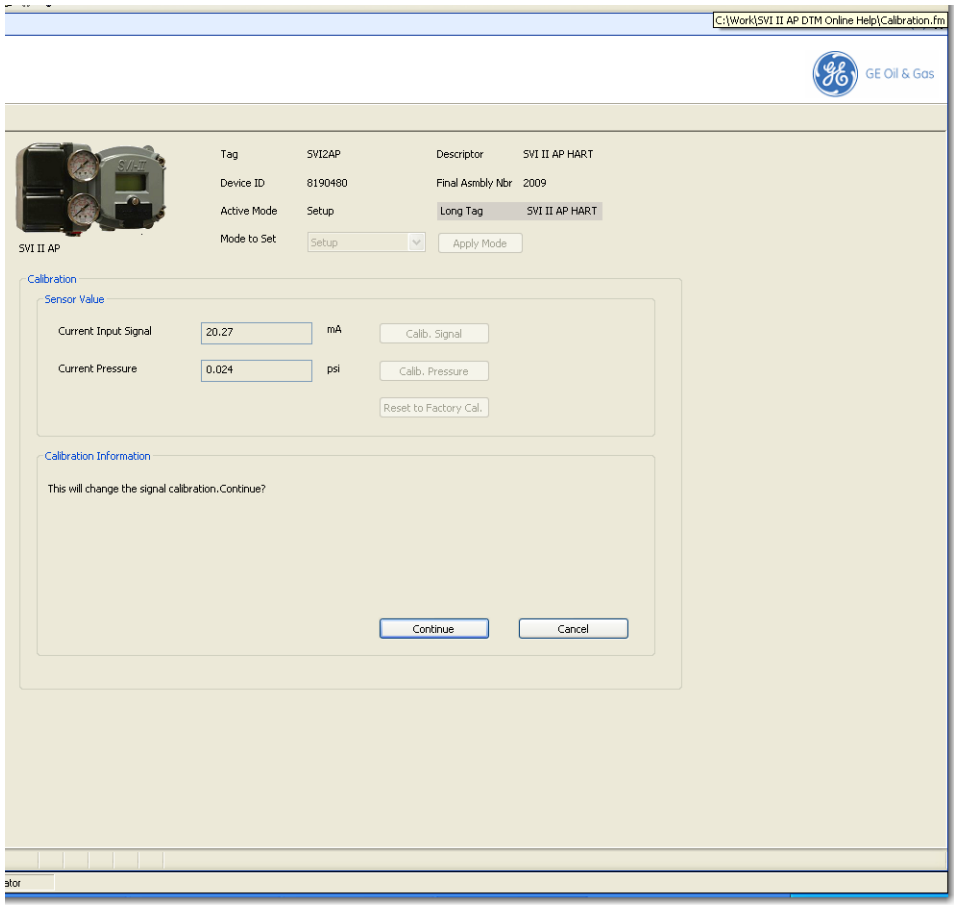


Figure 63 Calibration Calibration Screen with Calibration Information Pane

2. Click Continue and *Calibration Calibration Screen with Calibration Information Pane - Input Signal*appears.

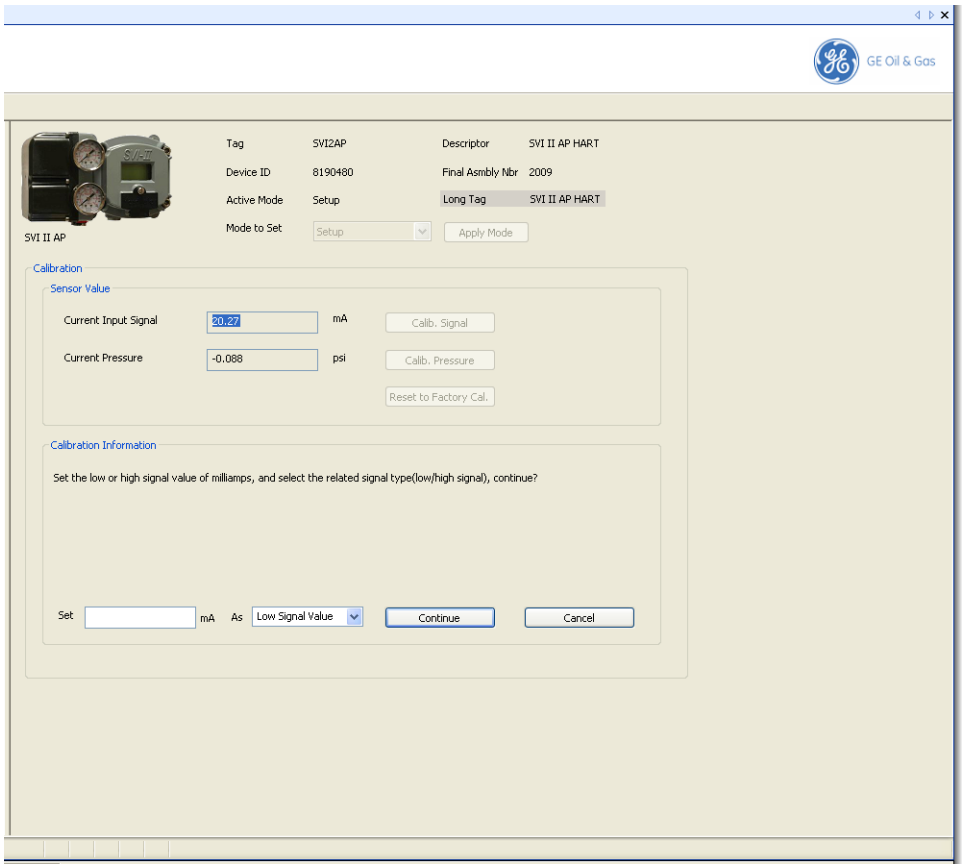


Figure 64 Calibration Calibration Screen with Calibration Information Pane - Input Signal

3. Enter either a value and use the *As* pulldown to select **Low Signal Value** or **High Signal Value**, click Continue and if a valid value is used *Calibration has been changed* appears.
4. Click Continue.

Calibrate Pressure

To do this:

1. Click Calib. Pressure and the lower screen changes to *Calibration Calibration Screen with Calibration Information Pane*.

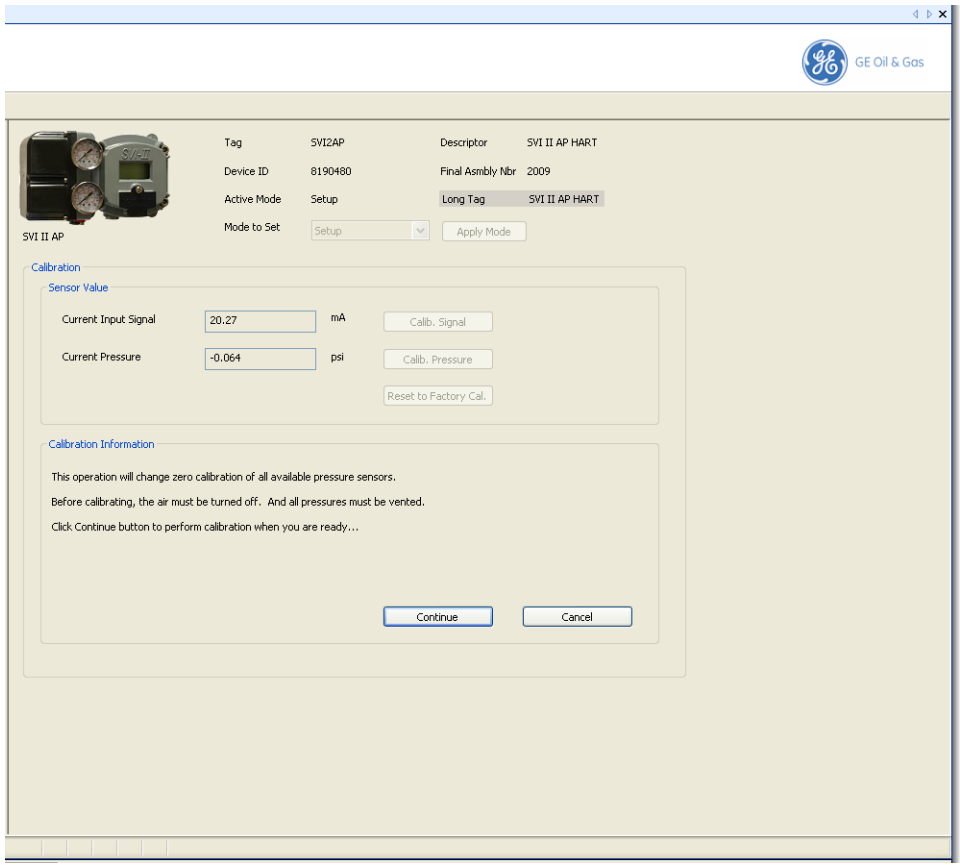


Figure 65 Calibration Calibration Screen with Calibration Information Pane - Pressure

2. Turn off the air supply and wait until the valve pressure falls to zero.
3. Click Continue and *Calibration has been changed* appears.
4. Click Continue.

Reset to Factory Cal

To do this:

1. Click Reset to Factory Cal. and the lower screen changes to *Calibration Calibration Screen with Calibration Information Pane*.

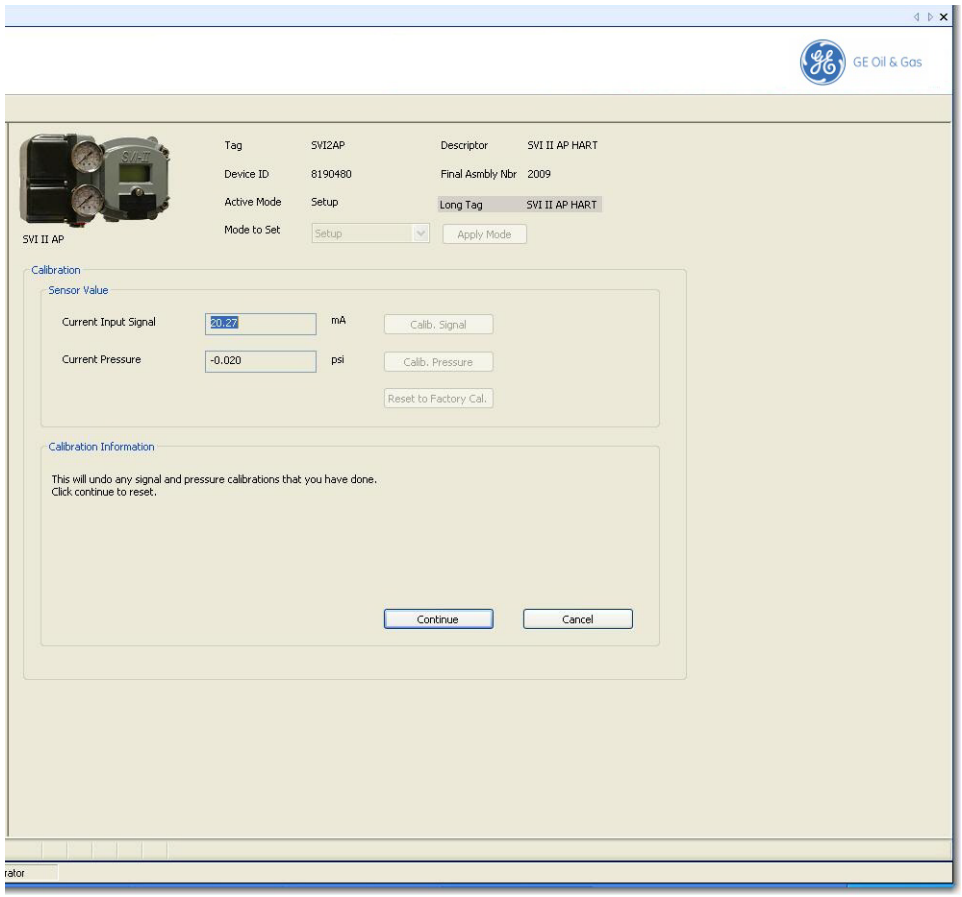


Figure 66 Calibration Calibration Screen with Calibration Information Pane - Factory Cal

2. Click Continue and *Calibration has been reset* appears.

3. Click Continue.

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12. Commissioning

Commissioning Services Screen

Use the *Commissioning Services Screen* to monitor all pressures on one screen.

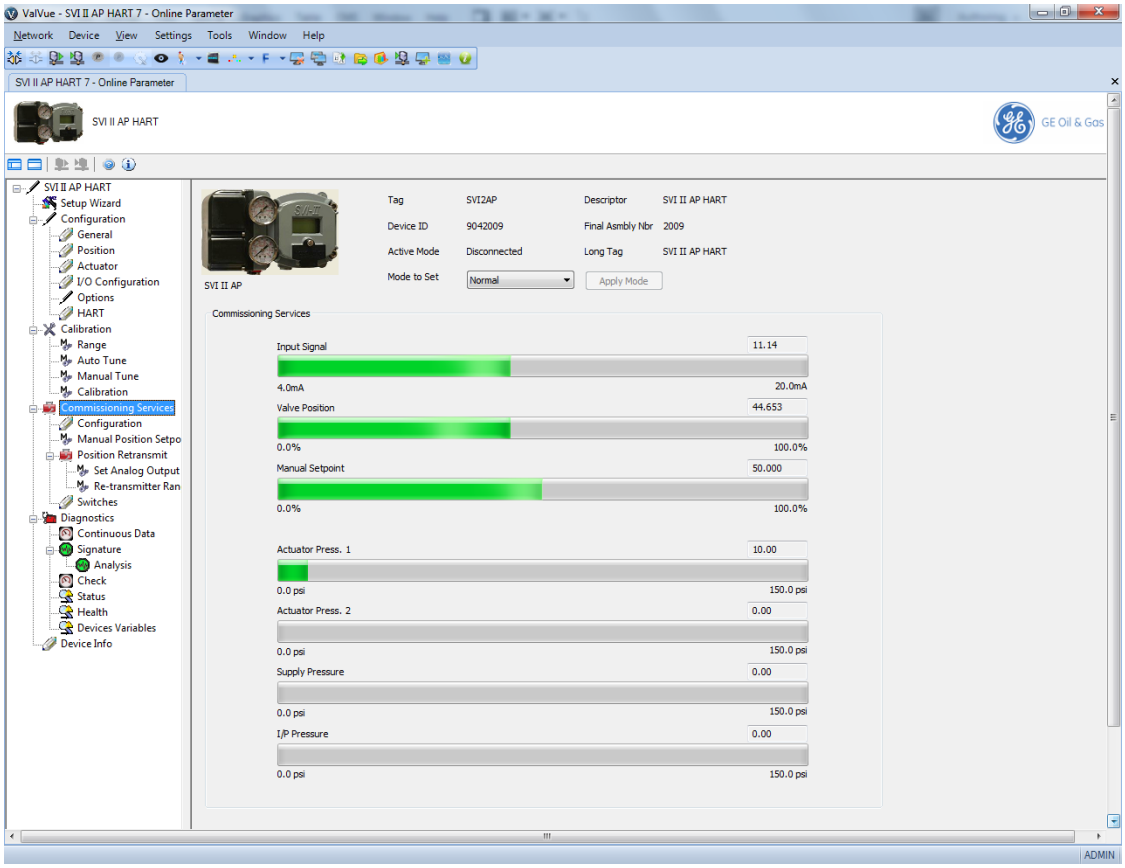


Figure 67 Commissioning Services Screen

Buttons and Fields

Input Signal	Displays the input signal strength in mA as a bar graph and in a text box. The signal strength appears on the bar graph and the in the text box. The range at the bottom is set on the *Configuration* screen ("Configuration" on page 63).
Valve Position	Displays the valve position as a bar graph and in a text box. The position from 0 to 100% percent appears on the bar graph and the user-configured limit appears in the text box, The range at the bottom is set on the *Configuration* screen ("Configuration" on page 63).
Manual Setpoint	Displays the *Manual Setpoint* set on the *Manual Position Setpoint* screen ("Commissioning Services Manual Position Setpoint Screen" on page 104). The value from 0 to 100% percent appears on the bar graph and the user-configured limit appears in the text box.
Actuator Press. 1/Actuator Press. 2	Displays the actuator pressures in a bar graph and text field. These characteristics change depending on whether the valve is single or double acting. If your unit is: □ Single acting, *Actuator Press. 1* shows the pressure and the other is grayed out. □ Double acting, both actuator pressures appear. In both cases it displays the sensor pressure read as a bar graph and in a text box.
Supply Pressure	Displays the pressure generated by the air supply in a bar graph and text box.
I/P Pressure	Displays the pressure generated by the I/P in a bar graph and text box.

Commissioning Services Configuration Screen

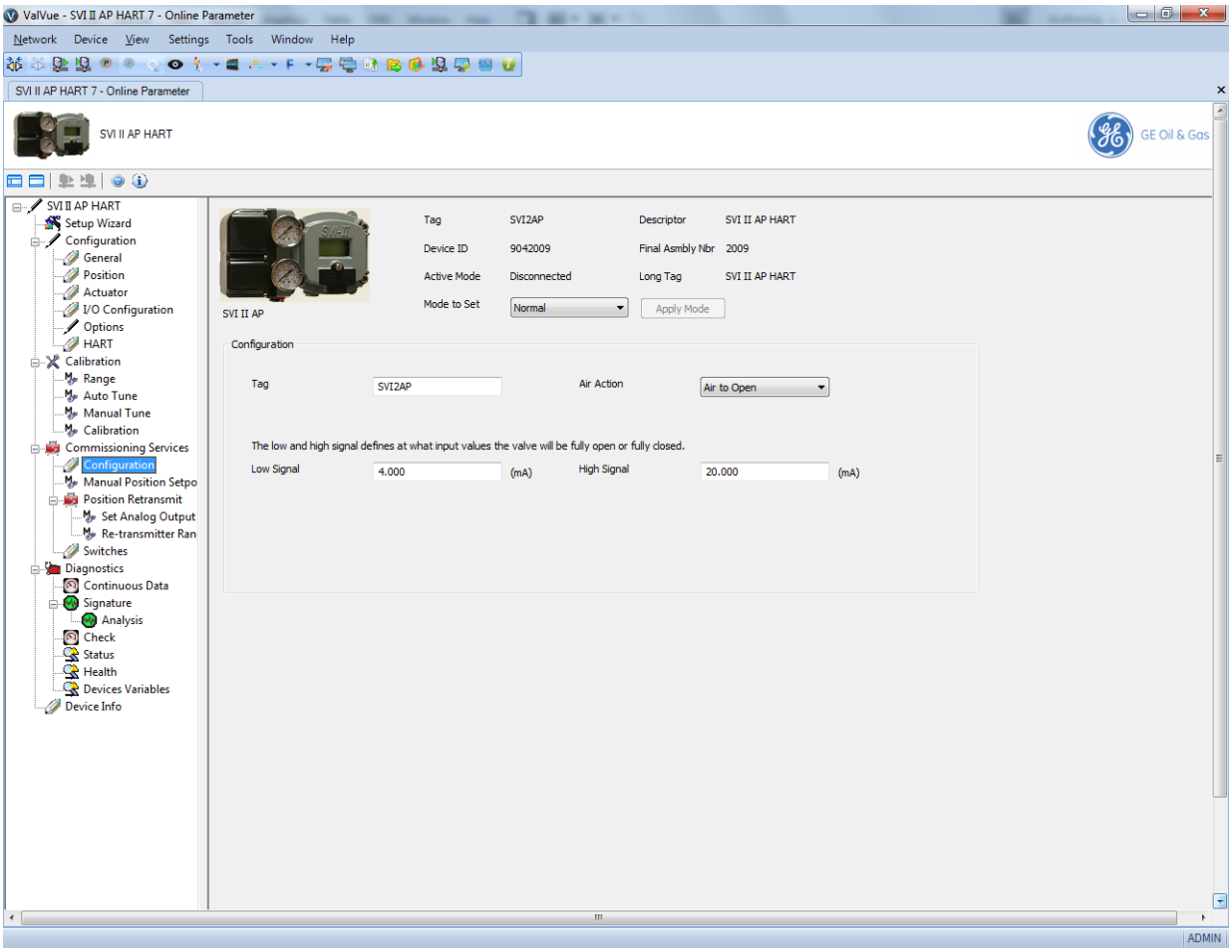


Figure 68 Commissioning Services Configuration Screen

Buttons and Fields

Tag	Enter up to eight characters long and is used to identify the positioner in the system and appears throughout the program.
Air Action	A pulldown list for selecting the valve action.
Low Signal	Enter the lower range value of input signal for valve closed (direct acting) or valve open (reverse acting). Range: 3.8 mA and 14 mA.
High Signal	Enter the high range value of input signal for valve closed (direct acting) or valve open (reverse acting). Range: 8 mA and 20.2 mA. *High Signal - Low Signal* > 5 mA.

Commissioning Services Manual Position Setpoint Screen

Use the *Commissioning Services Manual Position Setpoint Screen* screen to fully open the valve, fully close the valve or use the *Manual Setpoint* feature to input a setpoint in percentage of valve position or in signal range (mA).

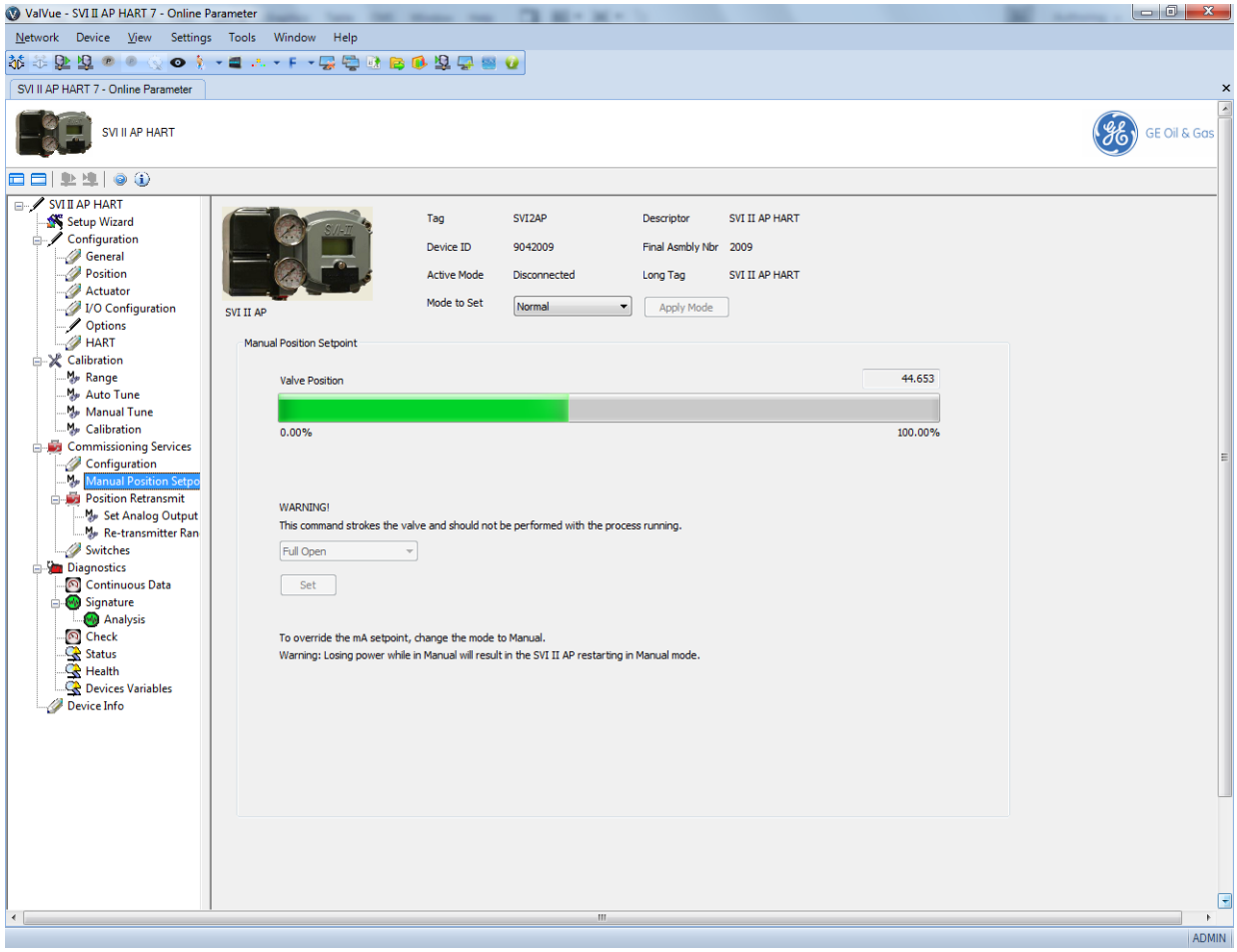
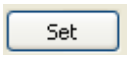


Figure 69 Commissioning Services Manual Position Setpoint Screen

Buttons and Fields

Valve Position	Displays the valve position in a display bar and in a text field. the bar displays up to 100% of configured travel range. The text box displays the actual percentage. For example, if the valve is configured to travel 113% and it is at maximum travel, 113% appears.
Full Open	Use the pulldown to select this fully open the valve. This command takes the valve out of closed loop control and sends a high or low signal to the I/P. This is available only in Manual or Setup mode.

Full Closed	Use the pulldown to select this fully close the valve. This takes the valve out of closed loop control and sends a high or low signal to the I/P. This is available only in Manual or Setup mode.
Manual Setpoint	Enter a value for the manual setpoint and click one of the button to the right. This is available in Setup and Manual mode. Range -5% and 160% or 4 mA to 20 mA. To override this setting change the mode to Setup or Manual.
Set Valve Position in %	Click and text field that appears. Enter a value and click **Set**.
Set Valve Position in mA	Click and text field that appears. Enter a value and click **Set**.
Set button	 Sets the configured items to the positioner.

Commissioning Services Position Retransmit Screen

The *Commissioning Services Position Retransmit Screen* shows a diagram of the SVI II AP board to show the Position Retransmit Wire Loop.

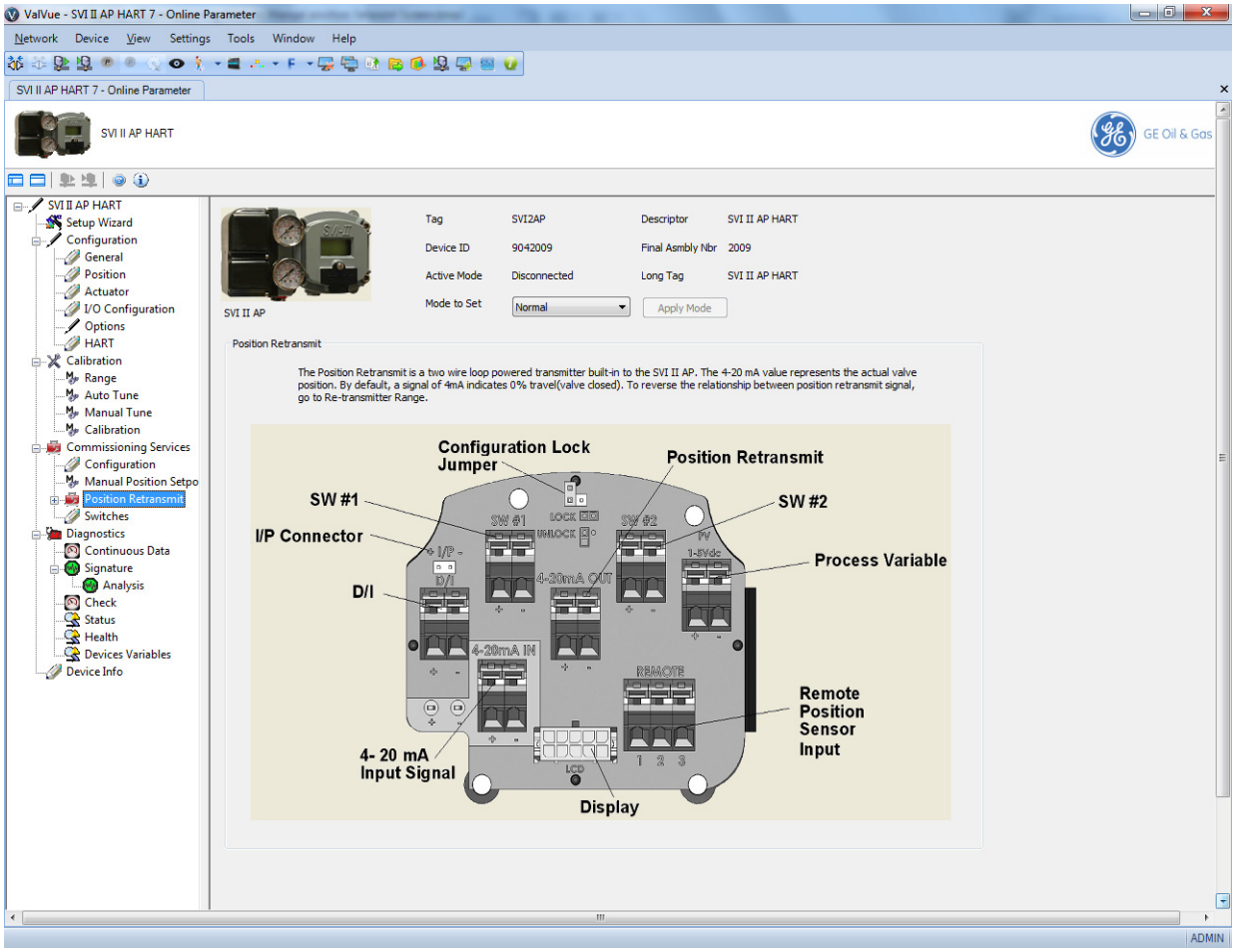


Figure 70 Commissioning Services Position Retransmit Screen

Commissioning Services Set Analog Output Screen

Use the *Commissioning Services Set Analog Output Screen* to set a fixed analog output for the position retransmitter for a loop wire check.

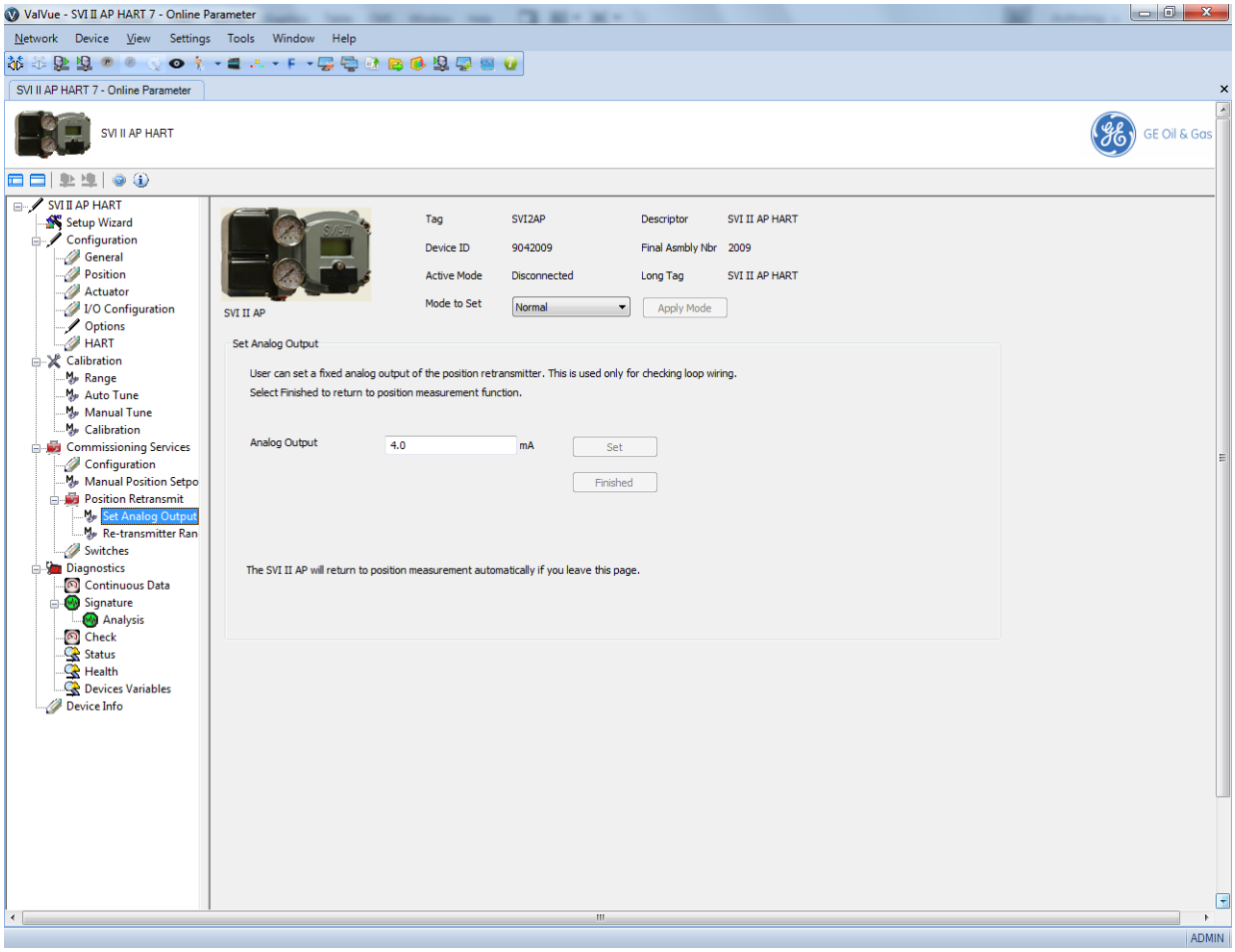


Figure 71 Commissioning Services Set Analog Output Screen

Buttons and Fields

Analog Output	Enter a fixed value for the position retransmitter. Enter *0* to place the transmitter out of the fixed output mode.
Set button	Set Click to set the value for the loop test.
Finished button	Finished Click to place the system back into position measurement mode.

Commissioning Services Re-transmitter Range Screen

The valve position is designed to be closed at 4 mA and open at 20 mA. If this is not occurring, use the *Commissioning Services Re-transmitter Range Screen* to change the relationship valve position transmitter output and the valve opening.

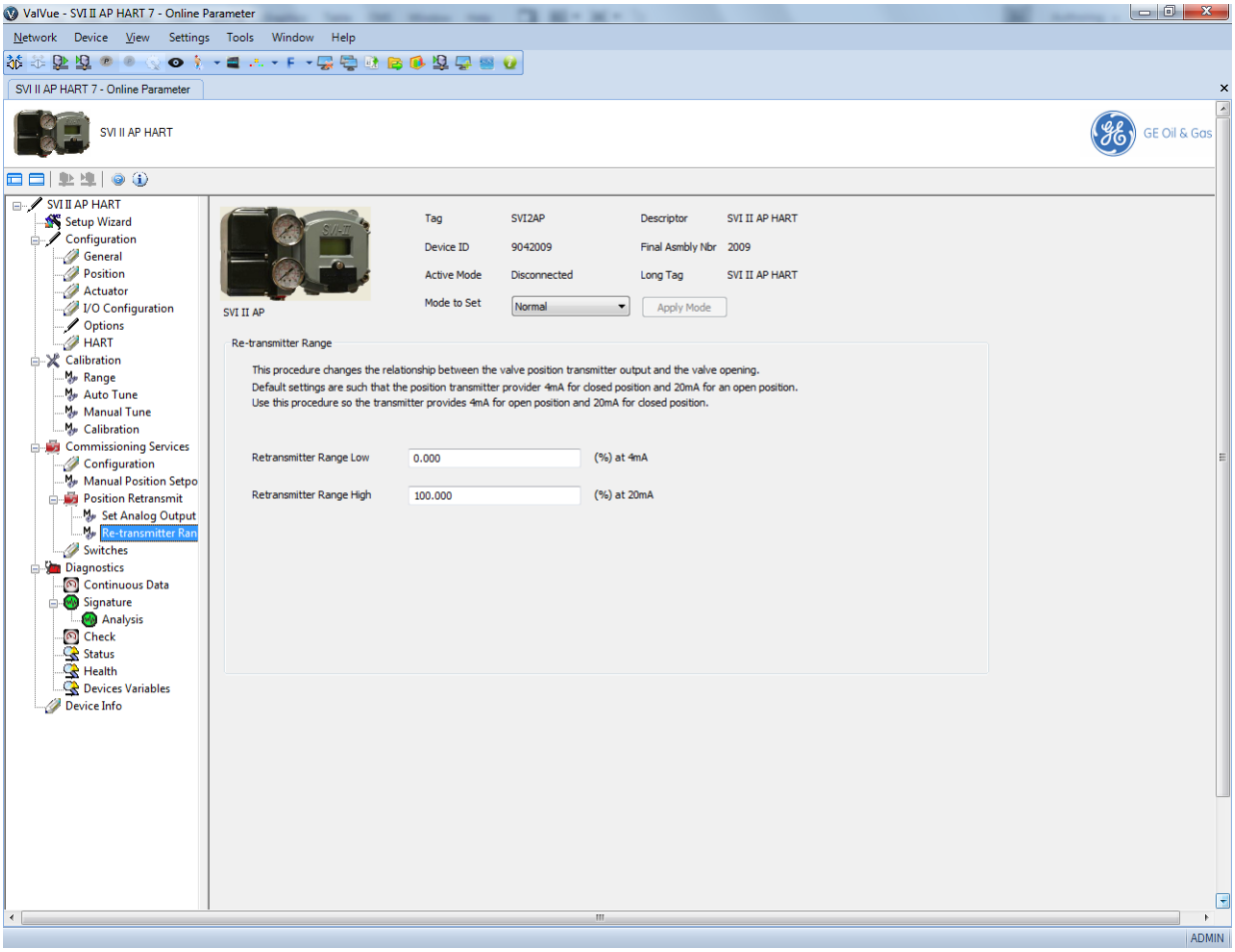


Figure 72 Commissioning Services Re-transmitter Range Screen

Buttons and Fields

Retransmitter Range Low	Enter a position for the valve in percent for the closed (4 mA) position.
Retransmitter Range High	Enter a position for the valve in percent for the open (20 mA) position.

Commissioning Services Switches Screen

Use the *Commissioning Services Switches Screen* to set the default operating position for the switches.

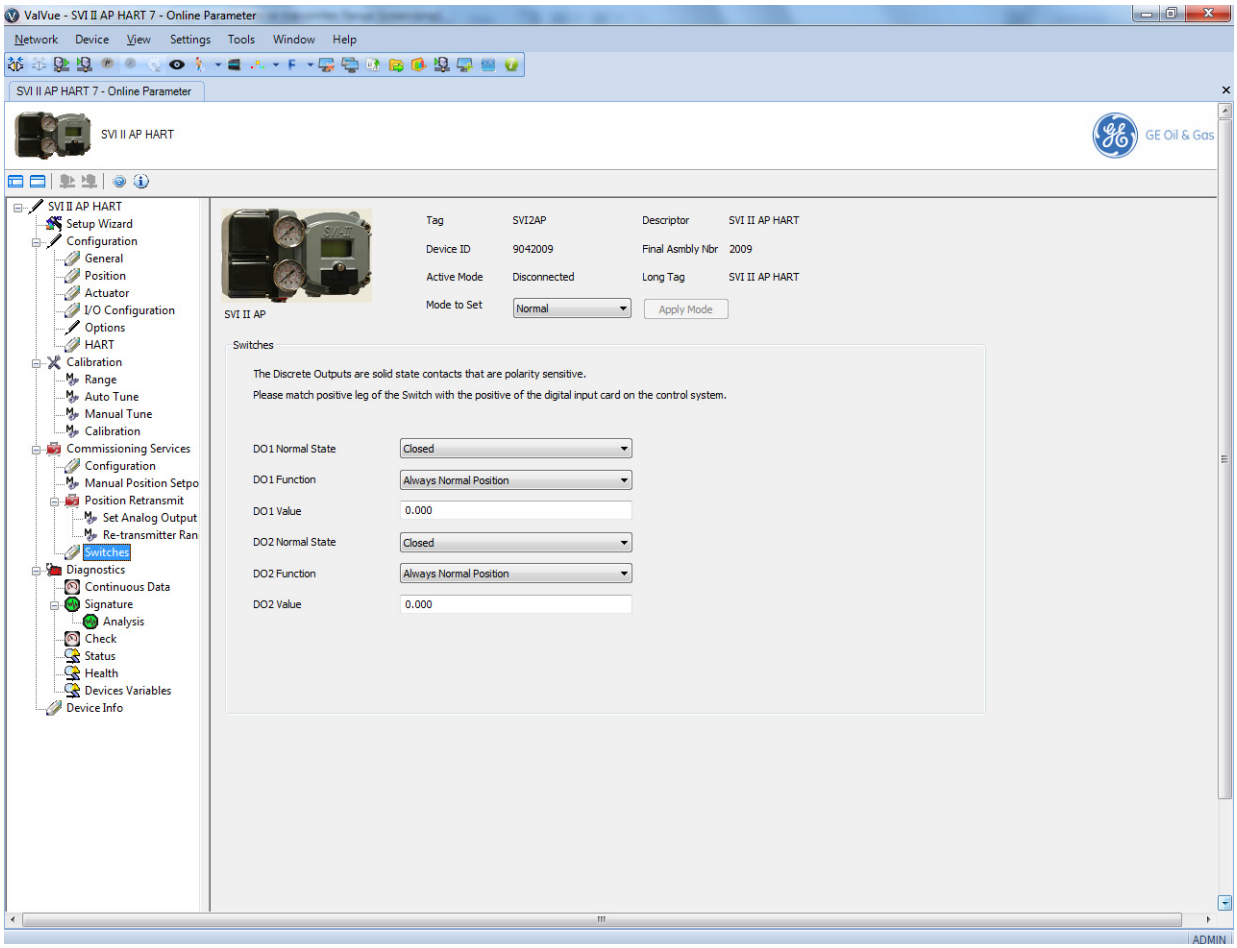


Figure 73 Commissioning Services Switches Screen

Buttons and Fields

NOTE

The contacts are OPEN when the SVI II AP is unpowered and may be made to be open or closed when the flag is asserted after boot.

DO1 Normal State/DO2 Normal State

The SVI II AP supports two identical contact outputs which can be logically linked to status bits. The two output switches can be opened or closed in response to conditions that the SVI II AP detects.

DO1 Function/ DO2 Function

Use this pulldown to select the type of action:

- *Always Normal Position* - The switch is not controlled by the SVI II AP and remains in it's default position. The two digital output switches can be opened or closed in response to detected conditions. The default configuration setting is *Always Normal Position*, where normal is closed, which means that the switch will not switch for any valve travel. To activate the switch at a given valve position, configure the switch *Position Low Limit* or *Position High Limit*.
- *Failsafe* - The switch is activated when the SVI II AP is in Failsafe mode
- *Reset* - The switch is activated whenever a reset has occurred and the switch remains activated until the SVI II AP status is cleared
- *Position Error* - The switch is activated whenever a position error has occurred and is deactivated when the position recovers to the correct position
- *Tight Shutoff Active* - The switch is activated whenever the device is in tight shutoff (tight shutoff is on and the valve position is less than the tight shutoff position).
- *Position Low Limit* - The switch is activated whenever the valve position is less than the position setting of this switch control.
- *Position Upper Limit* - The switch is activated whenever the valve position is greater than the position setting of this switch control.
- *Manual Mode* - The switch is activated whenever the SVI II AP is in Manual, or Setup mode.

CAUTION

*If both Position Low Limit and Tight Shut Off are used, the Position Low Limit **must** be above the Tight Shut Off.*

*If both Position High Limit and Full Open Above are used, the Position High Limit **must** be below the Full Open Above.*

DO1 Value/ DO2 Value

Use this to set the switch position limit.

13. Diagnostics

Diagnostics Screen

Use the *Diagnostics Screen* to perform a device reboot of the SVI II AP.

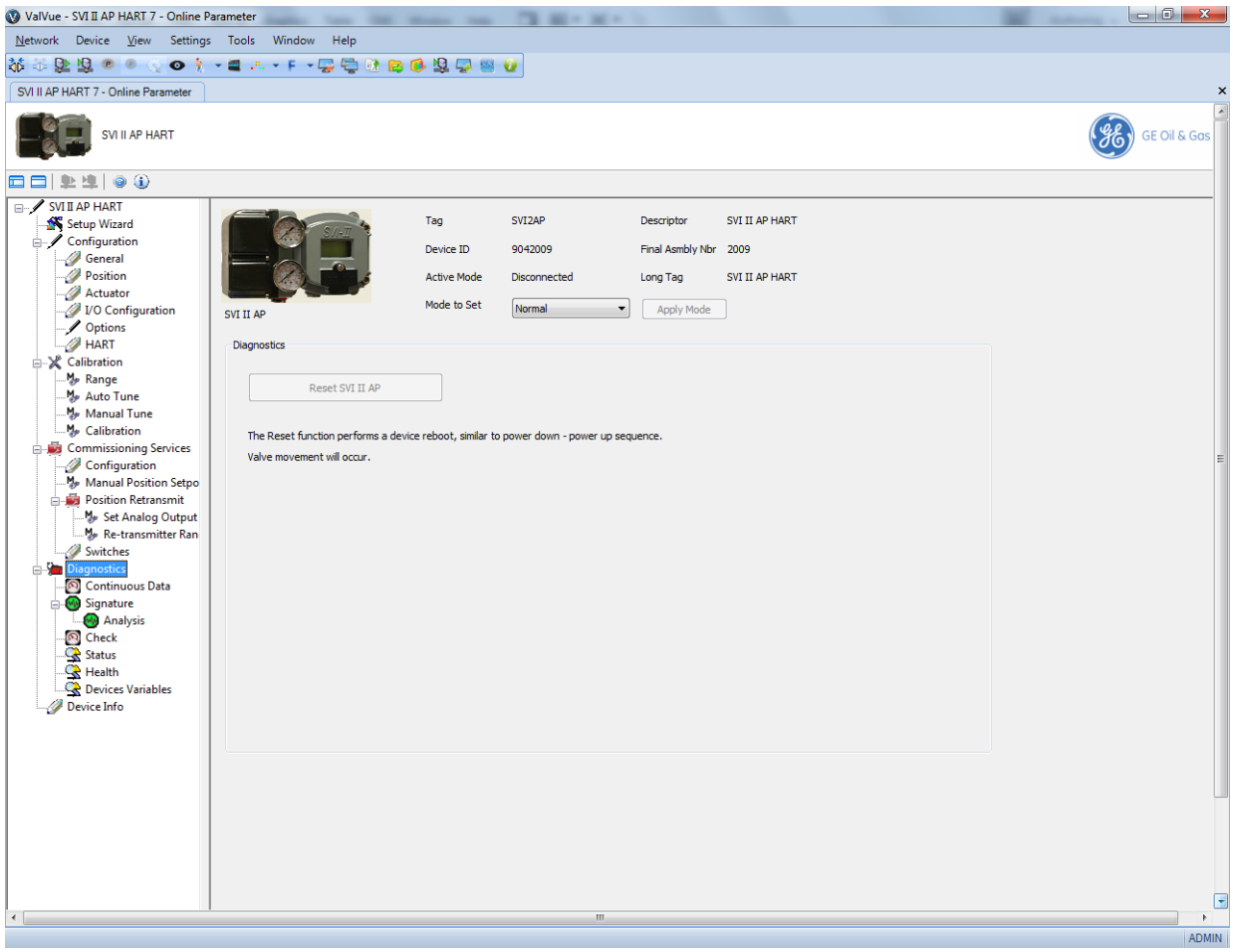
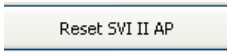


Figure 74 Diagnostics Screen

Buttons and Fields

Reset SVI II AP button — 

Click this to reset the SVI II AP.

Diagnostics Continuous Diagnostics Data Screen

Use the *Diagnostics Continuous Diagnostics Data Screen* to view data about valve operations at closing and opening, which useful in valve operation analysis.

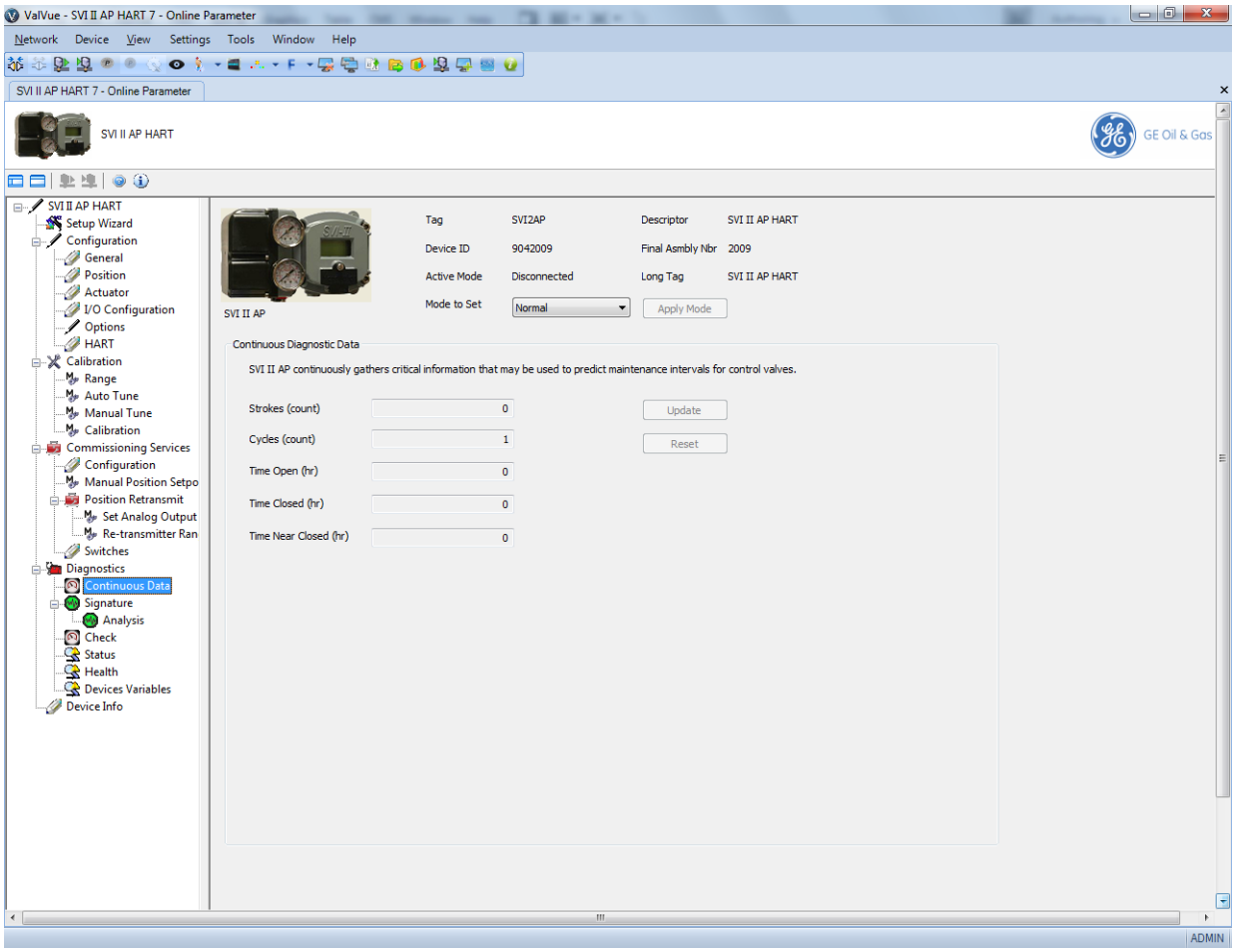


Figure 75 Diagnostics Continuous Diagnostics Data Screen

Buttons and Fields

Strokes	Displays the number of strokes.
Cycles	Displays the number of cycles.
Time Open (hr)	Displays the total open time in hours on the bar graph and in the text box.
Time Closed (hr)	Displays the total closed time in hours on the bar graph and in the text box.
Time Near Closed (hr)	Displays the total near closed time in hours on the bar graph and in the text box.

Update button		Click this to read the screen values from the positioner.
Reset button		Click this to reset all historian values to zero.

Diagnostics Signature Screen

Use the *Diagnostics Signature Screen* to perform diagnostic tests, and displays test results in the *Observer* window. Additionally, valve parameters including, *Position*, *Setpoint*, *Signal* and *Pressure* appear for reference.

From the *Diagnostics Signature* screen you can run Standard Actuator Signature tests, Step Response tests, Ramp tests, and Extended Actuator Signature tests.

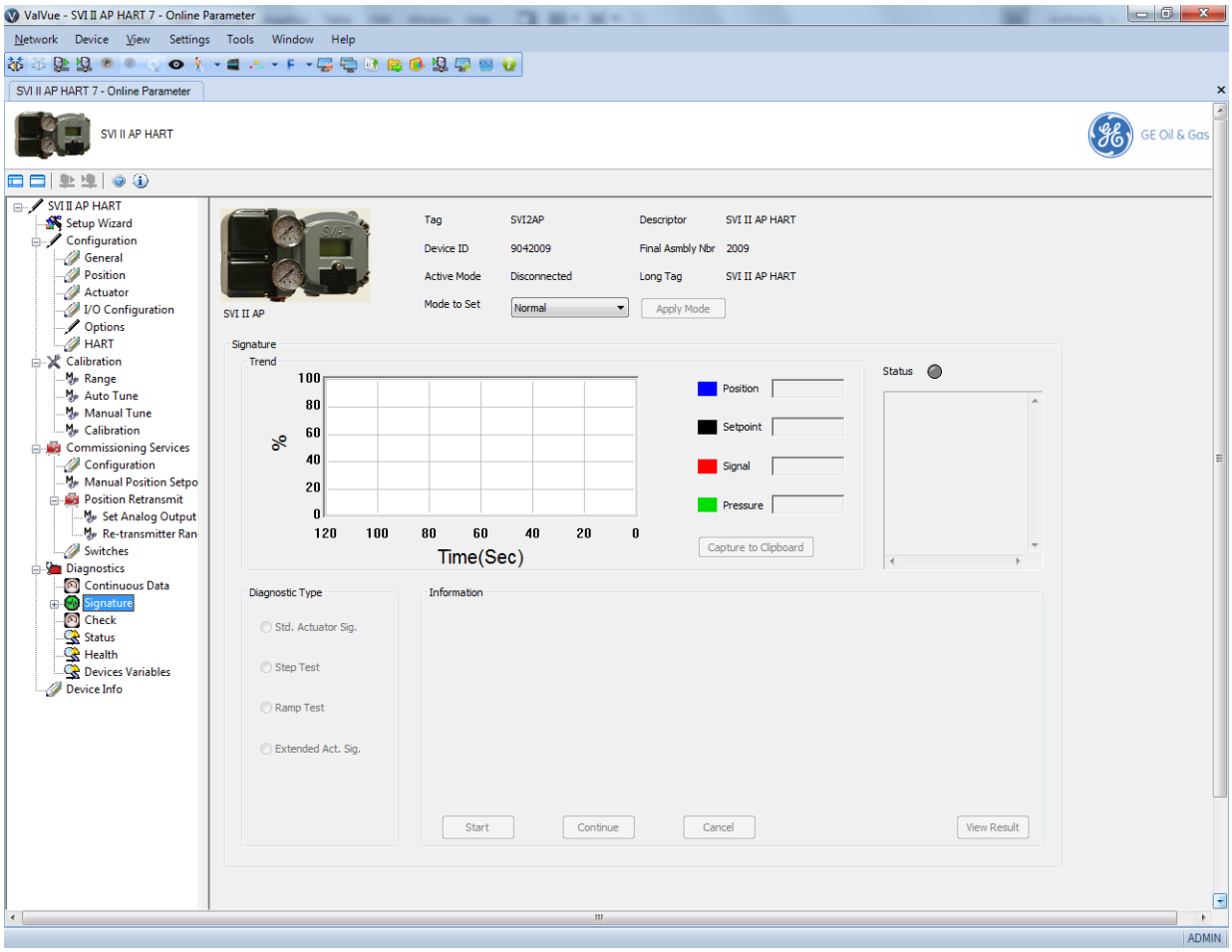
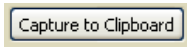


Figure 76 Diagnostics Signature Screen

Buttons and Fields

Observer	The graph displays these curves by color: ☐ *Position* - blue ☐ *Setpoint* - black ☐ *Signal* - red ☐ *Pressure* - green Zoom the graph by clicking in the graph and dragging an area. Unzoom by right-clicking in the graph.
Capture to Clipboard	 Captures the displayed curves to the Windows® clipboard.
Position	Displays the position of the valve is in percentage of valve opening. 0% is always closed and 100% is open. Because the travel of a valve may exceed its nominal travel, positions greater than 100% are possible.
Setpoint	Displays the percentage of setpoint that is read.
Signal	Indicates the input analog signal expressed in % of the configured signal range.
Pressure	Displays the pressure read by the sensor.
Status	Displays messages related to the test progress.
Diagnostic Type	A list of radio buttons to select the test type to run: ☐ *Std. Actuator Sig.* ☐ *Step Test* ☐ *Ramp Test* ☐ *Ext. Actuator Sig.*
Information	Displays information and operational button dictated by the test selected. Refer to the individual tests for detailed information.
Speed Level	Appears for a *Std. Actuator Sig.*and *Ext. Actuator Sig* test. The speed level is the rate of speed at which the test is performed, *1* is the slowest and *10* the fastest. The default speed level is 4.
Start Position (%)	Appears for a *Step Test* and *Ext. Actuator Sig*. Enter the start position for the step test as percentage of valve open.
Stop Position (%)	Appears for a *Step Test* and *Ext. Actuator Sig* only. Enter the stop position for the step test as percentage of valve open.
Time (s)	Appears for a *Step Test* only. Enter the time for each step. The SVI II AP measures the position at even time interval for the this amount of time.
Sample Rate (samples/s)	Appears for a *Step Test* only. Enter the number of samples to take per second. A higher rate produces a graph with more data points. This extends the test time.
Step Size (%)	Appears for a *Step Test* only. Enter the step size as a percentage for the valve to move within the overall range specified as *Start Position - Stop Position*.

One Way/Two Way	Appears for a *Step Test* only. Click a button to determine if the test is for open or open and close.
Start Signal (mA)	Appears for a *Ramp Test* only. Enter the mA from which to start the test.
Stop Signal (mA)	Appears for a *Ramp Test* only. Enter the mA where the test ceases.
Number of Samples	Appears for a *Ramp Test* only. Enter the number of samples to take per test. A higher rate produces a graph with more data points. This extends the test time.
View Result button	View Result Click this to view the result of the test in the *Analysis* screen (see "Diagnostics Signature Analysis Screen" on page 122).

Perform a Std. Actuator Sig. Test

The *Standard Actuator Signature* test is a response time test that measures the time for the valve to go from full closed to full open and the time for the valve to go from full open to full closed. For an SVI II AP/AD this test measures the friction, spring range and response time.

During the *Standard Actuator Signature* test the positioner is slowly moved from the starting position to the ending position and back and the two curves (up and down) are measured and displayed in the *Observer* graph.

To perform this test:

WARNING

This procedure moves the valve. This results in loss of process control.

1. Ensure the system is in Setup mode.
2. Click **Std. Actuator Sig.** and the *Speed Level* field appears in the *Information* area (*Information Field - Standard Actuator Test*).

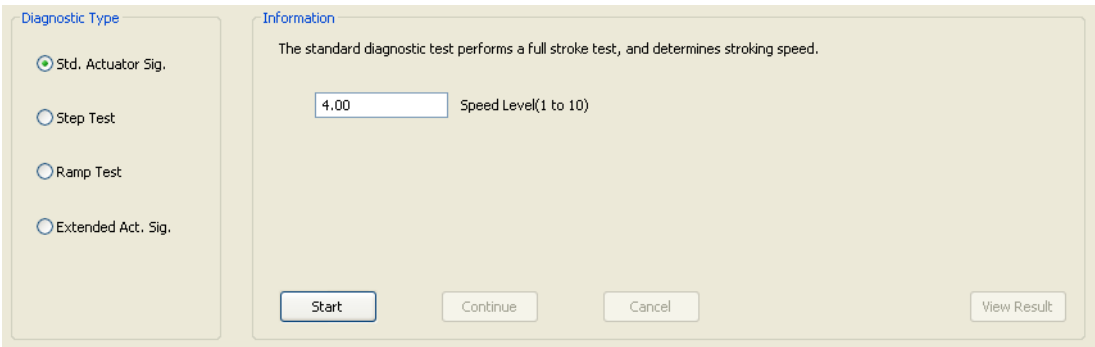


Figure 77 Information Field - Standard Actuator Test

3. Enter a *Speed Level*, click Start and a warning appears. Click Continue and test starts.

   The *Status* field displays relevant messages, the icon goes yellow, traces appear in the *Observer* graph and values populate in the fields to the right (*Diagnostics Standard Signature Test Traces*).

Figure 78 Diagnostics Standard Signature Test Traces

   The *View* button activates.

4. Click View Result to open the *Analysis* screen to see the results.

Perform a Step Test

The *Step Test* produces a time vs. position graph where the valve is submitted to a stepped input. The graph can contain data for 2 to 60 seconds of data with data taken up to every 0.05 seconds. The step profile may contain multiple steps. To run a step profile, you must enter the starting position, the ending position, the pause between each step, the step size, and whether or not to measure both up and down steps.

The step test starts at the starting position and makes steps according to the *Step Size* field until the ending position is reached. For each step, the SVI II AP measures the position at even time intervals for the amount of time specified in *Time*. If *Two Way* is specified, when the end position is reached, the procedure is repeated from the end position to the start position.

Results are measured and displayed in the *Observer* graph.

To perform this test:

WARNING

This procedure moves the valve. This results in loss of process control.

1. Ensure the system is in Setup mode.
2. Click **Step Test** and the *Information* area appears (*Information Field - Step Test*).

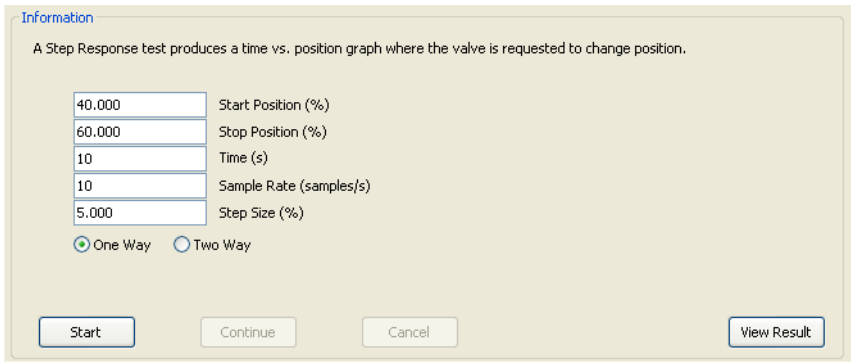


Figure 79 Information Field - Step Test

3. Enter a *Start Position, Stop Position, Time, Sample Rate* and *Step Size*.
4. Click **One Way** or **Two Way**.
5. Click Start and a warning appears. Click Continue and test starts.

   The *Status* field displays relevant messages, the icon goes yellow, traces appear in the *Observer* graph and values populate in the fields to the right.

   The *View* button activates.
6. Click View Result to open the *Analysis* screen to see the results.

Perform a Ramp Test

The *Ramp Test* produces a position vs. input signal graph for both increasing and decreasing signal. The signal is a simulated signal so linearity cannot be checked.

Results are measured and displayed in the *Observer* graph.

To perform this test:

WARNING

This procedure moves the valve. This results in loss of process control.

1. Ensure the system is in Setup mode.
2. Click **Ramp Test** and the *Information* area appears (*Information Field - Ramp Test*).

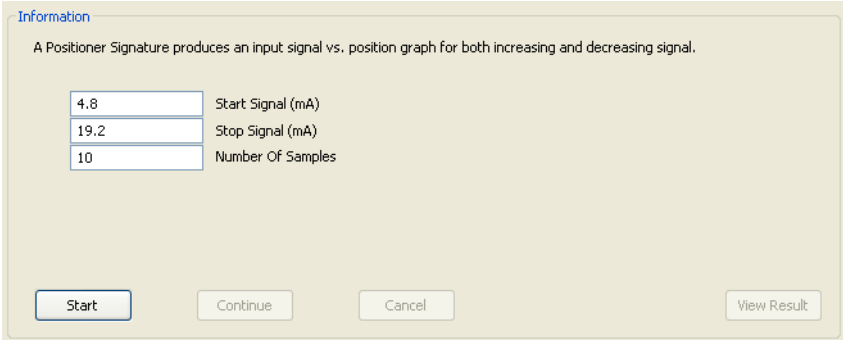


Figure 80 Information Field - Ramp Test

3. Enter a *Start Signal*, *Stop Signal*, and *Number of Samples*.
4. Click Start and a warning appears. Click Continue and test starts.

   The *Status* field displays relevant messages, the icon goes yellow, traces appear in the *Observer* graph and values populate in the fields to the right.

   The *View* button activates.
5. Click View Result to open the *Analysis* screen to see the results.

Perform an Extended Actuator Signature Test

The *Extended Actuator Signature* slowly ramps the pressure to the actuator up and down over a user selected position range and measures the position vs. pressure. The signature is useful for determining valve friction and for identifying performance problems at specific valve positions.

Results are measured and displayed in the *Observer* graph (*Extended Actuator Signature Test Results*). After the test, data appears in the *Status* area (*Extended Actuator Signature Test Results*).

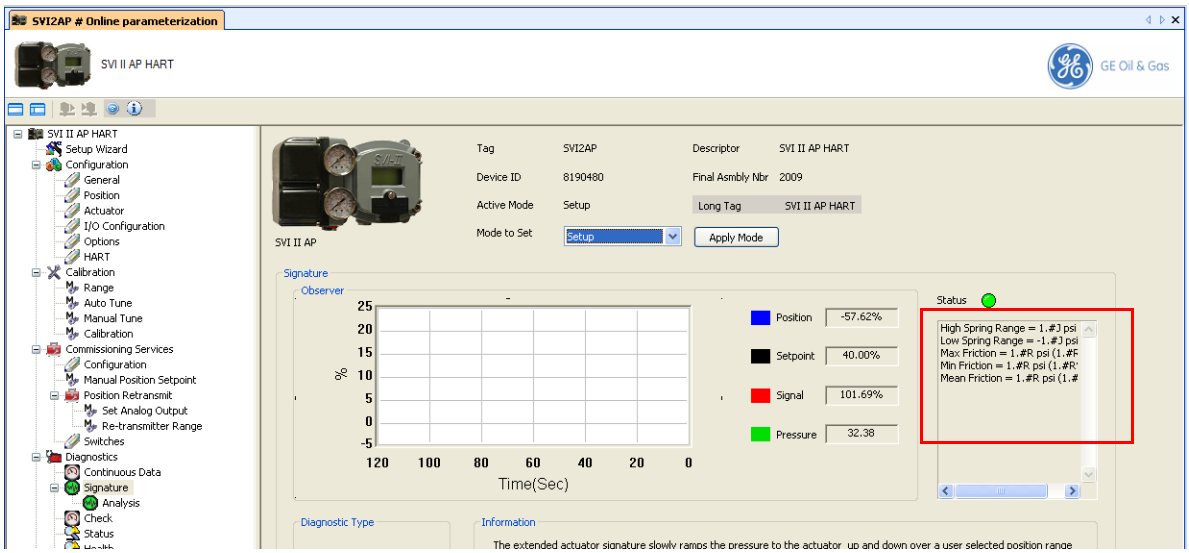


Figure 81 Extended Actuator Signature Test Results

To perform this test:

WARNING

This procedure moves the valve. This results in loss of process control.

1. Ensure the system is in Setup mode.

2. Click **Extended Act. Sig**. and the *Information* area appears (*Information Field - Extended Act. Sig. Test*).

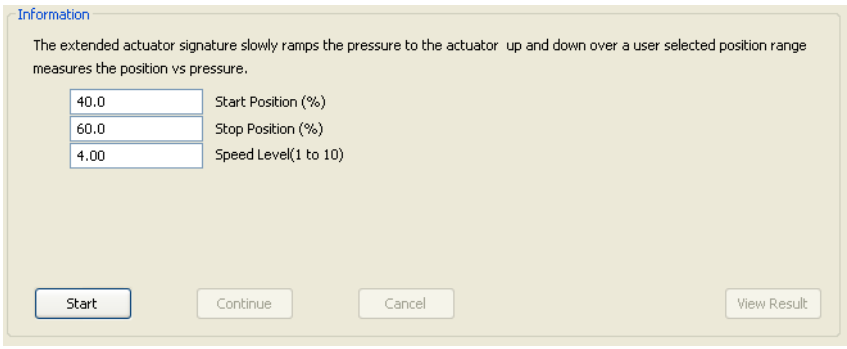


Figure 82 Information Field - Extended Act. Sig. Test

3. Enter a *Start Position, Stop Position,* and *Speed Level.*
4. Click Start and a warning appears. Click Continue and test starts.

   The *Status* field displays relevant messages, the icon goes yellow, traces appear in the *Observer* graph and values populate in the fields to the right (*Diagnostics Extended Act. Sig. Test Traces*).

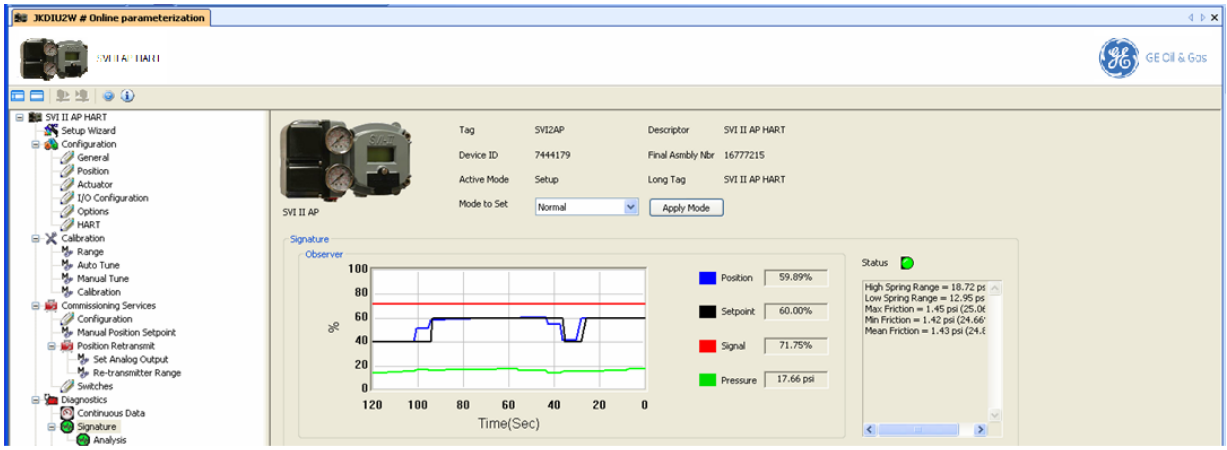


Figure 83 Diagnostics Extended Act. Sig. Test Traces

The *View* button activates.

5. Click View Result to open the *Analysis* screen to see the results.

View Results - Extended Actuator Test Results

To access this screen click **View Result**. For information on using this screen see “Diagnostics Signature Analysis Screen” on page 122.

Diagnostics Signature Analysis Screen

From this screen (*Diagnostics Signature Analysis Screen*) you can see the diagnostic results for the performance of the valve. The *Diagnostic Graph* and is useful for troubleshooting a control valve and for tuning the PID positioning parameters.

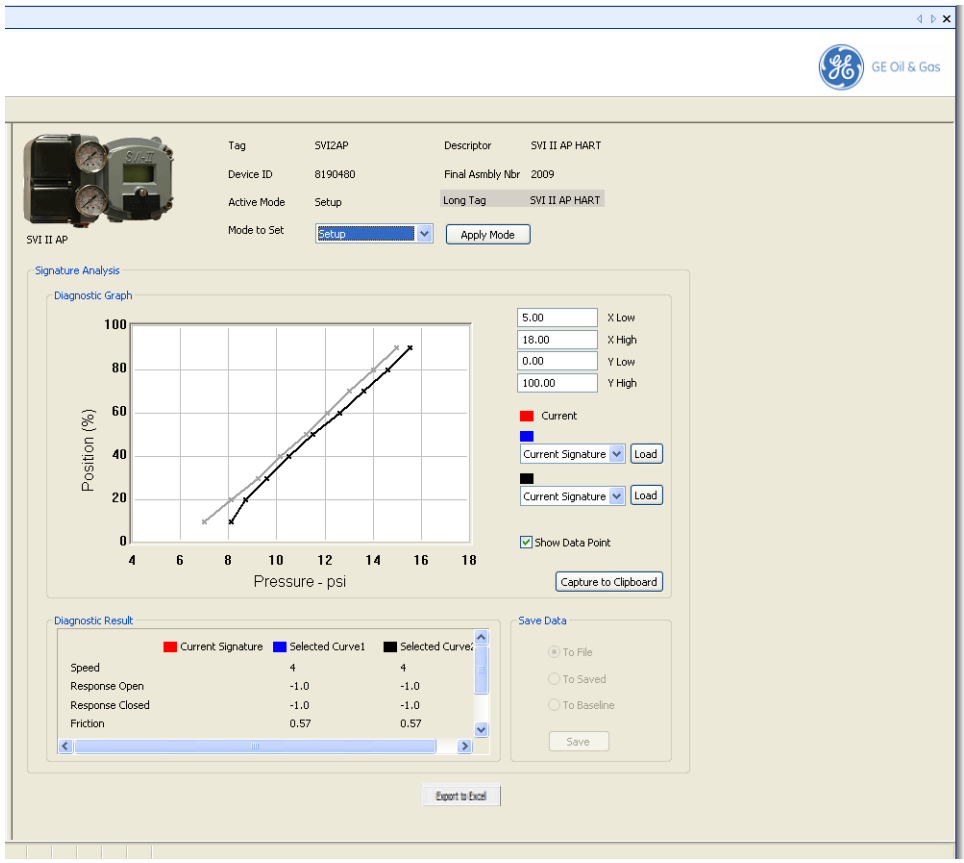


Figure 84 Diagnostics Signature Analysis Screen

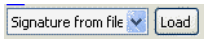
Buttons and Fields

Diagnostic Graph

Graph — A *Position (%)* vs. *Pressure* plot appears. The pressure units are configured on the *Configuration Options* screen (see "Configuration Options Screen" on page 73).

X and Y Low/High — Enter a value from to set the X and Y coordinates for the graph.

Graph Load fields — Use these two load two graphs for comparison. You can select:



- *Current Signature* - Displays the graph from the current operation.
- *Saved Signature* - Opens a previously saved test for comparison.
- *Baseline Signature* - Opens a previously saved baseline test for comparison.
- *Signature from File* - Opens a previously saved test for comparison.

Show Data Point — Adds the data points to the displayed curves.

Capture to Clipboard	 Captures the displayed curves to the Windows® clipboard.
Diagnostic Result	Displays color-coded data results for each curve in the following (depending on test type): ☐ *Speed* ☐ *Response Open* ☐ *Response Close* ☐ *Friction* ☐ *Friction %* ☐ *Lower Spring Range* ☐ *Upper Spring Range*
Save Data	Use the radio buttons to select the type of curve to save.
Export to Excel button	Use this button to export the results to an Excel *.csv* file for analysis.

Load a Curve

To load a curve from file:

1. Use the pulldown list to select *Signature from file*, click Load and *SVI Files Open Dialog* appears.

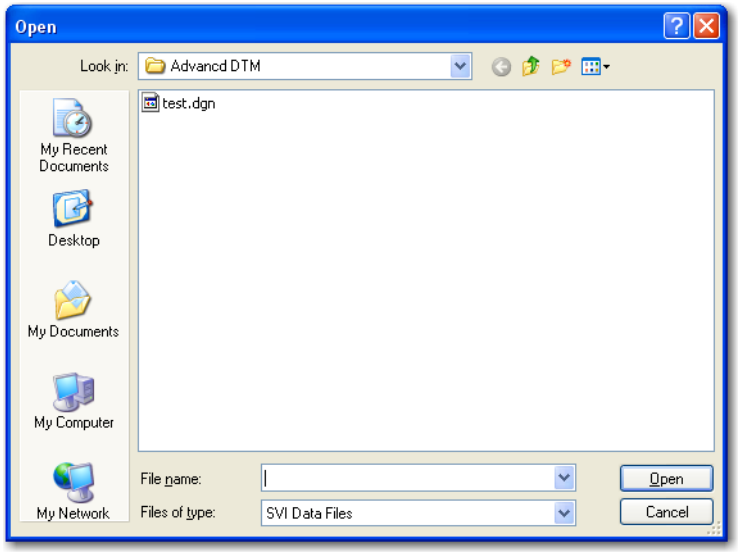


Figure 85 SVI Files Open Dialog

2. Navigate to the file (*.dgn*) and click **Open** and *Pick Signature Data* appears.

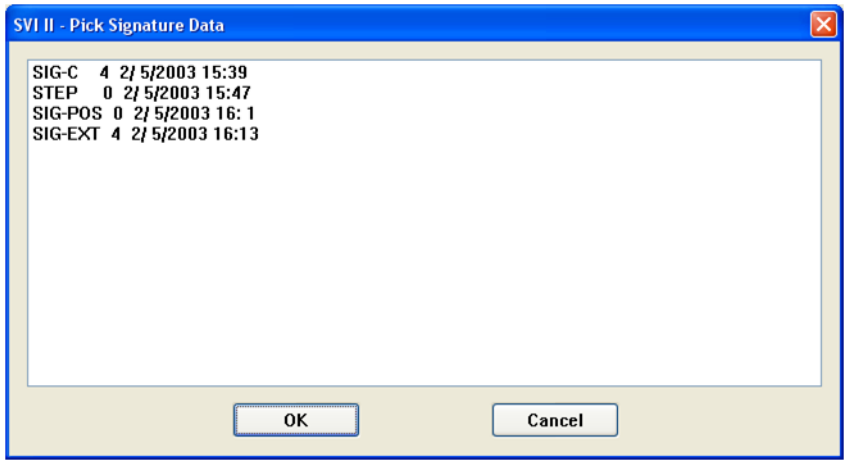


Figure 86 Pick Signature Data

3. Select a signature and click **OK**.

Save a Curve

To save a curve to file:

1. Select a file type radio button, click [Save] and *SVI Files Save Dialog* appears.

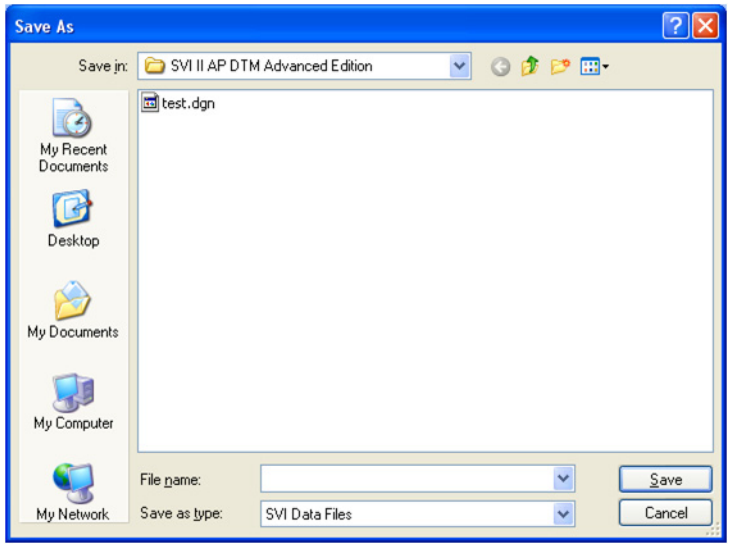


Figure 87 SVI Files Save Dialog

2. Navigate to the directory and click [Save].

Zooming

Change the graph's zoom by dragging a box around an area. To return the graph to its normal scale, right-click in the graph.

Diagnostics Check Raw Data Screen

Use this screen to view the raw counts of status of signals, pressure, temperatures and I/Os. Additionally, you can set the *I/O Output*. This screen displays positioner tag information, the current continuous diagnostics information and is updated every time the screen is selected.

From the *Check* screen, shown in *Diagnostics Check Raw Data Screen*, you can monitor and set some of the basic parameters: *Set I/P* and *Unset I/P*. The *Check* screen is used primarily for troubleshooting. To perform any action on the *Check* screen you must be in the Setup mode.

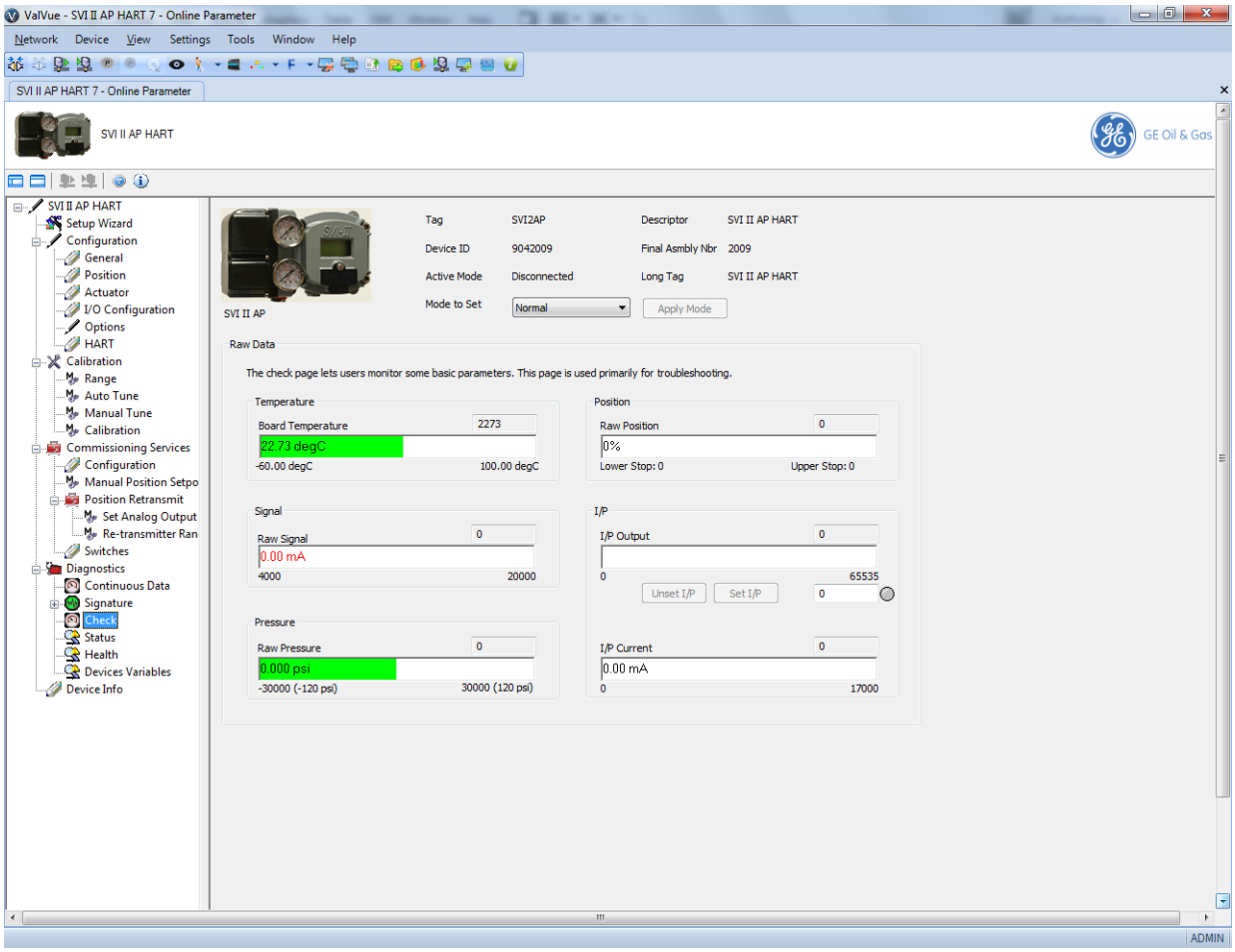


Figure 88 Diagnostics Check Raw Data Screen

Buttons and Fields

Temperature

Board Temperature	Displays the actual circuit board temperature in degrees as a bar graph and as counts in a text box.

Min Temperature	Displays the historical low temperature to which the positioner was be exposed as a bar graph and as counts in a text box.
Max Temperature	Displays the historical high temperature to which the positioner was be exposed as a bar graph and as counts in a text box.
Signal	
Raw Signal	Displays the input signal strength in counts as a bar graph and as counts in a text box.
Pressure	
Raw Pressure	Displays the raw A/D values for pressure, which is useful to GE engineers for diagnostic purposes. Displays the data strength in counts in a text box and as in a bar graph in the user-configured pressure units.
Position	
Raw Position	Displays the raw A/D values for position, which is useful to GE engineers for diagnostic purposes. Displays the data strength in counts in a text box and as in a bar graph as a percentage of open.
Lower Stop	Displays the position raw counts at the stop.
Upper Stop	Displays the position raw counts at the stop.
I/P	
I/P Output	Displays the I/P output in counts as a bar graph and in a text box.
	Use this field and two buttons to enter and set the I/P output in counts and to unset the I/P value. This value is the constant signal to the I/P. 0 resets the device to Normal mode. A red **!** appears if an input value is out of range. The LED to right indicates gray if unset and red when manually set.
I/P Current	
I/P Current	Displays the I/P current in mA as a bar graph and as counts in a text box.

Set I/P

Setting the I/P removes the valve from normal control and sends a constant, user defined signal to the I/P. This is useful for troubleshooting. This command is only available in Setup mode.

To set the I/P:

1. Enter a number between *1* and *65000* in the *Set I/P* edit box.
2. Click Set I/P.

   A warning dialog appears (*Set IP Warning Dialog*).

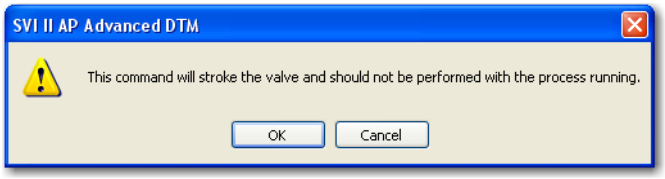


Figure 89 Set IP Warning Dialog

3. Click **OK**. The LED should appear red.

To resume normal control:

- Click Unset I/P. Returning to Manual or Normal mode also returns the valve to control.

Diagnostics Status Screen

Use the *Status* tab to see the SVI II AP operating and internal status. The screen is divided into a series of tabs that provide status, alarm, and fault information in a graphical form for all aspects of the system.

Each alarm condition is color coded according to the criticality of the alarm:

- Blue = low
- Yellow = Medium (error conditions that can occur in normal operation, not faults, that may presently exist or have historically existed)
- Red = High (indicates a fault)
- Green indicates no faults

On the *Status* tab you can reset the *Current Faults* or *All Faults* (Current and Historical). The window has selectable tabs that display the associated parameters for each tab. When you are on the *Active Faults* tab the current active faults appears (Figure 90). Mouse hover over a fault for a fault definition.

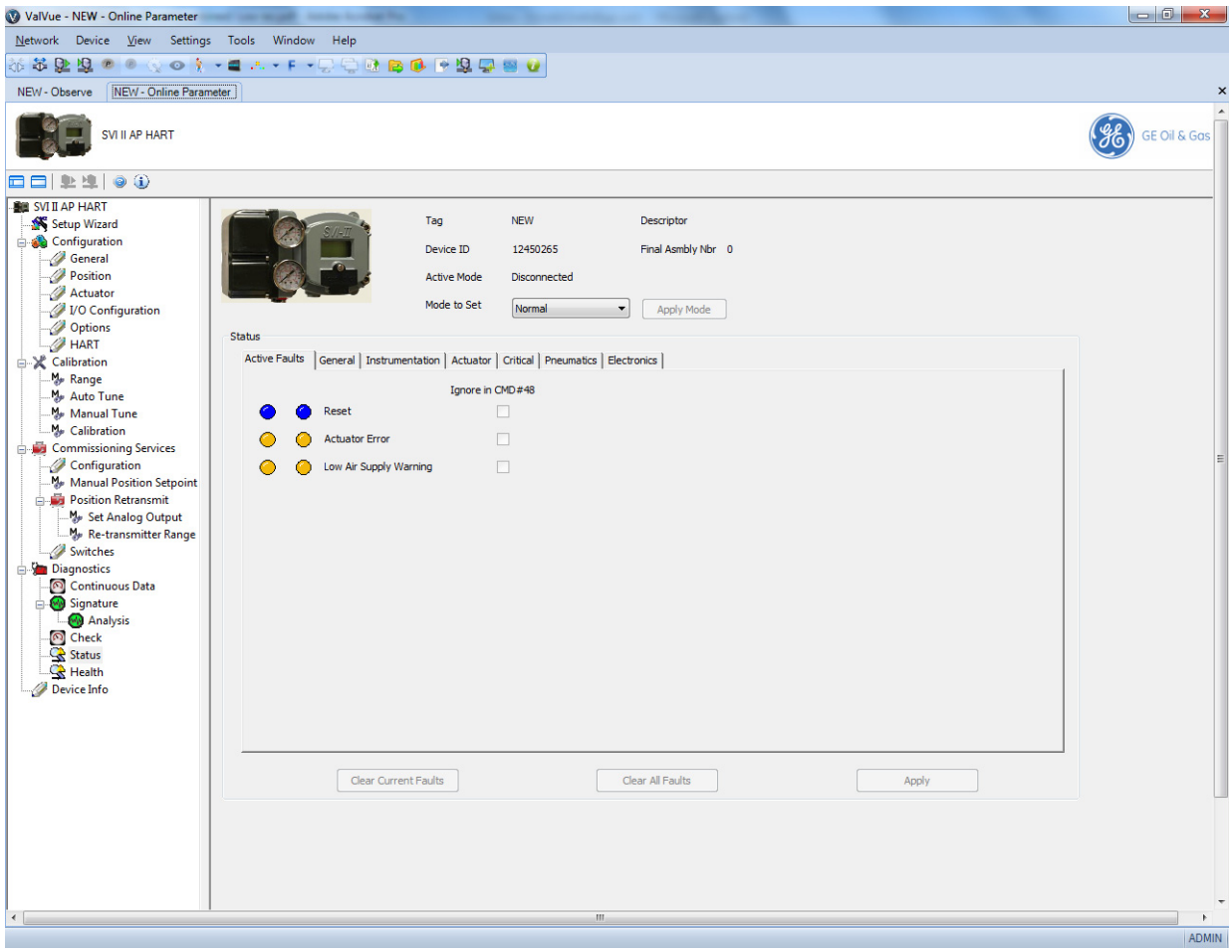


Figure 90 Diagnostics: Active Faults Tab

The ValVue 3 *Device Criticality* settings determine the scan period for monitoring of a positioner. Selecting *Do Not Bother* means no status is monitored for display. Ensure if you use *Inherent from Parent Area* that the settings do not include *Do Not Bother*. The ValVue 3 *Device Status Monitor Running* must also be active for any status to appear on an individual DTM's *Status* tab. Status updates for active faults also appear on the *Healthy Status* and *Device Monitor: Data Displayed* - refer to the ValVue 3 help or *GEA31426 Masoneilan Products ValVue 3 Software Manual*.

Buttons and Fields

Current Faults	Faults that have occurred and have not been cleared.
Historical Faults	Faults that have occurred but been cleared from *Current Faults*.
Ignore in CMD #48	Click an individual checkbox to remove that fault's status from any Command 48 status updates. You must click Apply to complete configuration. This functionality does not appear for HART® 5.
Clear Current Faults button	Clear Current Faults Click to clear *Current Faults*, if the fault cause no longer exists.
Clear All Faults button	Clear All Faults Click to clear *Current Faults* and *Historical Faults*, if the fault cause no longer exists.
Apply *Apply* button	Click to remove Command 48 status returns for user-selected individual *Ignore in CMD #48* checkboxes on each tab. This functionality does not appear for HART® 5.

General

The *General* tab displays general faults.

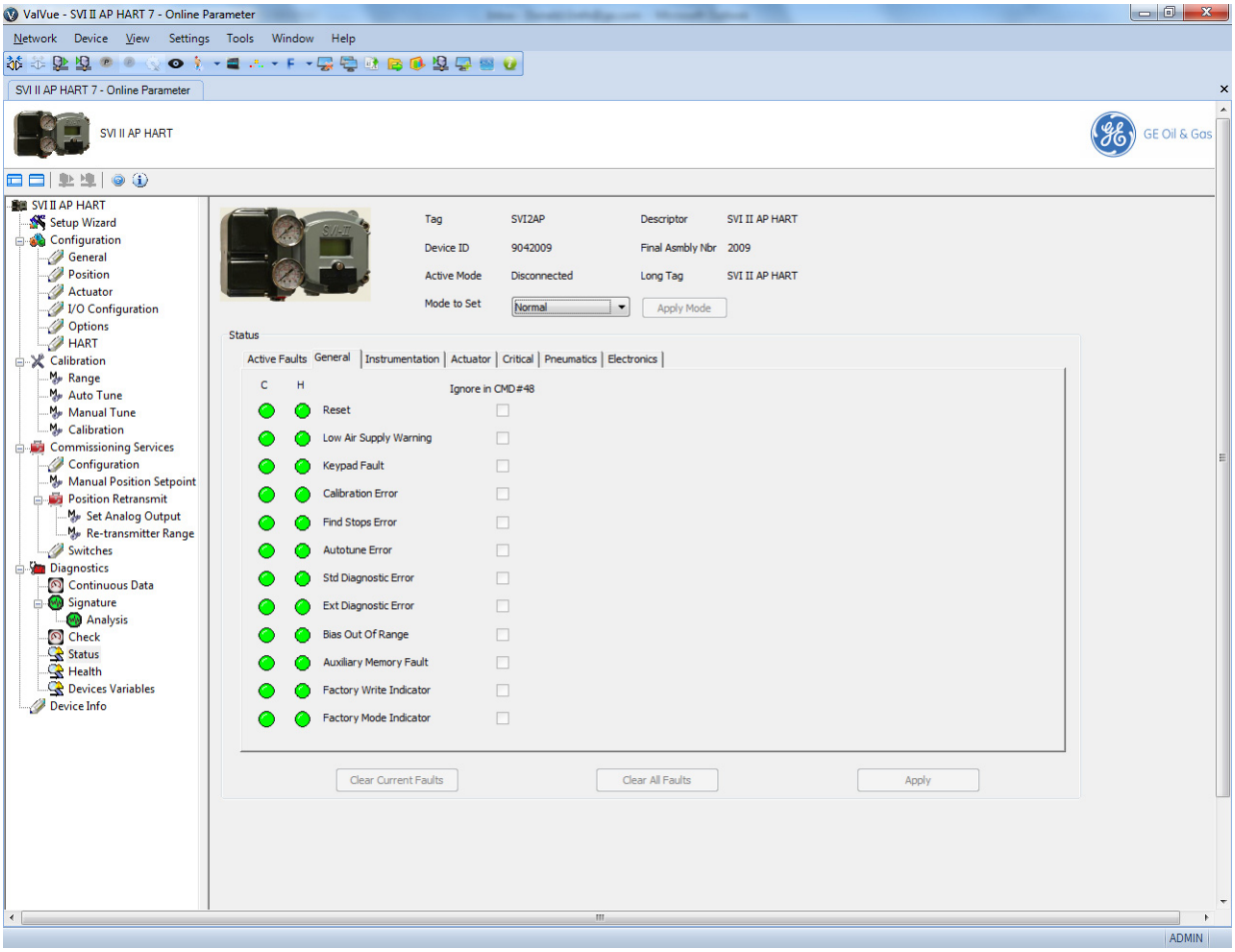


Figure 91 Status Tab: General

Instrumentation

The *Instrumentation* status tab displays a fault related to instrumentation operations.

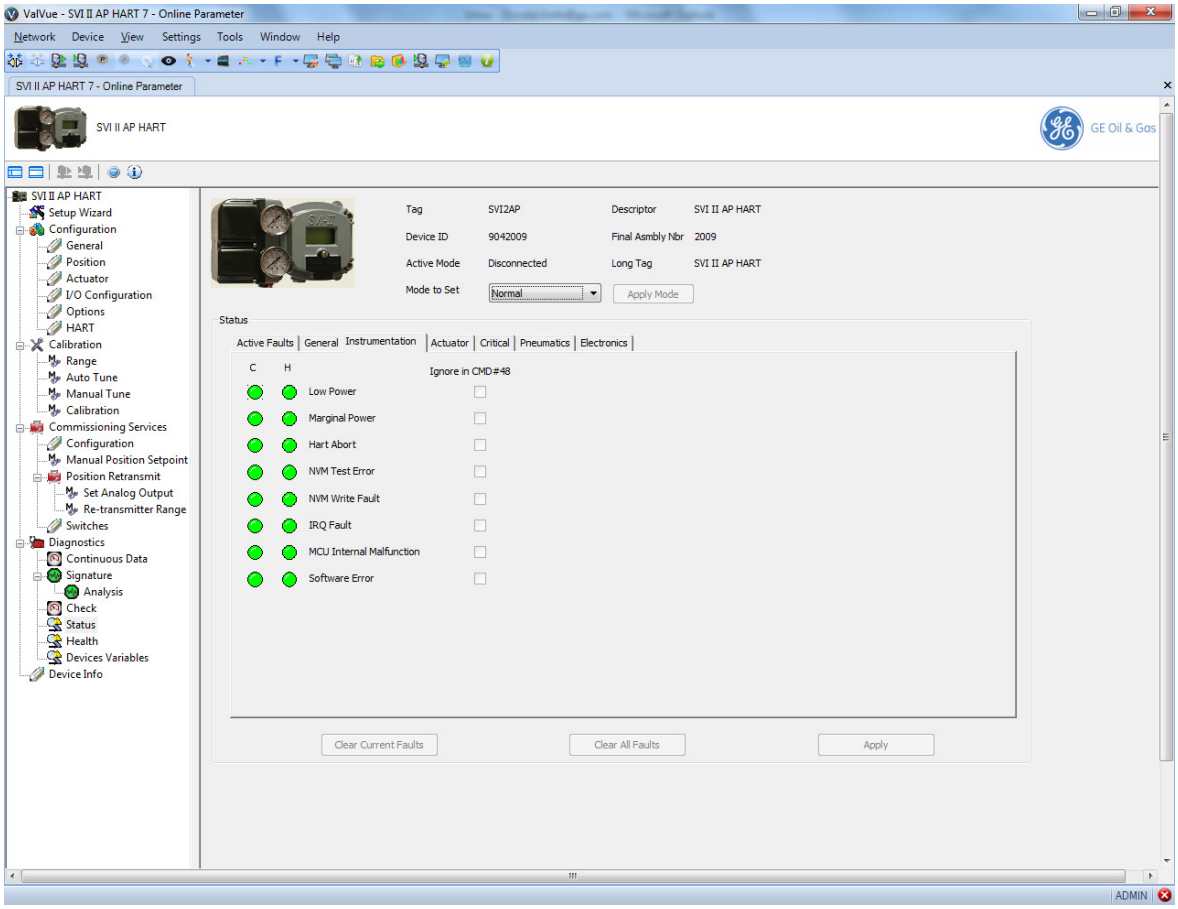


Figure 92 Status Tab: Instrumentation

Actuator

The *Actuator* status tab displays actuator faults.

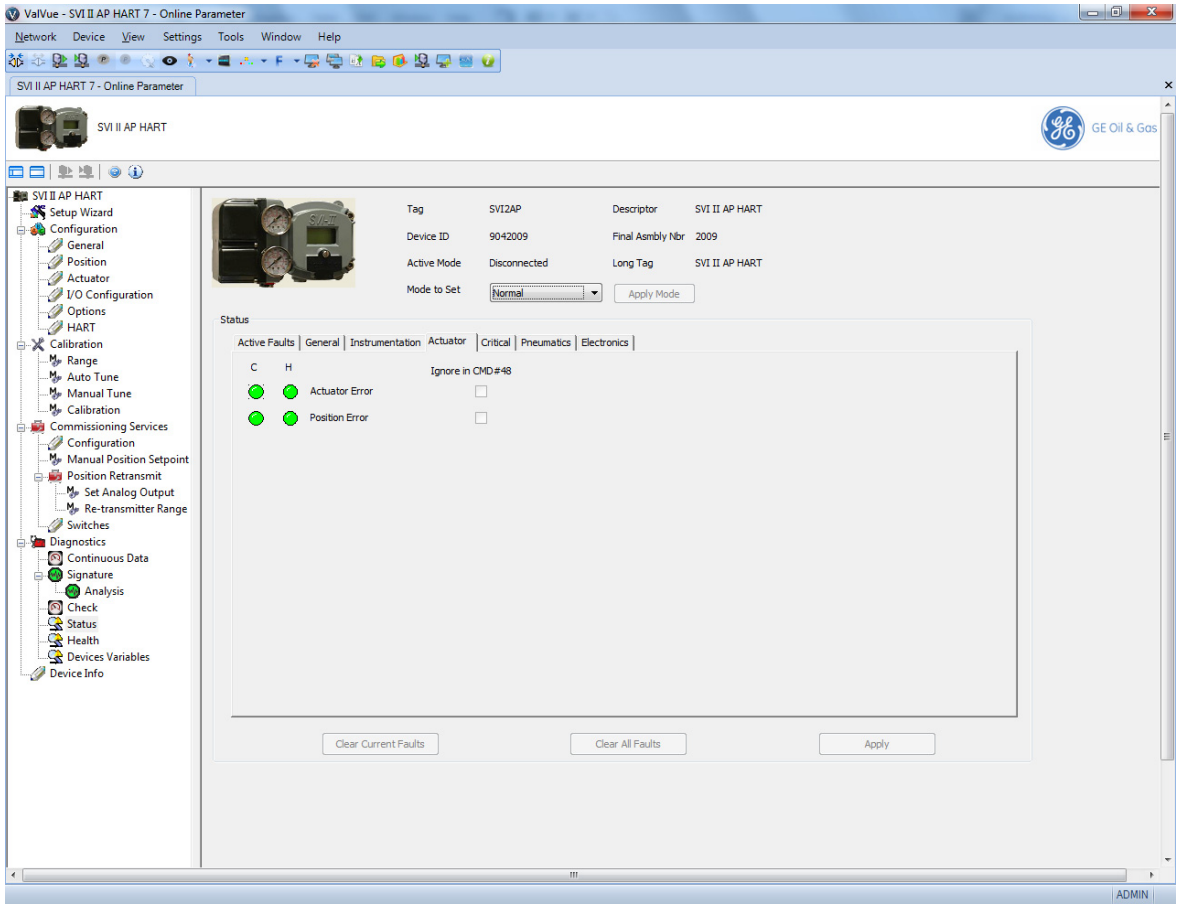


Figure 93 Status Tab: Actuator

Critical

The *Critical* status tab displays all critical errors.

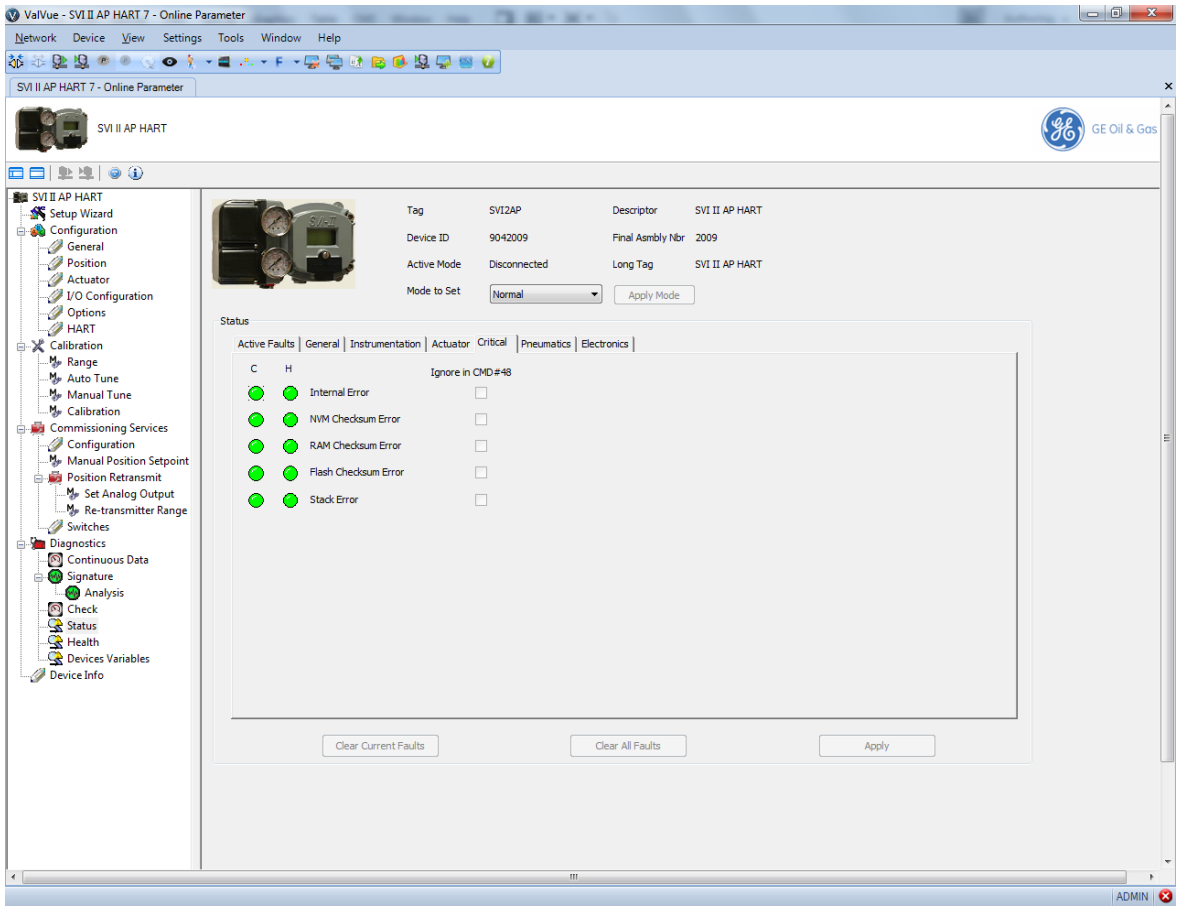


Figure 94 Status Tab: Critical

Pneumatics

The *Pneumatics* status tab displays all pneumatics related errors.

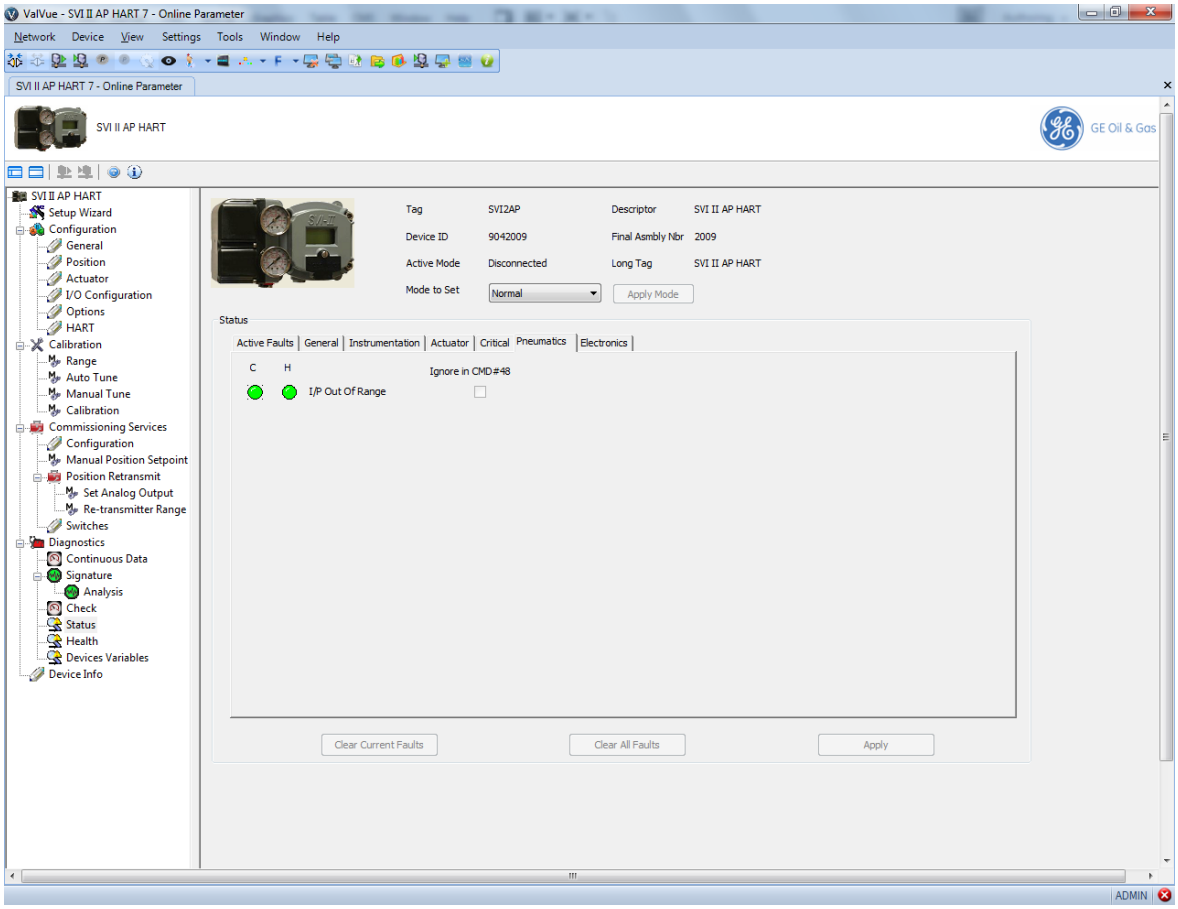


Figure 95 Status Tab: Pneumatics

Electronics

The *Electronics* status tab displays circuit and sensor related errors.

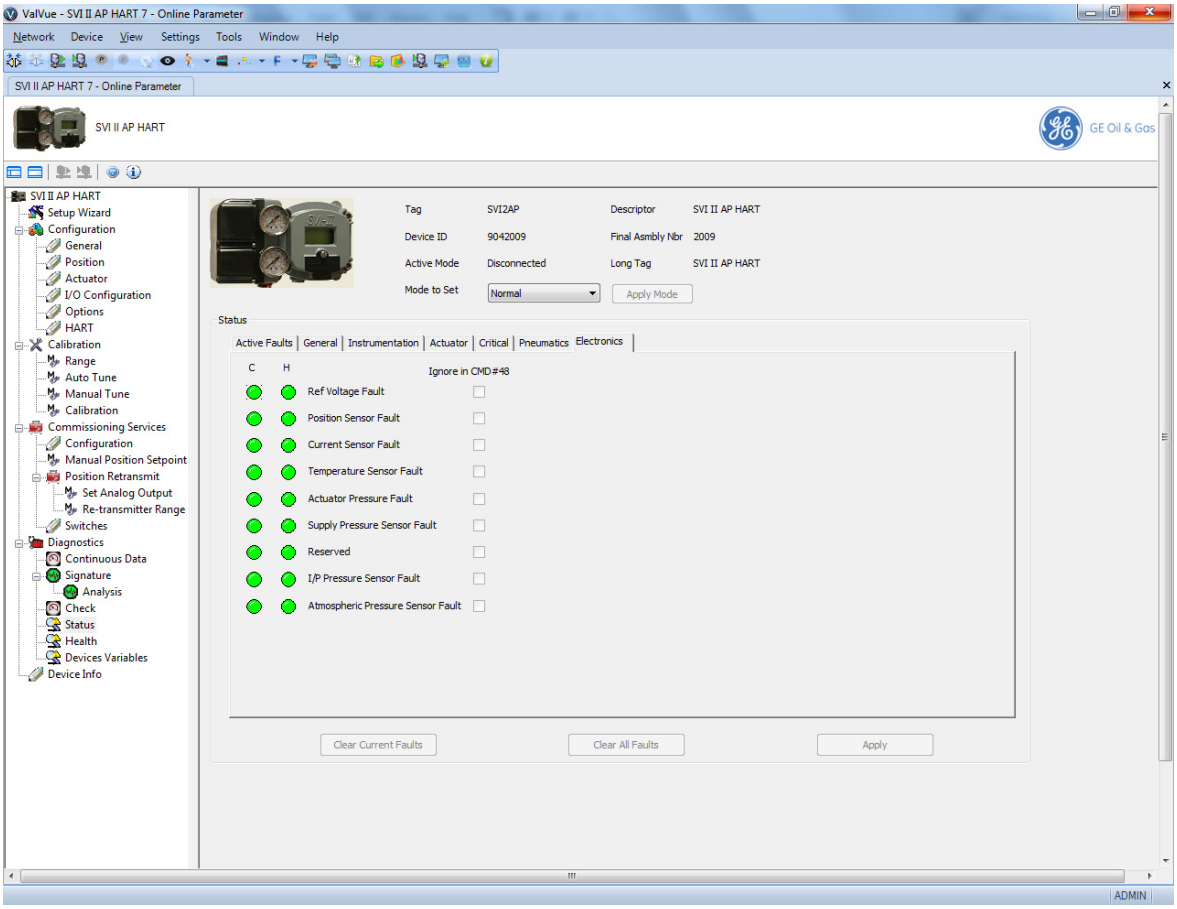


Figure 96 Status Tab: Electronics

Clear Current Faults

When you click **Clear Current Faults,** SVI II AP resets the status in the SVI II AP for all current faults *only*.

To clear current faults:

- Click **Clear Current Faults** and click **Yes** on the dialog that appears.

There should be no faults listed in the *Current* column on any tab or on the *Active Faults* tab.

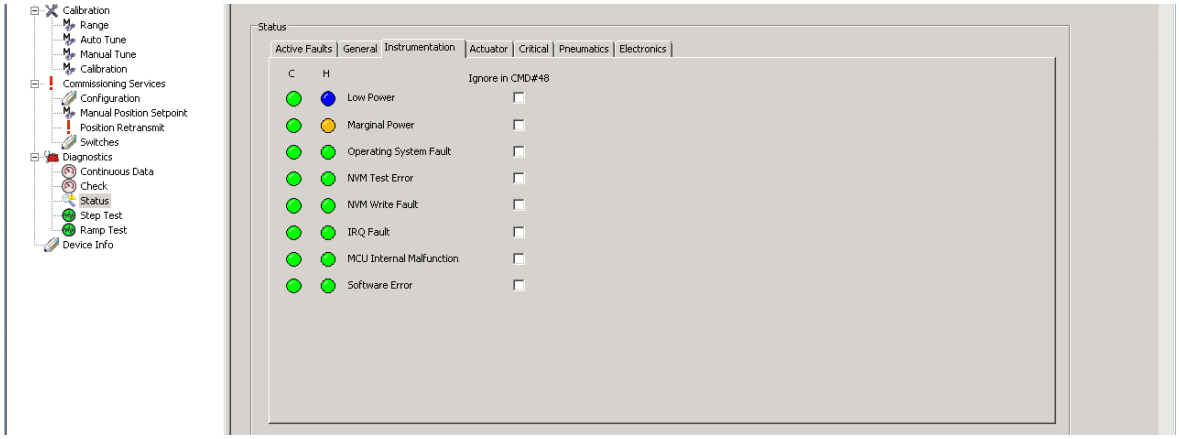


Figure 97 Current Faults Cleared

Clear All Faults

When you click **Clear All Faults** SVI II AP resets the status bit in the SVI II AP for all faults, both historical and current and all indicators, current and historical, revert to green.

To clear all faults:

- Click **Clear All Faults** and click **Yes** on the dialog that appears.

There should be no faults listed as current and historical on any tab.

Diagnostics Health Screen

Use this screen to view the status of signals, pressure, temperatures and I/Os.

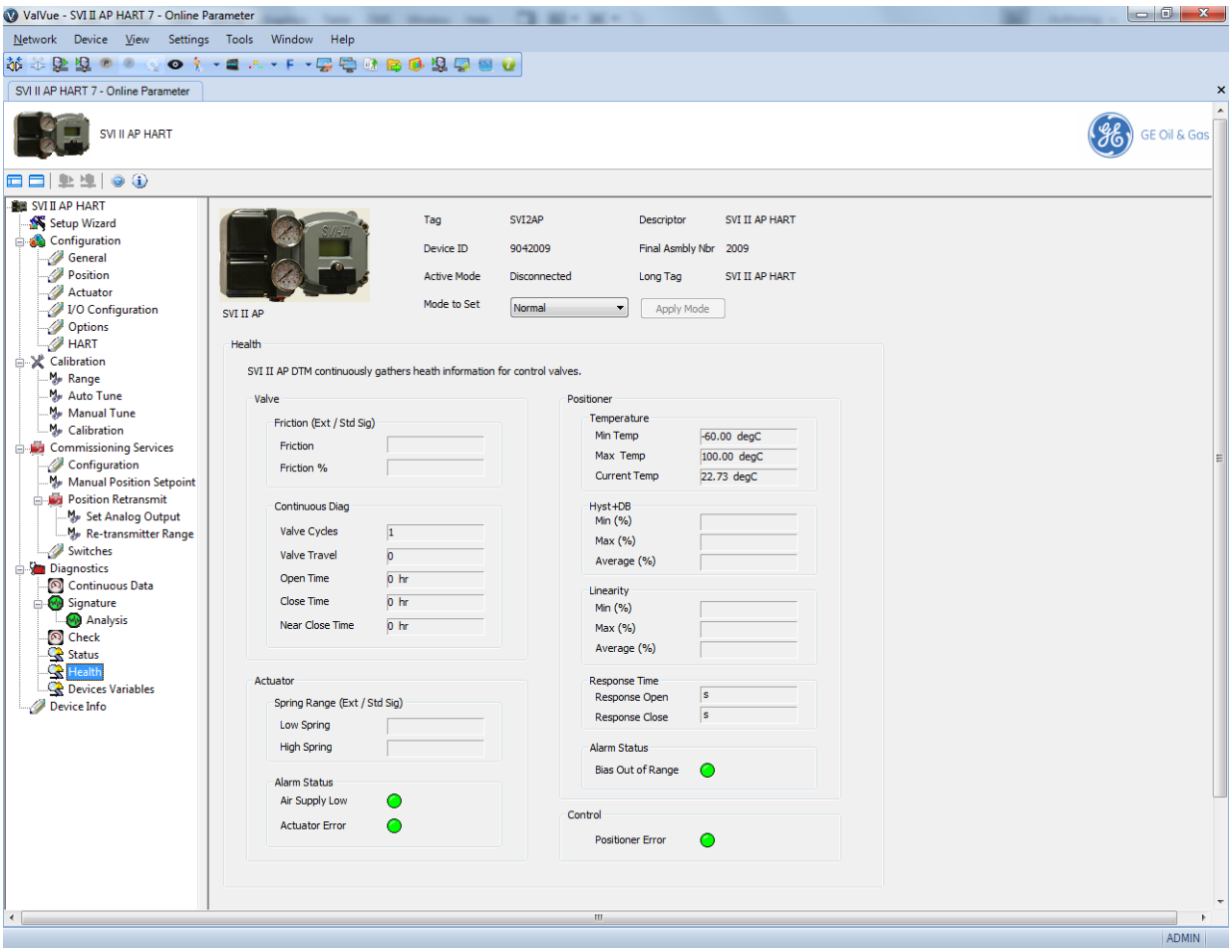


Figure 98 Diagnostics Health Screen

Buttons and Fields

Valve

Friction (Ext/Std Sig)

Friction	Displays the friction measured from a *Standard* or *Extended Actuator Signature* test.
Friction %	Displays the friction/spring range measured from a *Standard* or *Extended Actuator Signature* test.

Continuous Diag

Valve Cycles	Displays the number of valve cycles (direction changes) since the valve went into service or since the historian was reset.

Valve Travel	Displays the total valve strokes (complete open and close) since the valve went into service or since the historian was reset.
Open Time	Displays the cumulative time the valve was in the open position since the valve went into service or since the historian was reset.
Close Time	Displays the cumulative time the valve was in the closed position since the valve went into service or since the historian was reset.
Near Close Time	Displays the cumulative time the valve was in the near closed position by continuous diagnostics since the valve went into service or since the historian was reset. This is a useful tool in analyzing valve health.
Actuator	
Spring Range (Ext/ Ext Sig)	
Low Spring	Displays the *Lower Spring Range* measured from a *Standard* or *Extended Actuator Signature* test.
High Spring	Displays the *Upper Spring Range* measured from a *Standard* or *Extended Actuator Signature* test.
Alarm Status	
Air Supply Low	Indicates by going red when the air supply is insufficient for valve operation.
Actuator Error	Indicates by going red when the actuator is in error. Either air pressure is insufficient or the calibration of the valve position endpoint has significantly changed.
Positioner	
Temperature	
Min Temp	Displays the minimum temperature the positioner has read.
Max Temp	Displays the maximum temperature the positioner has read
Current Temp	Displays the current temperature the positioner has read.
Hyst + DB	Hysteresis and deadband is represents a range around the ideal operational value of position vs. value (*Hysteresis and Deadband Graph*). Data points are captured for both motions of the valve: open and closed. The difference between the data points and the Ideal line, calculated from the settings, is used to calculate the Hyst+DB value.

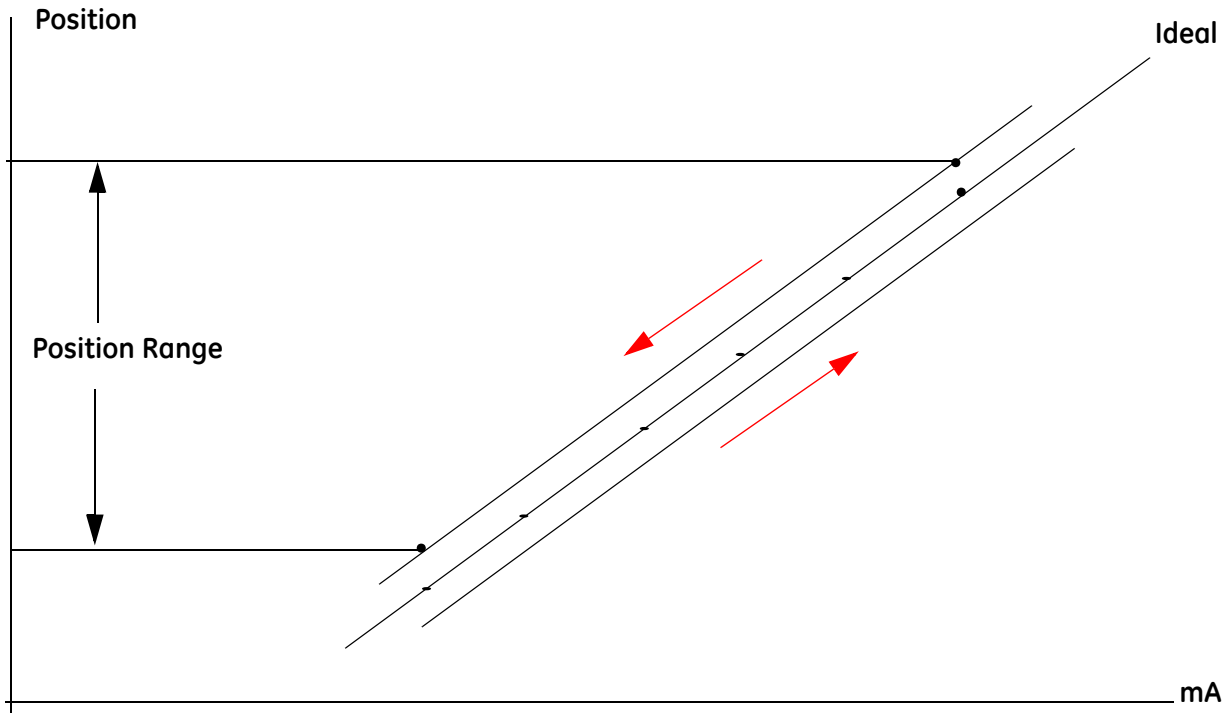


Figure 99 Hysteresis and Deadband Graph

Min (%)	Displays the minimum computed hysteresis and deadband value.
Max (%)	Displays the maximum computed hysteresis and deadband value.
Average (%)	Displays the average computed hysteresis and deadband value.
Linearity	Linearity is calculated as: $[(Pos_{Up} - Pos_{Down})/2 - Pos_{Ideal}]/Range$.
Min (%)	Displays the minimum computed linearity value.
Max (%)	Displays the maximum computed linearity value.
Average (%)	Displays the average computed linearity value.
Response Time	
Response Open	Displays the valve response time for opening.
Response Close	Displays the valve response time for closing.
Alarm Status	
Bias Out of Range	Indicates by going red when the position algorithm indicates an error in output bias. The I/P input signal has reached its limits without the valve reaching the proper position.
Control	
Positioner Error	Indicates by going red when the position algorithm indicates an error as the valve failed to go the requested position within the required time.

Device Variables

Use this tab to select and display a dynamically updated list of all device variables, including *Parameter*, *Value*, *Unit* and *Status*. For switches only the state is listed. You can select the data for display by activating the associated checkbox. This tab is only available for HART® 6 and 7.

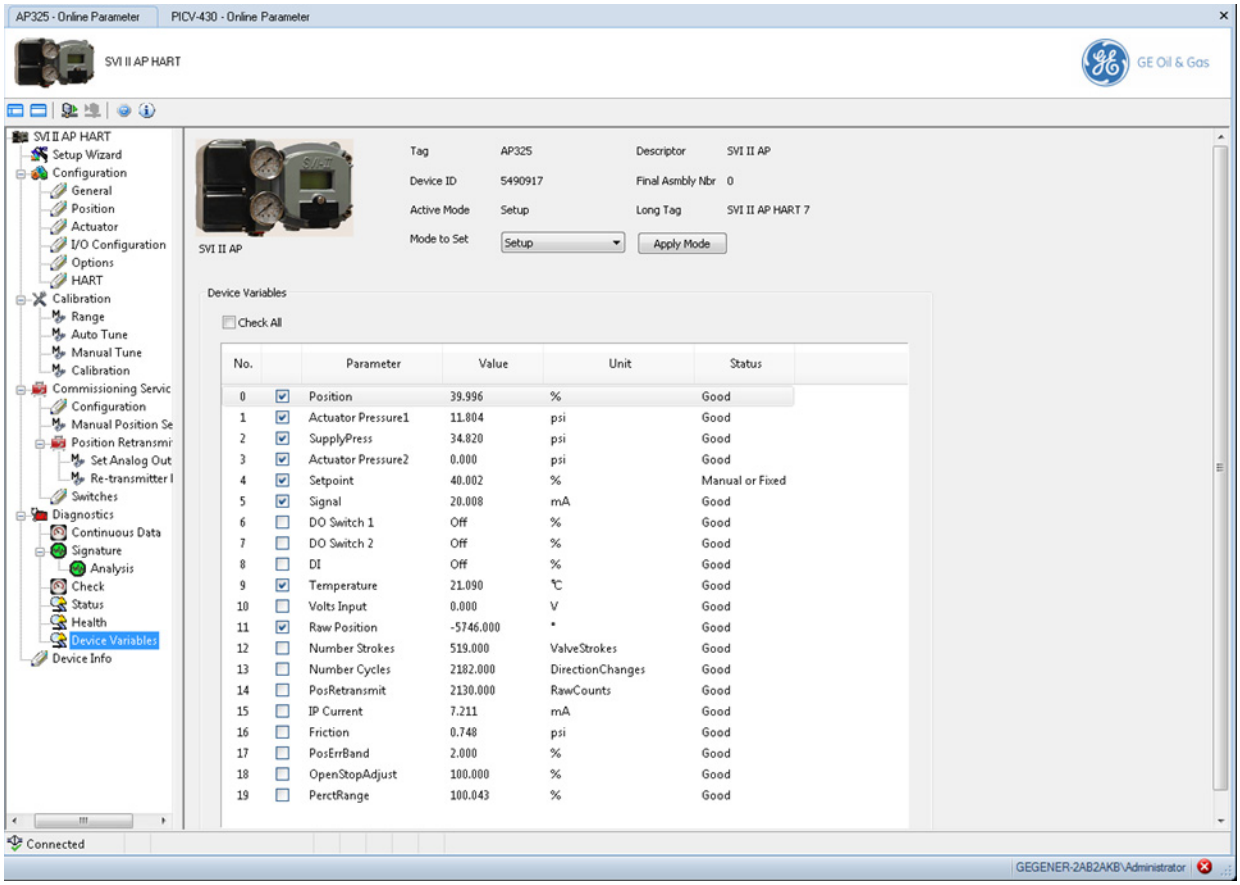


Figure 100 Device Variables Screen

Device Info Screen

Use this screen to view device Info data. Data displayed here is read from the positioner.

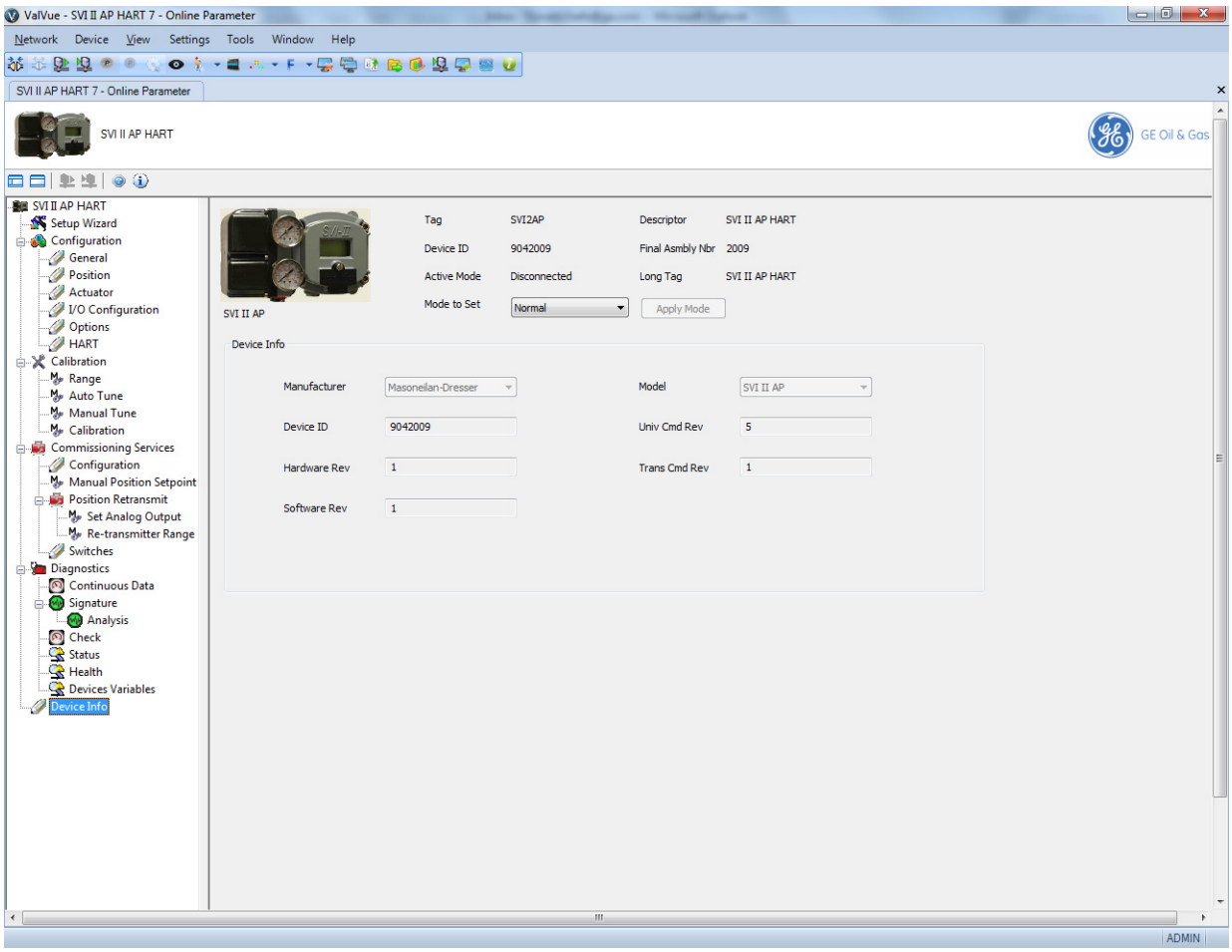


Figure 101 Device Info Screen

Buttons and Fields

Manufacturer	Displays the manufacturer.
Model	Displays the model.
Device ID	Displays the Device ID.
Univ Cmd Rev	Displays the HART® Command revision.
Hardware Rev	Displays the hardware revision.
Trans Cmd Rev	Displays the transmitter revision.
Software Rev	Displays the software revision.

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14. Troubleshooting

Table 2 Troubleshooting Guide for the SVI II AP

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Does not respond to a 4-20mA input	Insufficient air supply	High	Read air supply on top gauge or using ValVue software or Handheld or DTM or EDDL	Increase air supply 5psi greater than spring final
	Improper device mode	High	Read mode on front LCD, ValVue, Handheld, DTM or EDDL	Set device mode to NORMAL
	Insufficient loop voltage	Medium	Verify that there's at least 10.5 VDC at 4 mA using a resistive load instead of the positioner, measured in parallel on the wires where the position is installed	If voltage is insufficient, increase voltage using a signal conditioner
Does not respond to a 4-20mA input	Device in failsafe	High	Read LCD display for FAILSAFE, or using ValVue, Handheld, DTM, EDDL	Clear alarms then change mode to Manual, then to Normal. If unit stays in Failsafe either the travel sensor is out of range or the circuit board has a malfunction
	Defective I/P	Low	1. Disconnect the I/P and verify that there's no output. 2. Apply 1.5 mA to the I/P and verify that there's full output. **PRESET THE CALIBRATOR TO 1.5 mA MAX OTHERWISE PERMANENT I/P DAMAGE WILL OCCUR**	If either steps in the procedure does not work, replace the I/P module. See manual for part number

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Does not respond to a 4-20mA input	Defective relay - Single-Acting	Low	If the air is blowing through the vent, remove pilot plug assembly and check for debris on plug/ seat	1- Clear relay using clean dry air and a white cloth to validate air cleanliness 2- Replace the relay if #1 doesn't solve the problem
	Defective relay - Double-acting	Low	If P1 or P2 isn't moving from 4-20 mA, remove pilot plug assembly and check for debris on plug/ seat	1- Clear relay using clean dry air and a white cloth to validate air cleanliness 2- Replace the relay if #1 doesn't solve the problem
	Defective circuit board	Low	Verify that the voltage across the loop terminals is: 8 < VDC < 9.5 @ 20 mA and 10 < VDC < 11.5 @4 mA. Verify that there's no electronic active alarms using the LCD, ValVue, DTM or EDDL	Change the circuit board if the voltage isn't outside range or if there's active electronic alarms that can't be cleared. NOTE: If *Travel Sensor* alarm is active, this could simply be the magnet being out of range.
Failsafe shown on LCD, ValVue, Handheld or DTM software	Travel sensor out of range (magnet or remote mount)	Low	Using ValVue, Handheld or DTM, verify the value for Raw Travel Sensor count	Re-align magnets or the Remote Positioner Sensor (if used). Run Find Stops
	Circuit board malfunction	Low	Using ValVue, handheld or DTM or LCD, verify for electronic failure alarms See instruction manual for the list of Failsafe related alarms	Clear alarm, if alarm persist than change circuit board

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Find Stops calibration failed	Travel Sensor moved out of range	High	Verify that the travel sensor counts are within -15000 to +15000 when the valve is closed and opened.	Re-align magnet as necessary
	Travel Sensor moved insufficiently	High	Verify that the travel sensor span is at least 4000 counts between full closed and open position. Air supply gauge needs to be more than spring final for spring return actuator or 30 psi minimum for double- acting actuators	Verify that the travel sensor span is at least 4000 counts between full closed and open position. Air supply gauge needs to be more than spring final for spring return actuator or 30 psi minimum for double-acting actuators
	Positioner timed out trying to find the mechanical stops	High	When executing Find Stops, the procedure canceled out after 15 seconds while the valve is still traveling.	For large actuators, execute *Manual Stops* procedure instead of automatic stops
Autotune failed to complete	Feedback slipping, loose	High	On a rotary installation, the magnet assembly rotates using hands. On a reciprocating bracket, the turnbuckle, rod-end, and take off arm aren't secured.	Secure all set screws and locking nuts.
	Magnet far away from housing	Low	On a rotary installation, the face of the magnet holder isn't flush with the face of the mounting bracket. Instead it is recessed by more than 1/8"	Loosen up the set screws holding the magnet assembly in the magnet holder and pull the magnet so it is flush with the mounting bracket
Autotune failed to complete	High friction, sticking-slipping	Medium	The friction measured is more than 30% of the spring force or the valve is visibly jumping around the setpoint.	Run Autotune with Aggressiveness settings of 2 or 4, or, proceed to manually tune the SVI II AP ensuring the Integral Gain (I) is set to a minimum of 100.

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Position oscillation - Fast	Positioner gain (P) set high	High	Position overshoots by more than 20% of the step and rings more than twice	Decrease the Gain (P) & (Padj) by 50% increments until oscillation ceases
	External booster tuned aggressively	Low	Position overshoots by more than 20% of the step and rings more than twice	1. Adjust booster's bypass to a 1 1/4" turn from the closed position of the bypass adjustment 2. Decrease the Gain (P) & (Padj) by 50% increments until oscillation ceases
Position oscillation - Slow	Position gain (P) set low	Low	Verify that the gain is at least 100 and the oscillation is a smooth sine wave going up and down	1. Increase gain (P) and (Padj) by 50% increments until oscillation has reduced. 2. Adjust the Integral Gain (I) by reducing it by 25% until the position is flat line. If the oscillation is a square wave then increase the integral by 25% until it is a flat line.
	Valve friction > 25% of spring range	Medium	Verify using the ValVue Trend that the oscillation resembles a square wave pattern	1. Adjust the integral Gain (I) by increasing it by 25% until the oscillation *stretches* out to a flat line. 2. Set *DeadZone* parameter to 0.25%
	Loose feedback	Medium	The magnet can rotate freely using fingers on a rotary mounting or on a reciprocating assembly, the assembly arm with turnbuckle moves around using fingers	Tighten set screws and lock nuts as necessary

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Responds to 4-20mA but can't communicate HART®	Loop impedance (resistance) too low	High	1-Connect directly to the HART® terminal on the positioner, if no communication, measure peak-to-peak voltage of HART® signal using an AC meter. The voltage needs to be 0.6 VDC to 1.2 VDC. Add a temporary 100ohms to 300 Ohm resistor in series with the 4-20 mA signal 2- Power the positioner with a separate loop current source. If communication works using ValVue or a Handheld then this confirms an issue with loop impedance	If the voltage is sufficient, install a permanent resistor in series (100 to 300 in the marshaling cabinet) or install a signal conditioning device such as the Pepperl & Fuchs model: SMART Current Driver/ Repeater KFD0-SCS-1.55
	Defective circuit board	Low	Power the positioner with a separate loop current source and very if HART® communication doesn't work using ValVue or a Handheld	Replace the circuit board. See part number in the instruction manual
	Burst Mode activated	Medium	Power the positioner with a separate loop current source. If communication works using ValVue or a Handheld, validate if the Burst mode is activated.	Using ValVue or a handheld, turn off the Burst Mode ONLY if a HART® converter such as the Moore HIM or Rosemount® TRILOOP IS NOT in service with the SVI II AP Burst Mode
LCD is blank	Defective LCD cable/connector	High	Verify for cracks or pinched wires. Wiggle the cable around and verify if the LCD turns on.	Replace LCD assembly with cable/connector. See part number in instruction manual.
	Defective LCD circuit	Low	Gently push on the LCD circuit and verify if the LCD turns on and off	Replace LCD assembly with cable/connector. See part number in instruction manual.
	LCD connector improperly seated	Medium	Unplug and reset the LCD cable connector.	Ensure that the cable connector is fully inserted with the retaining clip in place.

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Air constantly blowing out from the vent	Air supply piped to Out port instead of IN	High	Verify that the air supply is connected to OUT.	Pipe the supply to the IN port.
	Debris on relay vent seat	Low	Remove the plug assembly from the relay and inspect for falling debris inside the relay.	Blow clear air in the relay and reinstall the plug assembly. Replace the relay if needed.
	Double-acting cylinder blow by	Low	Unplug one side of the cylinder and verify if the air stops blowing through the vent.	Repair cylinder leak/blow by.
Chirping sound coming from pneumatics	Pneumatic check-valve inside pneumatic cover	High	Remove plastic cover on pneumatic block and verify that the chirping noise goes away.	Take off check valve (white plastic piece) and roll between finger to soften it up then re- install.
Positioner doesn't power up with 4- 20mA	Insufficient voltage	High	Verify that the voltage across the loop terminals is: 8 > VDC < 9.5 @ 20 mA and 10 > VDC < 11.5 @4 mA.	Change the circuit board if the voltage isn't outside range or if there's active electronic alarms that can't be cleared.
	Defective circuit board	Low	Verify that the voltage across the loop terminals is: 8 > VDC < 9.5 @ 20 mA and 10 > VDC < 11.5 @4 mA.	Change the circuit board if the voltage isn't outside range or if there's active electronic alarms that can't be cleared.

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Valve position moves slowly to a large signal change > 25%	Gain (P) set too low	High	Verify that the gain is greater than 100.	Run Autotune if possible or Live Tuning using ValVue to modify the P gain while the process is running. Increase the gain by 50% increments until valve response is faster.
	Stroking Time parameter not set to a 0 value	Low	1. Using ValVue a handheld or other HART® interface, put the device in Setup Mode then run the Full Open and Full Close command. 2. Set the device normal and move the setpoint from 4-20mA. Compare the time the stroking speed time between Full open/close and 4-20 mA signal.	Set Stroking Time parameter to 0
	Insufficient air supply volume	High	Verify that the air supply gauge doesn't drop more than 15% of the air supply upon an setpoint change of 25% and 50%.	Verify that the air supply gauge doesn't drop more than 15% of the air supply upon an setpoint change of 25% and 50%.
	Large actuator volume to fill	Medium	The air supply gauge doesn't drop more than 15% of the air supply with a setpoint change of 100%.	Add a volume booster or replace SVI II AP with SVI II AP High Flow model.
No readback of Remote Position Sensor (RPS)	SVI II AP setup for HALL Sensor instead of RPS Input	High	Using ValVue or a Handheld, go to the Check page and read the sensor input and verify that the value isn't changing with the RPS sensor.	Using SMART Assistant® software and a HART® Modem to set the SVI II AP to Remote Mount.
	RPS Sensor wired incorrectly	Medium	The black, brown and red wires aren't connecting to the corresponding terminal 1, 2 and 3 on the SVI II AP.	Re-wire per the instruction manual and verify continuity for each wire.

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Switches don't change state. Always closed	Switch feature not available/activated	High	The part number on the SVI IIAP isn't SVI II AP-xxxx3xx2x or using ValVue or Handheld, read the Options of SVI II AP.	Contact GE for a digital upgrade of the switch/ transmitter functionality.
	Switch wired to power a power source with Incorrect polarity	High	With voltmeter validate the polarity of the wires. The positive is wired to the negative terminal of the Switch.	Wire the positive terminal of the switch to the positive of the power source and the negative terminal of the switch to the negative of the power source.
	Switch configured to stay closed	Medium	Using ValVue or Handheld, the Switch configuration is set to *Always Normal*.	Using ValVue or a handheld, set the switch trigger to the desired functionality.
Switches don't change state.	Switch not configured for any trigger	High	Using ValVue or Handheld, the Switch configuration is set to *Always Normal*.	Using ValVue or a handheld, set the switch trigger to the desired functionality.
	Defective switch	Low	Using an Ohm meter, the switch being always open or closed with ValVue or the Handheld indicates that the switch changes state with the set the trigger.	Replace the circuit board. See part number in the instruction manual.
No 4-20mA output from position transmitter	Transmitter feature not available/activated	High	The part number on the SVI IIAP isn't SVI II AP-xxxx3xx2x or using ValVue or Handheld, read the Options of SVI II AP.	Contact GE for a digital upgrade of the switch/ transmitter functionality.
	Switch wired to a passive input without any dc power	Medium	Disconnect the wires going to the Transmitter terminal on the SVI II AP and using a voltmeter verify that the voltage is greater than 10 VDC.	Connect the transmitter wiring to a power source with a minimum of 10 VDC.

Table 2 Troubleshooting Guide for the SVI II AP (Continued)

Symptom	Possible Root Cause	Probability	Validation Procedure	Corrective Action
Bias Out of Range alarm active	Setpoint at 0% or 100% while the position if off by more than 5%	Medium	Shutting the air supply, the position if off from 0% by +/- 5% Running Full Open and Full Close command with ValVue, the valve position stays off by +/-5% from 0% and 100%.	Re-run find stops.
	Problem with I/P or relay	Low	See I/P and Relay procedure.	See I/P and Relay procedure.
Actuator error alarm active	Handwheel or other travel restriction in place.	Medium	The handwheel on the actuator is not in neutral or is partially engaged Execute the Full Open and Full Close command with ValVue or another HART® interface, the valve doesn't travel to its full open and closed mechanical position.	Remove the travel obstruction if possible. Put the handwheel in neutral. If a low or high travel stop is present, leave as is.
	Extreme valve sticking	Low	Using ValVue Trend or OVD software, the valve has friction greater than 50% of the spring range or observing the valve, the movement jumps significantly with a smooth input signal.	Repair the valve when possible.
	Insufficient air supply	High	Using ValVue or another HART® interface, verify that the air supply is not set to 5 psi greater than the spring final. For double-acting actuator, the air supply is less than the required supply to generate the force to move the valve.	Increase the air supply per the actuator requirements.
Position doesn't follow setpoint in linear way	Characterization in position set to Eq%, Camflex%, QO or Custom	High	Using ValVue or another HART® Interface, the Characterization parameter is not set to Linear.	Set the Characterization to Linear.

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15. Security View

Security View Screen

Use this tab to change the access levels for the various roles in the DTM. The roles are industry standard, but you can change the role's privileges. To access this tab, you must have a *Administrator* level privileges. Additionally, you can load security settings that were previously created for another SVI II AP ("Load Security Settings from File" on page 156) and saved into a security file (.sec format) and save the present settings to the default file for later use ("Save Security Settings to File" on page 156). The default file settings are represented in Figure 102.

To access this screen (available to administrator only):

1. Click a device.
2. Select **Additional Functions > Security View**.

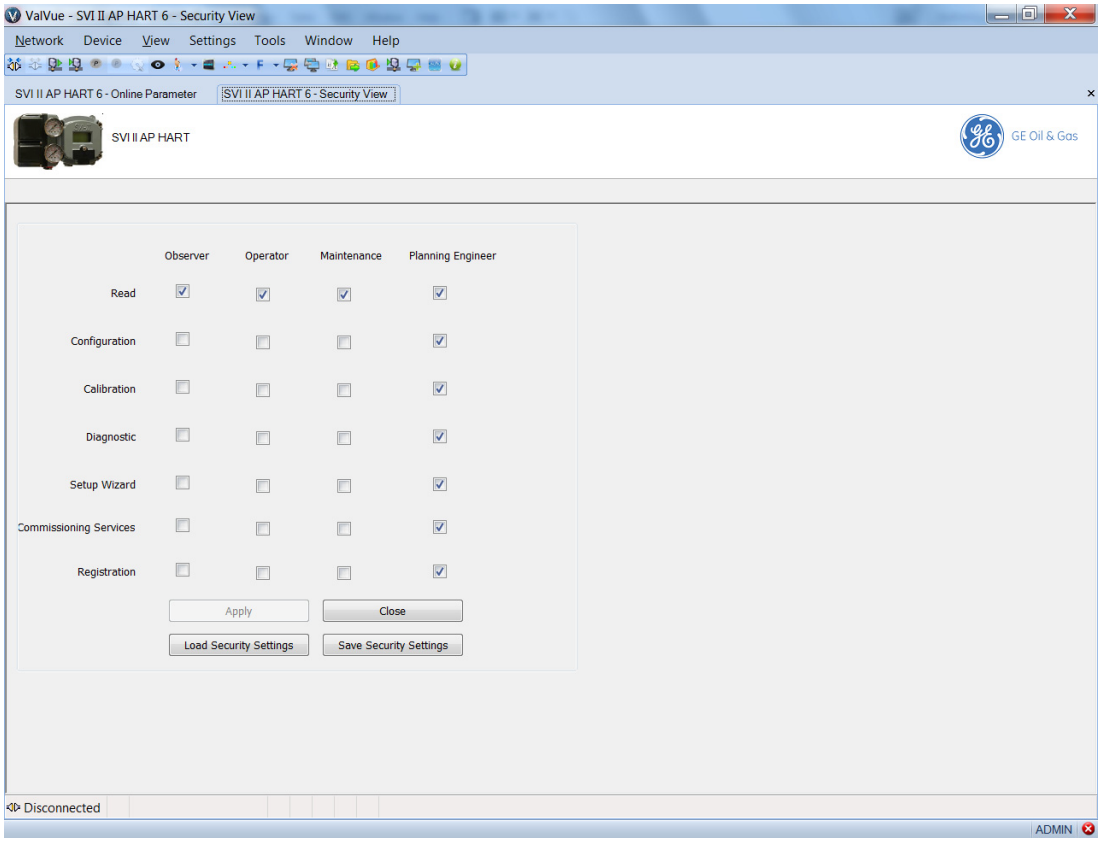

Figure 102 Security View

Change Privileges

To change privileges:

1. Change the user role's checkboxes as required.
2. Click Apply and then click Close.

Load Security Settings from File

1. Click Load Security Settings and the settings from the default file populate into the tab.
2. Change the user role's checkboxes as required.
3. Click Apply and then click Close.

   You must click Apply to save the settings to the positioner even if the only changes are the ones from loading the default settings.

Save Security Settings to File

1. Click Save Security Settings and a confirmation dialog appears (Figure 103).

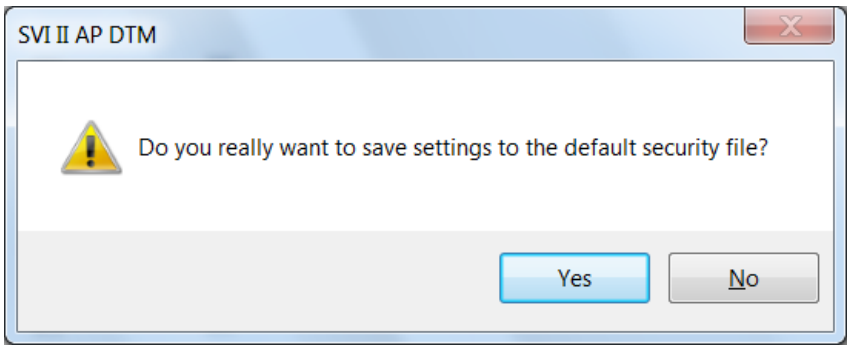

Figure 103 Save Security Settings to Default File Confirmation

2. Click Yes and the settings are saved.

Table 3 lists the permissions by SVI II AP task.

Table 3 Security View Permissions

	Read	Configuration	Calibration	Diagnostic	Setup Wizard	Commission Services	Registration
SVI II AP HART®	X	X					
Setup Wizard					X		
Configuration		X					
General		X					
Position		X					
Actuator		X					
I/O Configuration		X					
Options		X					
HART®		X					
Calibration			X				
Range			X				
Auto Tune			X				
Manual Tune			X				
Commission Services						X	
Configuration (below Commission Services)						X	
Manual Position Setpoint						X	
Position Retransmit						X	
Set Analog Output						X	
Re-transmitter Range						X	
Switches						X	
Diagnostics				X			

Table 3 Security View Permissions

	Read	Configuration	Calibration	Diagnostic	Setup Wizard	Commission Services	Registration
Continuous Data	X			X			
Signature				X			
Analysis				X			
Check	X			X			
Status	X			X			
Health	X			X			
Device Info	X						
Offline Page	X	X					
Observer	X						
Communication		X					
Registration							X
Audit Trail	X						
Report	X						
Download		X					

16. Switching HART® Versions

Use this feature to select the positioner HART® version. The firmware presently installed on the SVI II AP dictates the change that can be made. This is reflected by the choice that appears in the right-click menu. Firmware versions are changeable as follows:

- 3.2.3 to 4.1.1 you can change to HART® 6
- 3.2.5 to 5.1.1 you can change to HART® 7

To access this function (available to administrator only):

1. Select the positioner and right-click and select **Connect.** Parameters should upload.
2. Select **Additional Functions > Switch**. The actual menu item changes depending on the HART® version to which you can switch.

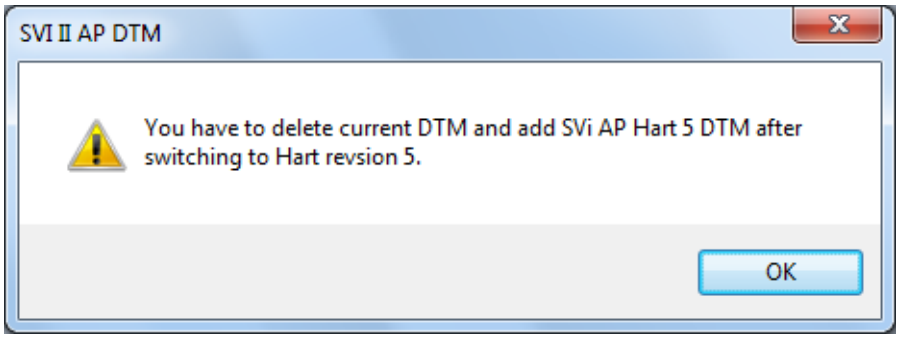

Figure 104 HART® Switch

3. Click **OK** and Figure 105 appears.

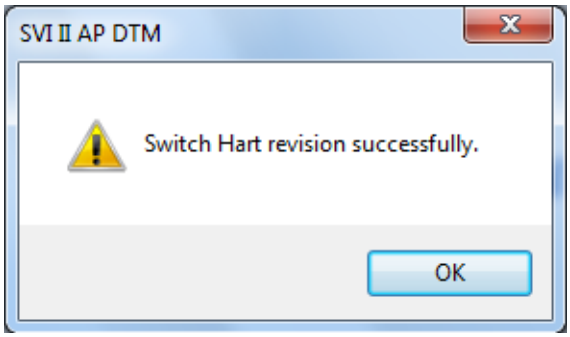

Figure 105 Success

4. Click **OK**.

5. 5. Either:

   - Ensure the modem is connected, select the HART modem under which you want the positioner, right-click and select **Rebuild Network**.

   or

   - Select **Disconnect** and delete the existing positioner from the topology tree. Right-click the communications DTM in the field network and select **Find New Devices** to find the transitioned device and load it with the correct HART® version.

   If the change fails, a dialog appears (Figure 106).

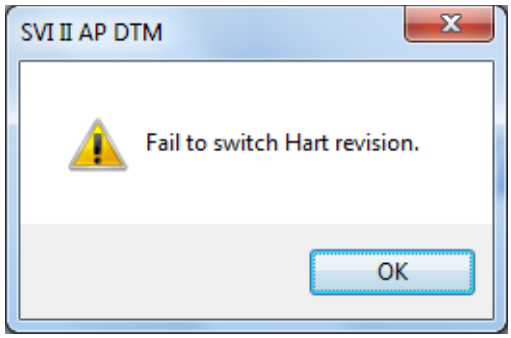

Figure 106 Fail To Change

17. AMS® Communication DTM

AMS Communication DTM

Use the AMS communication DTM to connect the AMS server, which reads and writes parameters from the AMS server via OPC. Currently the AMS communication DTM only supports the FF protocol and the SVIFF DTM.

NOTE

When using ValVue 3 in a large network use the Scan Next Level command to load information as in Figure 107.

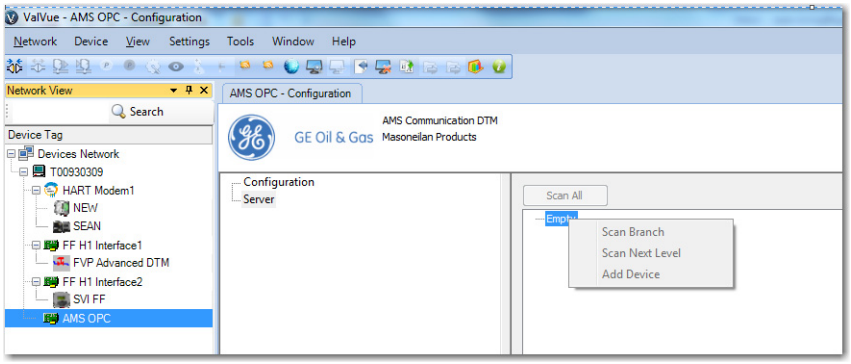

Figure 107 AMS OPC Scan Next Level

To use the AMS Communication DTM:

1. Update the ValVue3 device library to add the AMS Communication DTM into ValVue3.
2. Add the Windows® user name and password of the ValVue3 computer into the AMS Server. Add into *Administrator* group and the *AMSDeviceManager*.

3. Select the ValVue3 device network level, right-click and select **Add a Field Network** and *Add a Field Network with AMS Communication DTM* appears.

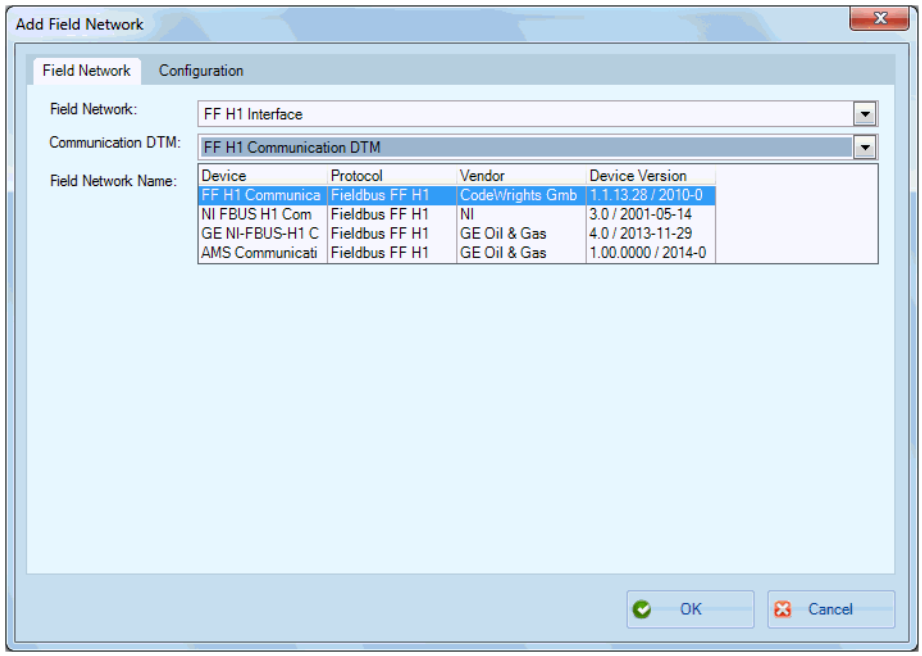

Figure 108 Add a Field Network with AMS Communication DTM

4. Select **FF H1 Interface** in the *Field Network* pulldown and **AMS Communication DTM** in the *Communication Network DTM* pulldown.

5. Click **OK** and the *AMS Communications Page* appears.

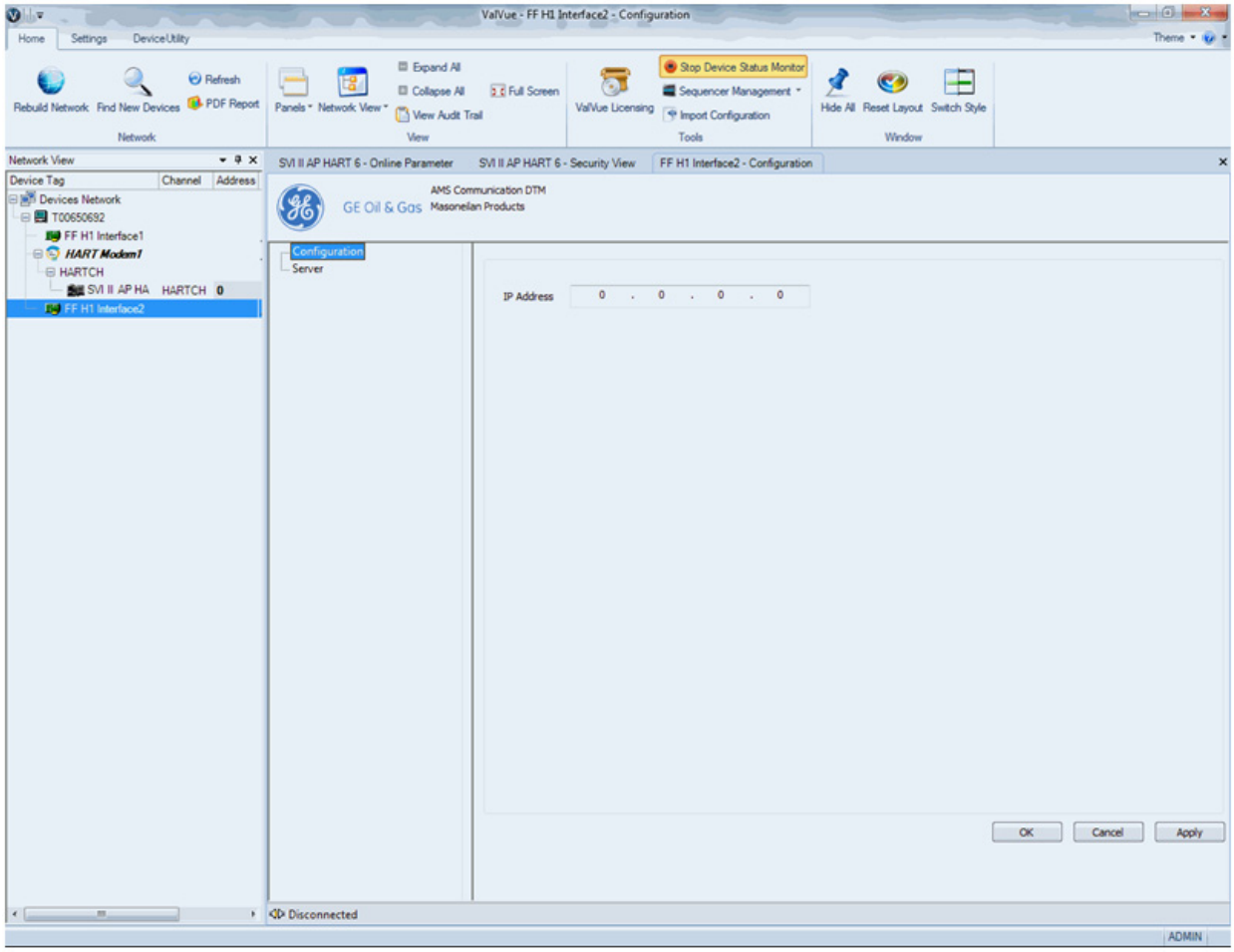

Figure 109 AMS Communications Page

6. Set the *IP Address* of the AMS Server and click **OK**.

7. Click **Server** in the pane to the left and the *AMS Server Hierarchy Page* appears.

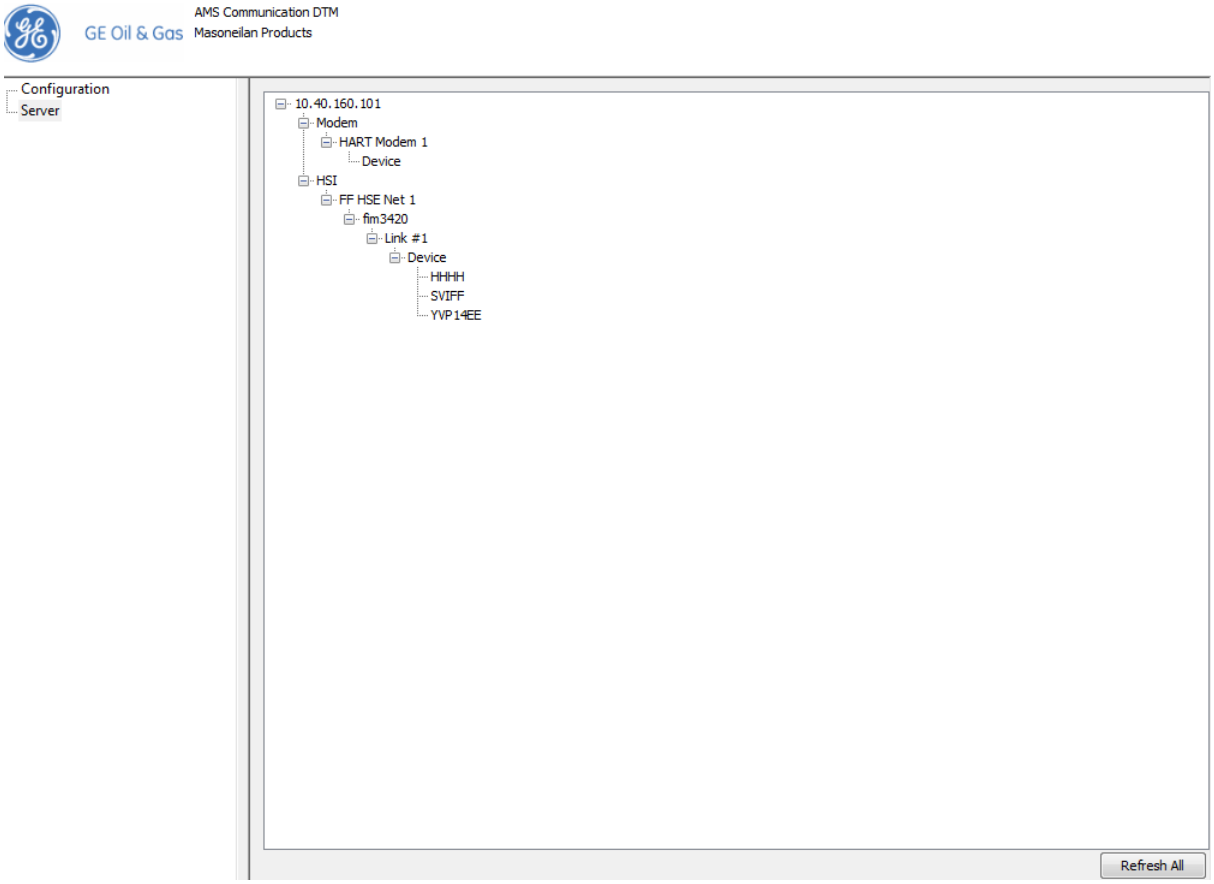

Figure 110 AMS Server Hierarchy Page

8. Click **Refresh All**.
9. Add the SVI FF DTM into ValVue3.
   You can now use the SVI FF DTM just like the *GE NI-FBUS-H1 Comm. DTM*. The difference is that AMS OPC don't support the read/write parameters of the MIB block, so none of the *Network Settings* related parameters in SVI FF DTM work.

18. Configuring Frame Application to Work With the SVI II AP DTM

Applicable To:

- SVI II AP, Registration Module, PRM 3.10, FieldMate 2.03, or other DTMs

Topic: Software

Problem: When trying to access the licensing functionality an error message appears. This occurs as the SVI II AP Advanced DTM has .net compatibility issues with some of frame applications.

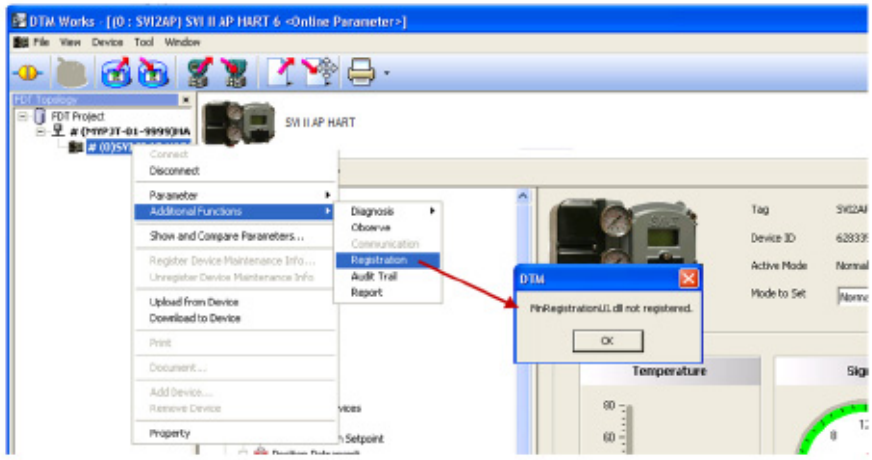

Figure 111 Registration dll Error

Solution:

Each product commonly used in conjunction with the SVI II AP DTM and each version has a unique solution, which are given in the following sections.

- "PRM 3.10" on page 166
- "FieldMate 2.03" on page 166

PRM 3.10

1. Open the *PRM3.10* installation folder; default path is *C:\PRM\Program*.
2. Open the *FMFdtContainer.exe.{036D1490-387B-11D4-86E1-00E0987270B9}.config* using Notepad. Change:

   <startup>

   <supportedRuntime version="v1.1.4322"/>

   to

   <startup useLegacyV2RuntimeActivationPolicy="true">

   <supportedRuntime version="v4.0" />

   and save the file.
3. Launch DTM works in *PRM3.10* again and the registration dialog successfully opens.

FieldMate 2.03

This procedure uses *FieldMate Basic R2.03.00 Lite Edition* as example.

1. Open the *FieldMate 2.03* installation folder; default path is *C:\FM\Program*.
2. Open the *FMFdtContainer.exe.{036D1490-387B-11D4-86E1-00E0987270B9}.config* using Notepad. Change:

   <startup>

   <supportedRuntime version="v1.1.4322"/>

   to

   <startup useLegacyV2RuntimeActivationPolicy="true">

   <supportedRuntime version="v4.0" />

   and save the file.
3. Launch DTM works in *FieldMate* and the registration dialog successfully opens.

For questions concerning this article, e- mail at svisupport@ge.com.

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